

Teanaway Solar Reserve

Conditional Use Permit Application Supplement and Expanded SEPA Checklist Supplement

SUBMITTED TO
**Kittitas County,
Washington**

SUBMITTED BY
Teanaway Solar Reserve, LLC



FEBRUARY 2010

PREPARED BY



EXECUTIVE SUMMARY

Per the request of the Kittitas County Community Development Services (CDS), Teanaway Solar Reserve, LLC (TSR) submits this supplemental information to its August 2009 Expanded State Environmental Policy Act, together with a revised Conditional Use Permit application and Draft Development Agreement, for TSR's proposed solar facility.

I. BACKGROUND AND INTRODUCTION

On August 19, 2009 TSR submitted to CDS an application for a conditional use permit and draft development agreement to construct a solar farm capable of generating up to 75 direct current megawatts of photovoltaic solar energy (Project). At the time of the August submittal, it was projected that the solar facility would utilize approximately 580 acres of a 982 acre site zoned Forest and Range. The Project area is located approximately 4 miles northeast of Cle Elum, and includes Section 22, 23, and 27 of Township 20N, Range 16E (see CUP Application, Attachment A, Figures 1 through 3 for site location).

TSR's August 2009 submittal materials also included a 44-page, expanded SEPA Environmental Checklist. The expanded SEPA checklist addressed all of the environmental elements and presented detailed information addressing items such as construction impacts, traffic associated with construction and operations, and the location of any critical areas that could be affected by the with the project site. In addition to the contents of the expanded SEPA checklist, TSR also submitted several additional studies and technical reports, including:

- Sensitive Species Report;
- Wetland Delineation Report;
- Cultural Resources Report; and
- Zone of Visual Influence Memorandum

On August 22, 2009, CDS determined that the land use application was complete, and issued a Notice of Application (NOA) on September 3, 2009. The Notice was sent to County officials, state agencies, the Yakama Nation, neighboring landowners and interested parties. The NOA also informed the public that TSR's were posted and available for review on the Kittitas County website. The NOA further informed the public that written comments must be submitted to CDS by 5:00 pm on September 18, 2009, as per the Kittitas County Code. During the comment period, the County received comments from County departments, non-county agencies, and the public.¹

After the close of the comment period the applicant submitted a summary of the comments received during the comment period along with the Applicant's proposed approaches for responding to those comments. On December 4, 2009, the County provided TSR with its

¹ It should also be noted that TSR has conducted an exhaustive public notification campaign on its own accord. TSR has held three public meetings on July 9, 2009, October 22, 2009 and December 4, 2009. TSR also launched a website that included up-to-date information on the project. Additionally, TSR has met individually with concerned landowners.

comments on the expanded SEPA checklist, conditional use permit application and Draft Development Agreement. CDS directed TSR to submit any additional studies and revised application materials by February 2, 2010. CDS subsequently extended the deadline to February 22, 2010.

In the following materials, TSR provides a revised Conditional Use Permit application (Revised CUP), and Draft Development Agreement (Revised DA). TSR also provides a revised Expanded SEPA Checklist (Revised Expanded SEPA Checklist), which includes a number of supplemental studies and technical reports, including:

- A Geology and Soils Hazards Evaluation ;
- A Fugitive Dust Control Plan;
- A Hydrologic Analysis;
- A Vegetation Management Plan;
- A Wildlife Mitigation Plan; and
- A Transportation and Road Plan.

These materials were prepared to fully address the comments of the County, state agencies, and general public on TSR's August 2009 materials. These materials also include numerous conditions designed to mitigate impacts to a level of non-significance. Accordingly, TSR agrees that these measures should be incorporated into the County's SEPA determination, as well as the permits and approvals necessary to construct and operate the Project as enforceable conditions of development.

Based upon TSR's materials provided by the Applicant, the responsiveness of these materials to the comments received relating to the Project, the applicable provisions of the Kittitas County Code and the criteria necessary for approval of the CUP, TSR respectfully requests that the County issue a mitigated determination of non-significance (MDNS) for the proposed Project. TSR also requests that County Staff issue a recommendation to the Board of Adjustment that the Conditional Use Application be approved subject to the conditions identified in the SEPA documents.

II. STATE ENVIRONMENTAL POLICY ACT

In response to comments received on TSR's August 2009 materials, including those by the County in its December 4, 2009, letter, TSR has updated its checklist and conducted a number of additional studies to further evaluate and mitigate the Project's probable impacts. These studies are documented in the Revised SEPA Checklist and in the following technical reports:

- A Geology and Soils Hazards Evaluation (Supplement to SEPA Checklist, Attachment D);
- A Fugitive Dust Control Plan (Supplement to SEPA Checklist, Attachment E);
- A Hydrologic Analysis (Supplement to SEPA Checklist, Attachment F);

- A Vegetation Management Plan (Supplement to SEPA Checklist, Attachment G);
- A Wildlife Mitigation Plan (Supplement to SEPA Checklist, Attachment H); and
- A Transportation and Road Plan (Supplement to SEPA Checklist, Attachment I);

Additionally, TSR has significantly revised its Visual Impact Analysis (Supplement to SEPA Checklist, Attachment L) and will enter into an agreement with Fire District No. 7 to provide for fire protection and other services to the project site (Supplement to SEPA Checklist, Attachment M). TSR will also enter into an agreement with WDFW to provide mitigation for potential impacts to elk habitat and other issues previously raised by the agency (Supplement to SEPA Checklist, Attachment H). At the County's request, TSR has also enclosed a redlined version of the Revised SEPA Checklist that incorporates the information from the additional reports.

These supplemental reports address the comments on TSR's initial expanded SEPA checklist. We are confident that the Project, these supporting materials, and TSR's proposed mitigation measures justify the issuance of a Mitigated Determination of Nonsignificance. TSR understands the supplemental materials are extensive, and does not object to an additional public review and comment period to ensure earlier comments have been addressed.

A. The County Should Issue a Mitigated Determination of Nonsignificance for the Proposed Solar Facility.

TSR acknowledges that many of the comments submitted have requested that the County issue a Determination of Significance. The primary reason an EIS has been requested is based entirely on the size of the project. A DS cannot be issued simply because a project occupies a large site. Rather, the County must assess the Project's probable impacts. The County may only issue a DS if it determines that the Project's probable impacts would "significantly affect the quality of the environment." RCW 43.21C.030(2)(c).

In making the threshold determination, the responsible official must view the project through the lens of the existing regulatory framework this project will have to comply with. RCW 43.21C.240. This includes, but is not limited to, state and federal water quality laws, the County's critical areas ordinance, zoning code, and building regulations. Compliance with these laws and regulations act as built-in mitigation for the proposal. The County should only issue a DS if it concludes that compliance with these laws and regulations, and any additional proposed mitigation measures, do not sufficiently mitigate against significant adverse impacts.

In this case, TSR inspected all potential impacts to a level of detail that exceeds typical checklists. The studies and analyses confirm the propriety of the County's initial decision to process this SEPA checklist through the optional DNS process. Ultimately, SEPA is an environmental full-disclosure statute. An EIS is a tool used to help ensure that impacts have been adequately considered and mitigation. There is no additional information that would be

obtained from an EIS that has not already been presented by the reports and analyses submitted by TSR.

Accordingly, while large in size, the Project will not create significant adverse impacts on the environment, and there is no foundation or incremental benefit of requiring an EIS.

TSR provides this summary of the environmental elements and the mitigation measures agreed to in order to lower any impacts below the level of significance.

a. Earth

TSR commissioned a Geology and Soils Hazard Report (Geo-Hazard Report) to further evaluate the potential for erosion or landslides as well as other geological hazards at the project site. (Attachment D). The Geo-Hazard Report concludes that very few geological hazards are located on the site. On-site reconnaissance confirmed that the slopes in the project area do not exceed 33.3 percent.

The Geo-Hazard Report determined that the Project site's primary limitation is soil type for the proposed access roads. Yet, even this limitation will not pose any significant site development problems. The project area is already defined by primitive logging roads that cross the project area. Visual observations of these roads revealed a surprisingly small amount of erosion, which further re-affirmed the stability of the surrounding slopes and the small potential for any significant erosion. Moreover, any soils related issues with respect to road construction are easily compensated for through the design process.

In sum, the Geo-Hazard Report concludes that the proposed solar facility can be designed, constructed and operated to minimize or avoid any adverse geologic and soil impacts to the environment. Any potential impacts are effectively mitigated through compliance with existing laws and regulations including, but not limited to Title 17A.06 of the Kittitas County Code and RCW 90.48. For instance, prior to commencing construction TSR will have to apply for and obtain an NPDES Permit from the Department of Ecology (WDOE). As part of the NPDES Permit TSR will have to prepare and implement a Stormwater Pollution Prevention Plan which includes an Erosion Control Plan designed to minimize erosion during construction.²

Regardless, the Geo-Hazard Report does provide some suggestive mitigation measures in addition to those already provided by existing laws and regulations to further reduce the risk, if any, for potential geological and soil related impacts. Those measures are set forth on page 7 of the Geo-Hazard Report and include:

² In its letter dated December 4, 2009, the County noted that TSR must submit the BMPs it plans to incorporate as part of its NPDES obligations before the County would issue its SEPA determination. The BMP selection process is based detailed construction designs and is subject to WDOE requirements through the NPDES permitting process. Those designs have not been prepared and thus, TSR cannot submit the BMPs it thinks it might be required to install to obtain and comply with WDOE's NPDES Permit. Suffice it to say, the NPDES Permit is designed to ensure that no significant impacts to water quality will result. For the County's purposes, having to obtain and comply with an NPDES permit is sufficient. RCW 43.21C.240.

- Construction zones and areas to be disturbed will be well-defined, limited in extent, and managed by onsite inspectors and construction managers.
- Periodic inspection will be made of erosion control measures, and as required after precipitation events. Erosion control measures will be repaired or replaced as necessary.
- Berms and other water-channeling measures will be used to direct stormwater runoff to appropriate detention ponds, where necessary.
- Barriers and other measures including hay bales, silt fences, and straw mulches will be used to minimize and control soil erosion.
- Cut slope design for roads will not exceed the soil strength limits. Potentially unstable areas will be identified in the design process and avoided during construction. Site grading will be implemented to achieve stable, non-erosive slopes.
- The seismic site class according to the International Building Code will be determined during subsequent geotechnical investigations. Structures and tower foundations will be designed to withstand anticipated seismic loads.
- For the final design phase, a detailed geotechnical investigation and testing program will be conducted to evaluate the engineering properties of the soil.
- In the event of a volcanic eruption that could damage or impact project facilities, the project facilities would be shut down until safe operating conditions return. If an eruption occurred during construction, a temporary shutdown would likely be required to protect equipment and human health.

The proposal's soil and geologic impacts will not have a significant affect on the environment.

b. Air

As noted in the initial Expanded SEPA checklist, the proposed solar facility will produce up to 75 megawatts of emission free energy. As a result, the proposed facility will not result in a significant impact to the local and regional air resources. To the contrary, by supplying a clean source of energy supply the project will benefit local and regional air quality.

Nevertheless, WDOE commented that additional mitigation measures could be implemented to further reduce potential construction related impacts to air. The agency recommended that TSR implement a dust control management plan to control any dust that may be created during the construction process and sign a beneficial use statement to minimize the burning of brush and timber.

In its initial SEPA checklist TSR proposed to create and implement a Fugitive Dust Control Plan. While the additional materials were being prepared TSR created a Dust Control Plan and will implement the measures in the plan (Supplement to SEPA Checklist, Attachment E). Those measures include, but are not limited to, applying dust suppressants on an as needed basis, reducing vehicle speeds, limiting vehicle access, limiting the amount of disturbed areas and revegetating disturbed areas as soon as possible in accordance with the Vegetation Management Plan (Supplement to SEPA Checklist, Attachment G).

WDOE also suggested that TSR provide a beneficial reuse statement. It is TSR's intent not to burn woody debris, slash, or logging refuse. Any woody debris chipped on site will be put to a beneficial use (e.g. chipped material will be sent to a compost facility, used for paper or ground cover). If burning is necessary, TSR will secure the necessary permits from the Department of Ecology and agrees to a condition that no more than approximately 130 consumable tons of material will be burned.

WDOE also requested more information with respect to how the buildings will be powered. Specifically, WDOE asked whether nonroad engines will be used to power buildings at the site. TSR has clarified in the public utilities section of the expanded SEPA checklist that it intends to power the operations building by the existing electrical grid.

c. Water

A number of public comments expressed concern over potential impacts to water, specifically stormwater related impacts. Many of these concerns were based upon a misunderstanding of the amount of impervious surfaces that will be created from the proposal. The County also specifically requested information regarding impervious surfaces. Accordingly, TSR prepared a Hydrologic Analysis (Supplement to SEPA Checklist, Attachment F) to further address those concerns.

It is estimated that the Project will result in 1.17 acres of impervious surfaces. That is less than 1% of the 982 acres. The solar panels themselves will be supported by poles driven into the ground and will not require concrete footings. This allows natural vegetation to grow under and around the panels to facilitate natural drainage.

(i) Surface

The Hydrologic Analysis concluded that there would be a small increase in stormwater runoff from the site, without the implementation of any BMPs. The analysis divides the area into two primary drainage basins: "South Drainage Basin" and the "North Drainage Basin". The South Drainage Basin drains the project site in a southerly direction that ultimately leads to a ditch along Red Bridge Road. The North Drainage Basin drains the project area north to the Teanaway River.

The Hydrologic Analysis concludes that the proposal is expected to have a minimal increase to stormwater flows off the site. For the North Drainage Basin the proposal will increase stormwater runoff by 0.2, 0.2, and 0.3 cubic feet per second for the 2, 10, and 100-year, 6-hour storm, respectively. This increase will result in no appreciable difference from existing conditions. Similarly, stormwater from the South Drainage Basin will increase by 1.6, 2.9 and

9.90 cubic feet per second for the 2, 10, and 100-year, 6-hour storm, respectively. The impacts of a 10-year, 24-hour storm were also analyzed for both basins. The increases in peak discharge from the North and South Drainage Basins were 3.0 and 33.60 cubic feet per second, respectively. Although these increases in flow are higher than those reported for the 6-hour storm events, they are negligible when compared to the flow contribution of the watershed upstream of the project site. These minimal increases in stormwater runoff can be controlled through flow control BMPs implemented pursuant a NPDES permit.

(ii) Groundwater

No on-site groundwater withdrawals are anticipated for the Project.

(iii) Water Runoff (Stormwater)

The Hydrologic Analysis concluded that there would be a small increase to stormwater runoff from the site, without the implementation of any BMPs. The analysis divides the area into two primary drainage basins: "South Drainage Basin" and the "Teaway River Drainage Basin". The South Drainage Basin drains the project site in a southerly direction that ultimately leads to a ditch along Red Bridge Road. The Teaway River Drainage Basin drains the project area north to the Teaway River.

The Hydrologic Analysis concludes that the proposal is expected to have a minimal increase to stormwater flows off the site. For the Teaway River Drainage Basin the proposal will increase stormwater runoff by 0.1, 0.2, and 0.3 cubic feet per second for the 2, 10, and 100-year six hour storm respectively. This increase will result in no appreciable difference from existing conditions. Similarly, stormwater from the South Drainage Basin will increase by 1.6, 2.9 and 33.5 cubic feet per second for the 2, 10, and 100-year six hour storm respectively. These minimal increases in stormwater runoff can be controlled through flow control BMPs implemented pursuant a NPDES permit.

Several comments expressed particular concern over flooding in the winter months as a result of a flooding event that occurred in January of 2009. TSR specifically researched this event and found evidence that the flooding was most likely the result of human causes unassociated with TSR or the Project site, and unrelated to any hydrologic issues on the proposed project site. Nevertheless, the Hydrologic Analysis concludes that the proposal will not create a significant increase in the amount of stormwater and off-site discharges during such events because the surface during rain on snow events has limited infiltration capacity to begin with.

d. Plants

In response to comments addressing the removal of vegetation, the Applicant prepared a Vegetation Management Plan for the project area. TSR agrees to abide by the BMPs recommended in the Vegetation Management Plan (Supplement to SEPA Checklist, Attachment G). Those BMPs insure that disturbed areas are promptly revegetated with native seed mixtures and that noxious weeds are kept under control.

e. Animals

WDFW submitted comments expressing concern over impact to elk wintering habitat. Given the large range of the Clockum Elk Herd (app. 1600 sq. miles), the small portion of the range that the Project site comprises, and the small percentage of the Clockum herd that actually utilize this area for their wintering range, any potential impacts appear less than significant. To further ensure there are no significant impacts to elk, and to further ensure WDFW's prior comments have been addressed, TSR will enter into an agreement with WDFW to mitigate for the loss of wintering habitat and other issues raised by WDFW. That agreement will be consistent with the agency's Wind Power Guidelines, and requires, among other conditions, that TSR provide mitigation for the loss of habitat permanently impacted by the Project at a 2:1 ratio.

f. Energy and Natural Resources

A number of comments focused on the lack of any enforcement that the site will be properly decommissioned when the proposed solar facility is no longer viable. The County also requested that TSR provide additional information regarding the impacts from decommissioning. TSR has addressed the process of decommissioning in the Revised DA (Attachment E to the CUP Application). The Revised DA establishes an enforceable process for decommissioning and site restoration that will ensure all environmental issues are adequately addressed and also requires that TSR post a bond prior to construction to cover the decommissioning process. TSR has addressed the potential impacts from decommissioning and restoration activities in the Revised Expanded SEPA Checklist and its attached reports.

g. Environmental Health

The County requested additional information addressing noise from the Project. The proposed solar facility is not expected to generate noise in excess of what is permitted under the County Code.

Other comments suggested that solar panels would result in toxic stormwater. TSR specifically inquired into this issue with the manufacturer of the solar panels. The manufacturer confirmed that the solar panels proposed for the site are silicone-based and non-toxic.

h. Land and Shoreline Use

The County identified a discrepancy between two pages in the original SEPA checklist with respect to frequently flood areas. The statement suggesting that frequently flooded areas apply to the project was in error and has been corrected. No critical areas are impacted by this project. Wetlands and their buffers will remain undisturbed and there on-site observations revealed no slopes in excess of 33.3 percent in the Project Site.

The Revised Expanded SEPA Checklist includes proposed modifications to development standards. For instance, the height limitation is proposed to increase from 35 feet to 150 feet in order to accommodate the transmission structures. TSR considered burying the line, but burying a line of this voltage is not technically feasible and has its own set of environmental impacts.

The western half of the northern boundary abuts property zoned Commercial Forest. (Attachment J, Figure 6). The County specifically requested that TSR describe proposed modifications to the 200-foot setback from the Commercial Forest Zone. It is not clear whether the 200-foot setback applies to the Project. The KCC states that:

Properties bordering or adjacent to the Commercial Forest zone are subject to a 200' setback from the Commercial Forest Zone. (KCC 17.57.050(1)).

KCC 17.56.065. This provision incorporates the exceptions outlined in KCC 17.57.050(1) which include the construction of "private, public and semi-public gas, electric, water or telecommunication and utility facilities including but not limited to fire stations, utility substations, pump stations, wells, hydroelectric generating facilities and transmission lines and facilities." The proposed solar facility is an electric generating facility and thus, would fall within the exception to the 200 foot setback provision outlined in KCC 17.56.065.

Nevertheless, TSR is providing a 100 foot firebreak that also serves as a setback along the boundary with the adjoining commercial forest property. The 100-foot setback mitigates against any potential conflicts that could arise between the proposed solar facility and the adjacent commercial forest property to the north. Assuming the 200 foot setback does apply, TSR has addressed this requirement through the Development Agreement.

i. Housing

The County requested more information on the availability of housing to meet the demands for construction workforce. The City of Ellensburg is home to a major education institution, Central Washington University. As a University Town it has a number of major hotel chains including, but not limited to, the Comfort Inn, the Quality Inn, Hampton Inn and Holiday Inn. These four hotels alone have a total of approximately 390 rooms each; more than adequate for Project.

j. Aesthetics

TSR submitted a Potential Visual Impact Simulation with the original SEPA Checklist. The Visual Impact Simulation concluded that visual impacts to the surrounding area will be minimal and not detrimental to the character of the surrounding area.

At the County's request, an additional view analysis was prepared for to further assess the Project's visual impacts. (Supplement to SEPA Checklist, Attachment L). The View Assessment added six new viewpoints to the original four to further assess the Project's visibility from surrounding areas. The View Assessment used a modeling system called a Zone of Visual Influence (ZVI) analysis to determine where the project may be visible from. The ZVI method overstates the actual visibility because it does not take into account the presence of trees, vegetation or other structures that would block the view from surrounding areas. The Geographic Information System (GIS) model used to develop the ZVI does not take into account objects such as trees, buildings, and small topographic features that may block or screen views of the project. Factors that influence visibility such as haze, lighting conditions, weather, and

viewing distance are also not considered. In conclusion, the project would likely be difficult to see from beyond approximately 3.5 to 4 miles.

As part of the Visual Impact Simulation, representative locations were also chosen to simulate what the project will look like. Those simulations demonstrate that the solar reserve will be largely unrecognizable from many of the areas identified in the ZFI analysis. Even where the project is visible, the impacts are not significant. While the solar reserve alters the appearance of the project site, primary views of iconic geologic features such as Mount Stewart are not impeded.

Nevertheless, TSR has proposed a number of voluntary measures to reduce any potential impacts to aesthetics including:

- Maintaining trees in the 100' fire break setback around the site perimeter (trees will be limbed up to 12 feet);
- Maintaining the existing trees in the undisturbed portions of the project area; and
- Using non-reflective materials on the metal structures to reduce glare.

k. Light and Glare

Per the County's request the Light and Glare section of the Revised Expanded SEPA Checklist has been supplemented to confirm that staging areas may have lighting. As the checklist notes, however, construction is limited from 7 am to 7 pm. As a result, impact from these temporary light fixtures will be minimal. Nevertheless, the same mitigation measures proposed for the inverter enclosures are also proposed for the on-site staging area lights to further reduce impacts.

The solar panels themselves are designed to capture and absorb light and will not reflect like mirrors would. Metal surfaces will be treated to reduce reflection and glare.

l. Recreation

TSR has clarified that it intends to continue to allow historical uses of the property to the maximum extent practicable.

m. Historic and Cultural Preservation

TSR notes that it did prepare a thorough cultural resources inventory of the project site. One comment questioned the decision to keep the *Cultural Resources Report* out of the public view. State law prohibits distributing such reports to the public. RCW 42.56.300 ("Records, maps, or other information identifying the location of archaeological sites in order to avoid the looting or depredation of such sites are exempt from disclosure under this chapter.").

TSR notes that the NOA was submitted to all state agencies including the Department of Archaeology and Historic Preservation (WDAHP), as well as the Yakama Nation. Neither the WDAHP nor the Yakama Nation commented on the proposal.

Nevertheless, TSR has agreed to conduct shovel testing prior to significant site disturbance to further guard against any potential impact to cultural resources. If cultural artifacts are found during shovel testing or construction TSR will stop work in the area of the discovery and notify WDAHP.

n. Transportation

TSR prepared a thorough traffic analysis to assess potential traffic-related impacts to area roads. The report concludes that levels of service will not be significantly impacted by traffic generated from this project. Similarly, construction access will not cross the bridge spanning the Teanaway River on Red Bridge Road.

Nevertheless, TSR agrees to improve Wiehl Road to applicable County road standards. TSR also agrees to improve the private roads accessing the site to County standards for private roads and post signs directing parties to the site.

o. Public Services

Despite unsupported assertions to the contrary, the Project will not have a significant impact on public services. The proposal will not create a significant increase for demand on schools. Moreover, the October 2009 Economic Impact Analysis for the Project amply demonstrates the financial benefits the Project will provide schools. The application also does not propose to utilize storm or sanitary sewers. At the County's request, TSR agrees to condition its CUP on entering into, and maintaining in full effect, an agreement with Fire District #7 for fire and other emergency services.

p. Utilities

No significant impacts are expected from utilities. Mobile utilities will be provided during construction. During operation, electricity will be provided by the project. Telephone and data lines may be extended to the O & M building.

2. Site Location

The County also requested that TSR expand upon the factors for use of this site for the proposed Project. The current Project site was chosen after a thorough evaluation of other potential sites in the area and was chosen for a variety of reasons. The proposed site was selected for a number of equally compelling reasons including, but not limited to:

- The Teanaway area generally receives 300 days of sunlight annually;
- The specific site is on south facing slope which maximizes the amount of sunlight the panels receive in the summer in winter;
- The site is in close proximity to an existing major transmission line operated by the BPA;

- The site has few critical areas and is not directly adjacent to major water bodies or their tributaries;
- The site is zoned Forest and Range which permits the propose facility with a conditional use permit; and
- The site is more easily accessible from major arterial roads than more remote sites.

For purposes of SEPA, the site minimizes the impacts that may be associated with sites farther away from existing transmission lines and access roads.

B. Conclusion

In sum, TSR has carefully conducted exhaustive environmental impacts analyses of the Project, resulting in numerous technical reports to supplement the Revised Expanded SEPA Checklist. Even though those reports generally conclude that no significant impacts will result from the Project, TSR has proposed a number of mitigation measures to further ensure that no probable significant environmental impacts will result from the Project. TSR requests that the County issue a Mitigated Determination of Nonsignificance.

III. CONDITIONAL USE PERMIT

A. Changes to the CUP Narrative.

In its December 4, 2009 letter, the County requested that TSR update the CUP narrative as appropriate to reflect any modifications to the Project. In response, TSR has updated and expanded its narrative, including changes to address various Project modifications, including:

- Reduction of Project size. The size of the proposed Project site development area has been reduced from 580 acres (original proposal) to approximately 477 acres, leaving approximately 505 acres undeveloped within the Project area. Solar arrays will occupy approximately 399 of the 477 acres;
- Elimination of concrete footings for the solar arrays. The proposed mounting options for the solar facility have been modified to eliminate the use of concrete pads. This significantly reduces the amount of impervious surfaces created by the project;
- Restriction of access. Access to the site has been modified to prohibit use of the portion of Red Bridge Road north of the intersection with Wiehl Road. This eliminates the County's concern about impacts to the bridge across the Teanaway River.
- Decommissioning and Restoration. A more detailed description of TSR's decommissioning and site restoration obligations has been prepared; and

- Extensive additional environmental analyses. Through SEPA review a number of environmental evaluations have been conducted to address potential impacts. The resulting technical reports include comprehensive plans such as Fugitive Dust Control Plans and Vegetation Management Plans, each containing numerous mitigation conditions TSR propose as enforceable SEPA and CUP conditions.

B. Compliance with the Kittitas County Criteria for a Conditional Use Permit.

The Kittitas County Code requires that:

(1) The Board of Adjustment shall determine that the proposed use is essential or desirable to the public convenience and not detrimental or injurious to the public health, peace, or safety or to the character of the surrounding neighborhood.

(2) The Board of Adjustment shall determine that the proposed use at the proposed location will not be unreasonably detrimental to the economic welfare of the county and that it will not create excessive public cost for facilities and services by finding that (1) it will be adequately serviced by existing facilities such as highways, roads, police and fire protection, irrigation and drainage structures, refuse disposal, water and sewers, and schools; or (2) that the applicant shall provide such facilities or (3) demonstrate that the proposed use will be of sufficient economic benefit to offset additional public costs or economic detriment.

KCC 17.60A.010. As explained in full below, the project fully satisfies these criteria for conditional use permits. Based on its review of the Project through its SEPA review and the probable impacts of Project, as mitigated, and the applicable legal standards for CUPs, TSR asks the County for its recommendation that the Kittitas County Board of Adjustment (BOA) approve the CUP.

- 1. The Solar Reserve is Desirable to the Public Convenience and not Injurious to the Public Health, Safety or to the Character of the Surrounding Neighborhood.**
 - a. The Proposal is Desirable to the Public Convenience Because it Creates a Source of Renewable Energy for the Region and Provides Economic Benefits to the County.**

In 2001, the citizens of Kittitas County had the remarkable vision to recognize the importance of preparing their community to take advantage of alternative energy development. The County Council proclaimed that:

Kittitas County recognizes the value of facilitating the construction and operation of both alternative and conventional energy producing facilities in reducing the disruption of commerce and governmental services caused by potential energy shortages, all of

which adversely affect the economy, public health, safety and welfare.

Kittitas County Ordinance No. 2001-12. In recognition of the importance alternative energy could play in the future of Kittitas County, the Commissioners amended the County ordinance to, among other things, allow alternative energy facilities as conditional uses in a number of zones, including the Forest and Range zone.

As a result of this leadership and its desire for environmentally sound economic diversity, Kittitas County has positioned itself to be at the forefront of alternative energy development. The Project alone is estimated to produce a significant economic benefit to the county:

- \$97.5 million of locally purchased goods during the proposed three year construction window;
- \$525,510 of locally purchased goods during annual operation;
- The creation of approximately \$1.5 to \$1.8 million dollars in additional property tax revenue; and
- The creation of 789 near-term jobs and 49 long-term jobs.

Economic Impact Analysis for the Teanaway Solar Reserve, October 2009.

In addition to the economic benefits, the proposed Project will provide significant environmental and energy benefits to Kittitas County, the State of Washington, and the Northwest Region. The Northwest Power Council predicts that demand for electricity will grow by 25,000 average megawatts by 2030.³ Renewable energy projects such as the Teanaway Solar Reserve help satisfy this demand without consuming fossil fuels.

As a result, it is no wonder that the facility has support from all levels of government as reflected in the record. When completed, the County will be home to one of the largest solar projects in the world and confirm its position as one of the leading areas in alternative energy development. TSR is proud to be part of the 2001 vision for alternative energy in Kittitas County.

b. The Proposal is Not Injurious to the Character of the Surrounding Neighborhood

The County's December 4, 2009 letter specifically requested additional supporting information to support the conclusion that the proposal will not be injurious to the character of the surrounding neighborhood.

As with any development, the proposed Project will alter the existing character of the surrounding neighborhood to some degree. The proposal replaces what is currently

³ Northwest Power and Conservation Council's, 6th Northwest Power Plan, Chapter 3 (Pre-Publication Version, Feb. 2010).

undeveloped, albeit heavily logged, land with a solar facility. It is important to note, however, that the criteria for CUP approval do not prohibit conditional use proposals from changing the character of the neighborhood. Rather the criteria for a CUP is intended to ensure that the proposal is properly designed and conditioned to avoid injuring the character of the neighborhood.

The character of the existing neighborhood is rural in nature. The Project Site itself is zoned Forest and Range, actively managed for commercial timber until the collapse of the timber industry, and is bordered by properties zoned Commercial Forest and Rural 3. (*See Attachment A to the CUP Application*).

(i) Whether The Project Is Injurious to the Character of the Neighborhood Must be Measured Against the Allowed Uses in the Forest and Range Zone.

Whether a proposal is injurious to the character of a neighborhood is deceptively susceptible to subjective evaluation. Nonetheless, such an evaluative process for a CUP is inappropriate. Instead, the approving authority must determine whether the proposed conditional use "injures the character of the neighborhood" by examining whether the proposal is objectively compatible with the surrounding area.

To undertake an objective analysis, a proposal must not be reviewed in a vacuum solely against the existing surrounding area. Rather, a comparative analysis between the impacts of the proposed use and those impacts from uses that could be undertaken on the proposed site under the existing zoning regulations is also required. In other words, a proposed conditional use is incompatible with the surrounding neighborhood only if it has greater impacts than that which might be expected from uses authorized in the given zone.

In this case, the Forest and Range zone allows a number of uses that would have greater impacts than the proposed solar facility. For instance, mining and quarrying are authorized uses in the Forest and Range zone as is agriculture, forestry, and 20 acre residential units. A proponent of any one of these uses is entitled to use the Project Site for these purposes without obtaining a CUP. Accordingly, a CUP for the proposed solar facility may not be denied unless the Project has impacts greater than those which would otherwise be created by authorized uses.

Of all the uses permitted outright in the Forest and Range zone, mining and associated activities likely generate the greatest amount of impacts. Comparing the proposed solar reserve a mining operation on the same site over the same acreage plainly reveals that the Project would not change the character of the surrounding neighborhood anymore than a mining operation would in the same area. For instance, a mining operation would have a much greater impact on the character of the surrounding neighborhood than the proposed solar facility would. Everything else being equal, a mining operation would generate greater traffic impacts because large trucks would be required throughout the operational life of the mine. The Project will only require large trucks during the construction phase. Similarly, noise from a mining operation would be greater because mining operations demand the operation of heavy machinery and blasting on a continuous basis. A mining operation would also permanently change the natural topography the

area and thus, alter drainage patterns and vegetation. The proposed solar facility maintains much of the natural topography and once constructed will be largely innocuous to the human senses.

As a result, the proposed solar reserve is not detrimental or injurious to the surrounding neighborhood.

(ii) The Project is Also Consistent With the Goals, Objectives and Policies of the Comprehensive Plan

The proposed Project fulfills the Goals, Plans and Objectives in the Kittitas County Comprehensive Plan. For instance, the proposal is consistent with the following General Planning Goals, Objectives and Policies:

- GPO 2.1 The maintenance and enhancement of Kittitas County's natural resource industry based including but not limited to productive timber, agriculture, mineral and energy resources.
- GPO 2.2 Diversified economic development providing broader employment opportunities.

The Project is an environmentally sound alternative energy resource and the first of its kind in Kittitas County. Accordingly, the solar reserve helps maintain and enhance the natural resource industry and diversifies economic development in the County. Moreover, the proposal has been designed to avoid disturbing critical areas and their buffers and therefore, is consistent with the goals and policies for critical areas and shorelines.

The Forest and Range Zone is considered a rural land use zoning designation for purposes of the Comprehensive Plan. The proposal is also consistent with the General Goals, Policies and Objectives of Rural Lands element:

- GPO 8.1 Municipal or public urban services should not be extend outside of urban growth areas in Rural Lands.
- GPO 8.2B Electric and natural gas transmission and distribution facilities may be sited within and through areas of Kittitas County both inside and outside of municipal boundaries . . . including to and through rural areas of Kittitas County.
- GPO 8.11 Existing and traditional uses should be protected and supported while allowing as much as possible for diversity, progress, experimentation, development and choice in keeping with the retention of Rural Lands.
- GPO 8.16 Growth in Rural Lands should be managed in a manner that minimizes impact on adjacent natural resource lands.

The proposed Project not extend municipal or public urban services to the project site and maintains the rural lands while allowing for diversity and progress in how rural lands are used.

As a result, this project will not impact the rural character by inviting urban sprawl. Additionally, the proposed site is ideal for this type of facility because the surrounding neighborhood is already defined by electric transmission; a high voltage transmission line operated by BPA already crosses immediately south of the Project. The proximity of the Project Site to the pre-existing transmission line makes it ideal for this type of development in the rural lands. Finally, the proposed solar facility is ideal for this area because it is a use that will have a minimal impact, if any, on adjacent natural resource lands.

2. The Proposal Will Not Create Excessive Public Costs for Facilities and Services.

The proposed project will not create an excessive public cost for facilities and services. The Project will not utilize the County's irrigation and drainage services, refuse disposal, water and sewer services, or schools. Improvements to roads will be made to accommodate any short-term impacts related to construction traffic, but no long-term impacts to the County's transportation structure are expected. Moreover, the Applicant has entered into an agreement with Fire District Number 7 to provide fire services to the Project Site. Use of police service is expected to be minimal because access to the property will be restricted.

Even if the BOA were to conclude that the proposal would result in a public cost or detriment, the economic benefit derived from the proposal more than compensates for any potential harm. As provided in the October 2009 Economic Impacts Analysis for the Project, the construction and operation of the project will yield a large amount of revenues for the County. For example, the Project will generate another 1.5 to 1.8 million dollars in additional property tax revenue on annual basis. These tax benefits more than offset any demand for public facilities and services generated by this project.

C. Conclusion

In sum, TSR has carefully designed its proposal to provide both economic benefits for the County at a minimal cost to the general public welfare and the surrounding neighborhood. The Project is environmentally sound, and TSR has undertaken exhaustive analysis and proposed numerous conditions for the CUP to ensure that short and long-term environmental impacts are mitigated to a less than significant level. The Project complies with the County's criteria for CUPs and we ask the County for its recommendation for its approval.

Responses to Public Comments on the Teanaway Solar Reserve Kittitas County, Washington

Prepared for
Teanaway Solar Reserve, LLC

February 2010

Prepared by
CH2MHILL



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Comment Number	Issues Raised	SEPA Checklist Category	Commenter	Date Comment Received	Summarized Comment(s)	Response	Documents and Pages in which Comment is Addressed
Comment 1	Mitigation should be required	Air	Department of Ecology Gwen Clear Environmental Review Coordinator	September 18, 2009	Some air emission producing activities will be undertaken as part of the construction and operation of this project. Mitigation measures, such as a dust management plan, are recommended. Non-road engines. Ecology will want to know how the applicant proposes to power the operations building on site. See Attachment 7 for complete letter.	TSR has prepared a Fugitive Dust Control Plan to ensure minimization of dust impacts. TSR will present this Fugitive Dust Control Plan to Department of Ecology for their review and approval. This plan will contain applicable best management practices. TSR will power the operations building from power derived from onsite renewable sources.	A Fugitive Dust Control Plan is included as Attachment E in the Expanded SEPA Checklist Supplement
Comment 2	Disposal of woody material.	Air	Department of Ecology Gwen Clear Environmental Review Coordinator	September 18, 2009	Woody debris disposal. Ecology and Kittitas County will prefer that the applicant signs a beneficial reuse statement. However, if the site is in an area that permits burning and the applicant chooses that option, analysis of impacts from burning needs to be in the SEPA. See Attachment 7 for complete letter.	It is TSR's intent not to burn woody debris, slash, or logging refuse. Any woody debris chipped on site will be put to a beneficial use (e.g. chipped material will be sent to a compost facility, used for paper or ground cover). If burning is necessary, TSR will secure the necessary permits from the Department of Ecology and no more than approximately 130 consumable tons of material will be burned.	This beneficial reuse statement is included in the Air Element and in the Vegetation Management Plan as Attachment G in the Expanded SEPA Checklist Supplement.
Comment 3	Dust control	Air	Jonathan M. Kemp (on behalf of CART), EnCo Environmental Corporation PO Box 1212 Puyallup WA 98371 Telephone: 253.841.9710	December 1, 2009 <i>Note: This comment was received after the public comment period had closed.</i>	Estimate the extent of and mitigating measures for sediment and dust control. See Attachment 39 for complete letter.	The TSR has prepared several management plans, including the Fugitive Dust Management Plan, Vegetation Management Plan, and Hydrologic Analysis, that address impacts from construction and on-going operations as well as best management practices.	A Fugitive Dust Control Plan is included as Attachment E of the Expanded SEPA Checklist Supplement. A Hydrologic Analysis is included as Attachment F of the Expanded SEPA Checklist Supplement. A Vegetation Management Plan is included as Attachment G of the Expanded SEPA Checklist Supplement.
Cultural Resources							
Comment 4	Cultural Resources		Jonathan M. Kemp (on behalf of CART), EnCo Environmental Corporation PO Box 1212 Puyallup WA 98371 Telephone: 253.841.9710	December 1, 2009 <i>Note: This comment was received after the public comment period had closed.</i>	The environmental engineering firm's Cultural Resource Report, labeled as Attachment C, was " <i>privileged and confidential for restricted distribution</i> " therefore this document was not available for review at this time. This document needs to be made available to the general public. It has been reported that an adjacent landowner found a possible Native Indian artifact (arrowhead) in an area very close to the project site boundary. Due to the reported artifact that was found to be very close to the project site a detailed cultural/heritage study should be performed on the project site to determine if any archeological sites of significant importance need to be protected or mitigated. See Attachment 39 for complete letter.	State law exempts cultural records from public disclosure. RCW 42.56.300. Kittitas County notified the Yakama Nation and the Washington State Department of Archaeology & Historic Preservation of the proposal. Neither entity submitted any comments on the proposal.	A public summary of the Cultural Resources Report, Attachment C, is included in the Historic and Cultural Resources Element of the Expanded SEPA Checklist Supplement.
Decommissioning							
Comment 5	Concerns about decommissioning the project	Energy and Natural Resources	Michael R. Hansen Resident of land adjacent to the proposed Solar Farm Parcel ID 14725, Tax Parcel Number 20-16-23000-0016	September 17, 2009	The development agreement has decommissioning and reclamation requirements. What is the enforcement ability for this when a company goes out of business? There is none. The county will be stuck with an area that at one time was a major asset for all its citizens and will have become a desolate wasteland without trees, populated with thousands of concrete pads and inverter buildings, a massive network of roads and no possible use or value to anyone. This should be of major concern to the County, which does not own the land but is responsible for authorizing its use. See Attachment 4 for complete letter.	TSR has revised the Development Agreement to include a comprehensive decommissioning and restoration approach.	The Development Agreement is included as Attachment E of the CUP Application Supplement.

Comment Number	Issues Raised	SEPA Checklist Category	Commenter	Date Comment Received	Summarized Comment(s)	Response	Documents and Pages in which Comment is Addressed
Comment 6	Concerns about decommissioning the project	Energy and Natural Resources	Barbara M. Hodgson Box 68, Medina, WA 98039	October 1, 2009	The developers appear to be counting on substantial tax subsidies to support the project and generate profit. If this fails to materialize in the future, the neighborhood could be left with overgrown industrial blight in a once beautiful environment and it would be impossible to restore the land. See Attachment 24 for complete letter.	TSR has revised the Development Agreement to include a comprehensive decommissioning and restoration approach.	The Development Agreement is included as Attachment E of the CUP Application Supplement.
Comment 7	Concerns about decommissioning the project	Energy and Natural Resources	Barb King Bill King Cle Elum, WA 98922	October 1,2009	So why do we care if they can't make a profit? Because if they cannot, the business will go under and we could be left with 400,000 ugly solar panels, clear cuts and ugly road systems in perpetuity on Cle Elum ridge. The CUP application has no plan for how to deconstruct this site should this occur. See Attachment 29 for complete letter.	TSR has revised the Development Agreement to include a comprehensive decommissioning and restoration approach.	The Development Agreement is included as Attachment E of the CUP Application Supplement.
Economic							
Comment 8	Economic concerns.	Energy and Natural Resources	Michael R. Hansen Resident of land adjacent to the proposed Solar Farm Parcel ID 14725, Tax Parcel Number 20-16-23000-0016	September 17, 2009	Where are the construction and operational cost analyses? What is the financial commitment of the people behind this? Is their motivation for a quick buck? What happens when the panels need replacing in 10 years and there is not money for that? The application says 2 to 4 maintenance employees will be needed. This is not significant to the county to warrant destruction of the area. The additional jobs for a panel assembly plant are positive but what is the connection between the farm and panel assembly? To save money, would not the owners simply outsource panel construction to China? Could that assembly plant be moved once the plant is in place and the owners say they need to cut costs or close down? See Attachment 4 for complete letter.	An economic analysis has been conducted and was submitted to the County on October 9, 2009 for public review as part of TSR's responses to public comments and County requests. This analysis demonstrates the considerable economic benefits to the County presented by the project. The methodology and the conclusions have been verified by Roy Savoian, PhD in Economics, and Tyler Prante, PhD in Economics, Professors of Business at Central Washington University.	An Economic Impact Analysis is included as Attachment N of the Expanded SEPA Checklist Supplement.
Comment 9	Economic concerns.	Energy and Natural Resources	Barb King Bill King Cle Elum, WA 98922	October 1, 2009	So what will Kittitas County really get? Not much. At best we will get an out of town company, using the state's forests for a quick profit, creating a two mile eye sore with very little economic benefit. All of our land values will be diminished and the Teanaway will join the ranks of those many great places in the state that used to be pristine. See Attachment 29 for complete letter.	See the response to Comment 9, above. The proposed project site has been managed as commercial timber land for over 100 years.	An Economic Impact Analysis is included as Attachment N of the Expanded SEPA Checklist Supplement.
EIS							
Comment 10	Need more time for review.	Not Applicable to SEPA	Mr. and Mrs. Jack Hodgson Partners, Pine Hills Ranch PO Box 68 Medina, WA 98039	September 14, 2009	At least one thousand "consultant days" were probably expended in preparing the hundreds of pages included in the Application and SEPA documents. There has been limited publicity about the opportunity for citizen response. What is mentioned in the official documents is not seen by the vast majority of interested individuals who would respond singly. It seems very unreasonable to provide an individual or family but 15 days of response time to comment on the Conditional Use Permit. We had about 10 days once we learned of the end date. We know the property and have access to it. This is not a reasonable period of time for input from the general public. We hope you will extend this period of time for response and deliberation.	Kittitas County conducts the official public comment and review. TSR has followed the procedure set forth by the Kittitas County Code (KCC, Chapter 15.04). Kittitas County issued a Notice of Application on September 3, 2009. TSR held three public meetings on July 9, 2009; October 22, 2009; and December 4 2009. TSR launched a website on July 9, 2009 and has been updating it frequently. TSR sent a mailing On July 9, 2009 to 300 residents within a close proximity to the proposed project. All residents within the 98922 zip code were sent a mailing on December 12, 2009. Numerous public presentations have been conducted at various businesses and organizations throughout Kittitas County. TSR has met individually at the request of various concerned landowners. On January 4, 2010 a staffed office was opened in downtown Cle Elum.	A Comprehensive List of Public Outreach Efforts is included as Attachment O of the Expanded SEPA Checklist Supplement.

Comment Number	Issues Raised	SEPA Checklist Category	Commenter	Date Comment Received	Summarized Comment(s)	Response	Documents and Pages in which Comment is Addressed
Comment 11	Wants issues to be addressed in an EIS	Not Applicable to SEPA	Charles Adams General Manager Pine Hills Ranch LLC	September 17, 2009	Mentions several issues and then requests that they be addressed as part of a full environmental impact study.	<p>The State Environmental Policy Act (SEPA) is a state policy that requires state and local agencies to consider likely environmental consequences of a proposal prior to approving or denying the proposal. In compliance with SEPA, TSR has submitted comprehensive studies to address all potential impacts associated with the project.</p> <p>The administrative record for the project, including any information submitted to the County in response to the public comments, supports issuance of an MDNS for the project and that, as mitigated, any probable environmental impacts from the project are less than significant.</p>	See All SEPA Attachments
Comment 12	More time for review is needed.	Land use and Shoreline	Bart Fite 730 39 th Ave. Seattle, WA 98122	September 18, 2009	An industrial project of the size and scale proposed must be examined further and more time granted for a public review of the applicant's phone book this application. Moreover, much of the applicant's proposals are conceptual. Without knowing what the applicant intends to build and how, how can the county properly examine its impacts? At the very least, the applicant needs to first flesh out the details of what it is actually proposing, and then a full environmental impact statement must be required to examine the serious negative impacts of the project. See Attachment 6 for complete letter	See the responses to comments 10 and 11, above.	<p>A Comprehensive List of Public Outreach Efforts is included as Attachment O of the Expanded SEPA Checklist Supplement.</p> <p>See All SEPA Attachments</p>
Comment 13	Need more time for review.	Not Applicable to SEPA	Richard Robbins 154 Lake Washington Blvd. East Seattle, WA 98112	September 18, 2009	The people living and owning property in the vicinity of the proposed solar farm should have sufficient time to study such an EIS and to make comments on the plans and site before it is permitted. See Attachment 11 for complete letter.	See the response to comment 10, above.	<p>A Comprehensive List of Public Outreach Efforts is included as Attachment O of the Expanded SEPA Checklist Supplement.</p> <p>See All SEPA Attachments</p>
Comment 14	Need more time for review.	Not Applicable to SEPA	Bonnie Robbins 154 Lake Washington Blvd. East Seattle, WA 98112	September 17, 2009	An EIS should be prepared and the comment period should be extended. "Please give us more time so that we can learn more about the impact the solar facility would make on the whole area." See Attachment 13 for complete letter.	See the responses to comments 10 and 11, above.	<p>A Comprehensive List of Public Outreach Efforts is included as Attachment O of the Expanded SEPA Checklist Supplement.</p> <p>See All SEPA Attachments</p>
Comment 15	Wants EIS	Not Applicable to SEPA	Robert and Diane Hill 2548 S. Camano Drive Camano Island, Wash. 98282 360 387 0393	October 4, 2009	Anna, I wanted to let you know that my Wife Diane and I do appose [sic] the process being followed to get Conditional Use approval for the Teanaway Solar Reserve. Such a major project will have very long lasting impact on the area and the approach to shorten the process from a full EIS to the DNS just offers major opportunity for error and needed broad scale evaluation. We own three Properties that Loping Lane, the project access road goes through Parcels 17792,21129 and 314136) Please clearly understand we do not support the direction being followed and asks for your consideration and voice in requesting a full Environmental Impact Statement plan. So, clearly we feel the CUP and DNS treatment is not the proper and honest approach to follow in such a large scale project.	See the responses to comments 10 and 11, above.	<p>A Comprehensive List of Public Outreach Efforts is included as Attachment O of the Expanded SEPA Checklist Supplement.</p> <p>See All SEPA Attachments</p>

Comment Number	Issues Raised	SEPA Checklist Category	Commenter	Date Comment Received	Summarized Comment(s)	Response	Documents and Pages in which Comment is Addressed
Comment 16	Wants EIS	Not Applicable to SEPA	Barb King Bill King Cle Elum, WA 98922	October 1, 2009	The problem is the County has already issued a preliminary Designation of Non-Significance (DNS). In short this means that they don't think this will do much to the environment?? However, the Washington Department of Fish and Wildlife has directly disagreed with this ruling and has objected asking for a full Environmental Impact Study (EIS). Good for them. Of Course this needs to be studied, at the very least. Why not study it? TSR doesn't want it studied, because of all of the game migration, wetland, steep slope, drainage, and ESA listed species (Steelhead and Bull Trout) issues it will trigger. The answer is TSR doesn't want you to know until its [sic] too late and they want to start building in early Spring. That is Right away! TSR has requested a 15 day notice and comment period. This is the shortest period allowed in county code. They have done this to try and "pull a fast one" on all of us by not providing time for us to comment--and trying to get their permits before anybody of consequence really noticed. A sign was nailed to the base of a pine tree (nice touch) by TSR on September 3rd off of Red Bridge Road. The same date notices were allegedly sent out to property to a handful of property owners (less than 20). What about those of us who look right across SR 970 at the site, or those that live below it? Aren't we entitled to know about something that so directly effects [sic] us? To be sure, a good neighbor would have allowed a much longer comment period an followed good process. A good neighbor would have spoken to the community before it rammed this down our throats. Is this an indication of how TSR will treat this community once it gets it permits? Denial of the CUP will effectively kill the project.. .at least for now. Also, if a full EIS is required, this will also delay the project allowing us to get our ducks in a row. A full EIS is also something you should ask for in your public comment. See Attachment 29 for complete letter.	See the responses to comments 10 and 11, above. Kittitas County conducts the official public comment and review. TSR has followed the procedure set forth by the Kittitas County Code (KCC, Chapter 15.04). Kittitas County issued a Notice of Application on September 3, 2009. The proposed site of the Teanaway Solar Reserve was selected for its south facing slope, maximizing the amount of sunlight the panels receive in the summer and winter; the annual 300 days of sunlight in the area; and its close proximity to major transmission lines which increases efficiency of energy transmission to the grid. The Bonneville Power Administration's (BPA) 345-kilovolt (kV) Rocky Reach-Maple Valley transmission line is in close proximity to the site, running east to west along the southern site boundary. Siting the project close to the existing BPA transmission line significantly minimizes the environmental impacts that could arise from using other sites further away from the line. In addition, the property is not occupied by any threatened or endangered species, such as the northern spotted owl, nor does it contain any high quality habitats, such shrub steppe grasslands. The site has been managed for commercial timber harvesting and has had frequent contact with machinery and human activity.	A Comprehensive List of Public Outreach Efforts is included as Attachment O of the Expanded SEPA Checklist Supplement. See All SEPA Attachments
Comment 17	More time for public comments	Not Applicable to SEPA	Jim and Janet Brose 951 Loping Lane Cle Elum, WA	October 5, 2009	The biggest issue we do have is the way this has been rushed through with little input from the community. Sure there would be some road improvement, but we moved here to enjoy a less hectic lifestyle and rural setting. A paved road will only encourage more traffic. The construction phase would ruin entire seasons of the spring and summer months, which is unacceptable to us. The notices have allowed us little time to respond or comment because of the clandestine way the county has promoted this program to the detriment of those who live in the community. No, we are not up on all the EIS requirements or even understand why a Conditional Use Permit would be granted when the area is clearly zoned. We need time to understand what rational the Commissioners are following. We would like the process to involve us, not skip us. We look forward to the opportunity to be heard. See Attachment 30 for complete letter.	Please see the response to comment 16, above.	A Comprehensive List of Public Outreach Efforts is included as Attachment O of the Expanded SEPA Checklist Supplement. See All SEPA Attachments

Comment Number	Issues Raised	SEPA Checklist Category	Commenter	Date Comment Received	Summarized Comment(s)	Response	Documents and Pages in which Comment is Addressed
Comment 18	EIS requested to "slow down" the project	Not Applicable to SEPA	Bill King	October 1, 2009	I just would appreciate some help to stop this CUP or at least slow it down with the requested EIS. See Attachment 31 for complete letter.	Comment noted.	A Comprehensive List of Public Outreach Efforts is included as Attachment O of the Expanded SEPA Checklist Supplement. See All SEPA Attachments
Comment 19	Wants EIS	Land Use and Shoreline	Bill Sparks PO Box 490 691 Quail Drive Cle Elum, WA 98922	October 3, 2009	This is the wrong location and should not be approved. I would certainly require an EIS at the very least.	See the response to comment 10, above.	A Comprehensive List of Public Outreach Efforts is included as Attachment O of the Expanded SEPA Checklist Supplement. See All SEPA Attachments
Comment 20	Wants EIS	Not Applicable to SEPA	Washington Department of Fish and Wildlife Mark S. Teske South Central Region Ellensburg District Office 201 N. Pearl Ellensburg, WA 98926	September 16, 2009	The scale of this proposal, the loss of critical habitat, the permanent nature of associated impacts, the significant alternation of hydrology, the access road flooding risk, storm water issues, as well as the expected water quality, quantity and changes in runoff timing in the impaired Teanaway River, are cumulatively significant and warrant a thorough review in and environmental impact statement (EIS). None of the above expected impacts were identified, addressed or mitigated in the project proposal. Thus, it is our recommendation that Kittitas County issue a Determination of Significance for the proposed solar reserve. See Attachment 2 for complete letter.	TSR has undertaken a variety of supplemental studies to further address the impacts associated with the construction and operation of the proposed solar facility. These studies include: a geotechnical analysis, a hydrological analysis, the creation of a dust management plan, a vegetation management plan, a wildlife mitigation report, and a road plan. In each of these plans the impacts are analyzed, addressed, or mitigation measures are proposed.	See All SEPA Attachments.
Comment 21	More time for public comments	Not Applicable to SEPA	Barbara Faulkner 32513 42 nd Place SW Federal Way, WA 98023	October 1, 2009	NOTE: COMMENT TO COMMISSIONER MARK MCCAIN, FORWARDED TO THE COUNTY Commissioner McClain, I was alarmed today to hear of the proposed TSR 1000 acre solar site project. I am a landowner off of Wiehl Road and respectfully request and urge the county require additional time for public input and comment. I believe The size and scope of this proposed project would have a long lasting negative impact on The Cle Elum ridge, property owners, property values, wildlife and the natural beauty of the area for years to come. I would also like to see a full EIS required for this project. See Attachment 34 for complete letter.	See the response to comment 10, above. Kittitas County conducts the official public comment and review. TSR has followed the procedure set forth by the Kittitas County Code (KCC, Chapter 15.04). Kittitas County issued a Notice of Application on September 3, 2009.	Kittitas County Code.

Comment Number	Issues Raised	SEPA Checklist Category	Commenter	Date Comment Received	Summarized Comment(s)	Response	Documents and Pages in which Comment is Addressed
Comment 22	Wants EIS		Jonathan M. Kemp (on behalf of CART), EnCo Environmental Corporation PO Box 1212 Puyallup WA 98371 Telephone: 253.841.9710	December 1, 2009 <i>Note: This comment was received after the public comment period had closed.</i>	The SEPA Environmental Checklist provides a conceptual and limited representation of the property and in my opinion did not provide adequate study to present actual site conditions over four seasons. This made it difficult if not impossible to analyze the true environmental impacts for the proposed project. The Purpose and Need statement that the project will "avoid environmentally sensitive areas" was not adequately demonstrated. The magnitude of this project, loss of priority habitat, priority areas, and special or sensitive areas for wintering deer, coyote, cougar, and elk, alteration of hydrology, changes in storm water quantity and quality, and other items presented in this letter appear to be cumulatively significant. The project as proposed will more than likely significantly impact resident and migratory priority, special, and/or sensitive species and will permanently damage the Ponderosa forest and meadow communities and winter range habitat for large mammals. It is therefore the opinion of this writer that the project, as proposed, should be subject to further and extensive environmental analysis including but not limited to a complete Environmental Impact Statement (EIS) with an alternative site analysis and economic feasibility study under the State Environmental Policy Act (SEPA) review process. This process must allow ample opportunity for public review and comment before any determination on the CUP is made. It is also my opinion that Kittitas County issue a Determination of Significance for this proposed project until these issues can be further studied. See Attachment 39 for complete letter.	TSR has undertaken a variety of supplemental studies to further address the impacts associated with the construction and operation of the proposed solar facility. These studies include: a geotechnical analysis, a hydrological analysis, the creation of a Fugitive Dust Management Plan, a Vegetation Management Plan, a Wildlife Mitigation Plan, and a Transportation Road Plan. In each of these plans the impacts are analyzed, addressed, and mitigation measures are proposed. The technical reports demonstrate that no significant impacts are anticipated from the construction and operation of the proposed project.	See All SEPA Attachments
Fire							
Comment 23	Concerned about fire danger.	Public Services	Charles Adams General Manager Pine Hills Ranch LLC	September 17, 2009	Fire is a concern to all who live in or near the woods and grasslands in the Teanaway area, particularly with its summer hot, dry and windy conditions. Applicant will have a huge number of wires, electrical connections, transformers, electric substations, a transmission intertie and other electrical equipment in close proximity with acres of dry grass under its approximately 160 acres of solar panels.	TSR is in the process of working with Kittitas County Fire District 7 for the provision of fire protection services. Large trees will only be removed when and where necessary to facilitate installation and operations of solar facility. TSR has developed a vegetation plan to address impacts from construction and on-going operations. In most cases, the trees will be "limbed" up to 12 feet per the Fire Code so that the seed source could remain intact. Small shrubs and herbs (<3 feet in height) will be left in place where possible to reduce the potential for storm water runoff.	A Vegetation Management Plan is included as Attachment G of the Expanded SEPA Checklist Supplement.
Comment 24	Compliance issues with fire code.	Public Services	Brenda Larsen Kittitas County Fire Marshal's Office 411 N. Ruby St., Suite 2, Ellensburg, WA 98926	September 23, 2009	The minimum road width shall not be less than 20' in width. In the event that the roadway infringes on a critical area, i.e. wetland, etc., provisions may be made to allow for a narrower road width in that area. All cul-de-sacs must have a minimum turning radius of no less than 50'. All development, design & construction shall comply with Kittitas County Code, Kittitas County Zoning and the 2006 International Fire & Building Codes. Due to the remote nature and topography of proposed project in this area, all new structures shall comply with the Wild-land Urban Interface Code requirements for defensible space and ignition resistant construction materials. In the event that sprinkler suppression systems and/or alarm systems are to be installed within the buildings, each system requires a separate permit from the Fire Marshal's Office. See Attachment 8 for complete letter.	TSR agrees with the Fire Marshall and shall incorporate measures into site design and road improvement plans.	A Transportation Road Plan is included as Attachment I of the Expanded SEPA Checklist Supplement. Figures are included as Attachment J of the Expanded SEPA Checklist Supplement. The Kittitas County Fire District 7 Contract is included as Attachment M of the Expanded SEPA Checklist Supplement.

Comment Number	Issues Raised	SEPA Checklist Category	Commenter	Date Comment Received	Summarized Comment(s)	Response	Documents and Pages in which Comment is Addressed
Comments 25	Fire concerns	Public Services	Jim and Janet Brose 951 Loping Lane Cle Elum, WA	October 5, 2009	Also, without water access in the proposed reserve, we are extremely apprehensive about the fire danger. What assurances will we have that these panels and electrical components will not ignite a fire?	TSR is in the process of working with Kittitas County Fire District 7 for the provision of fire protection services.	See Attachment M of the Expanded SEPA Checklist Supplement.
Information Requests							
Comment 26	Needs more information	Not Applicable to SEPA	Joan Neslund Ellensburg Public Library	September 29, 2009	I work at the Ellensburg Public library in Kittitas County. Patron are coming in with comments that this project is a scheme and not valid. Can you provide the library information on your project? See Attachment 16 for complete letter.	Kittitas County conducts the official public comment and review. TSR has followed the procedure set forth by the Kittitas County Code (KCC, Chapter 15.04). Kittitas County issued a Notice of Application on September 3, 2009.	Kittitas County Code.
Land Use							
Comment 27	Project will disrupt wildlife corridor.	Land Use and Shoreline	Michael R. Hansen Resident of land adjacent to the proposed Solar Farm Parcel ID 14725, Tax Parcel Number 20-16-23000-0016	September 17, 2009	The proposed solar farm is a gross deviation from the current Forest & Range zoning and a violation of the protections that zoning provides to adjacent land owners. If the County follows through with the plant, it will be a major eyesore and cause a large loss in the value of my 20 acre parcel. To minimize this loss, the County should require the following accommodations. It is also reasonable that there be no fencing on the property line, preferably none at all. A lack of fencing should provide access through the farm to the forest beyond. The area is a major recreational area for horseback riding, hiking, snowmobile access to the backcountry and hunting. The owners must reestablish natural vegetation and control weeds such as the noxious Russian Knapweed we have spreading in the area. See Attachment 4 for complete letter.	<p>The project is a "Major alternative energy facility" as defined in Section 17.61.010(9) and is an authorized conditional use in the Forest and Range Zone subject to approval of a CUP per Section 17.61.020(4) & (6).</p> <p>The proposed project will not include a fence; TSR proposes this as a mitigation measure for an MDNS. The proposed project will be built on leased land, not owned by TSR. Historically the landowner has allowed responsible uses of the land by anyone lawfully accessing the site, except for not allowing motorized vehicles on the property. Historically the road to the project site is gated to prevent access. TSR does not intend to change these policies. Responsible access through the project site will be allowed subject to conflicting requirements beyond TSR's control (such as insurance or fire protection), provided that individuals do not interfere with the construction, operations or maintenance of the project. Gating will continue to regulate motorized vehicles but a fence restricting access is not proposed.</p> <p>Natural vegetation will be reestablished through a site vegetation maintenance plan; the plan will also provide for the control of noxious or invasive plant species.</p>	<p>A Vegetation Management Plan is included as Attachment G of the Expanded SEPA Checklist Supplement.</p> <p>A Visual Impact Assessment is included as Attachment L of the Expanded SEPA Checklist Supplement.</p>
Comment 28	Conflict with character of the area	Land Use and Shoreline	Bart Fite 730 39 th Ave. Seattle, WA 98122	September 18, 2009	"An industrial project like the one envisioned would be spectacularly out of character with what is now a beautiful forest and range environment...Allowing this project would be a signal that industrial developments could be allowed almost anywhere, to the detriment of the environment and long term urban planning throughout the county and state." Short, cloudy days are the norm for much of the winter and regular snowfall would certainly impact the project. It appears the main driver of the project as a confluence of a willing lessor and serious tax subsidies allowing for a quick private profit while they last. See Attachment 6 for complete letter.	<p>The proposed project site has been managed as commercial timber land for over 100 years.</p> <p>The proposed site of the Teanaway Solar Reserve was selected for its south facing slope, maximizing the amount of sunlight the panels receive in the summer and winter; the annual 300 days of sunlight in the area; and its close proximity to major transmission lines which increases efficiency of energy transmission to the grid. The Bonneville Power Administration's (BPA) 345-kilovolt (kV) Rocky Reach-Maple Valley transmission line is in close proximity to the site, running east to west along the southern site boundary. Siting the project close to the existing BPA transmission line significantly minimizes the environmental impacts that could arise from using other sites further away from the line.</p> <p>In addition, the property is not occupied by any threatened or endangered species, such as the northern spotted owl, nor does it contain any high quality habitats, such shrub steppe grasslands. The site has been managed for commercial timber harvesting and has had frequent contact with machinery and human activity.</p>	See All SEPA Attachments

Comment Number	Issues Raised	SEPA Checklist Category	Commenter	Date Comment Received	Summarized Comment(s)	Response	Documents and Pages in which Comment is Addressed
Comment 29	Proposed setbacks	Land Use and Shoreline	Charles Adams General Manager Pine Hills Ranch LLC	September 17, 2009	Applicant has only provided "conceptual" view of the project which includes a 500 ft setback along our joint property line. There is no way to determine if this setback is adequate to mitigate impacts to our property. Would like to see "a larger setback to shield our property from some of the negative effects of the project but also to provide a buffer and corridor for deer, elk and other wildlife to move up the slope to the north facing areas of the site". Applicant shows 100 foot setback along portions of the southern boundary. "This minimum setback seems unreasonable in light of its direct visual impact." See Attachment 5 for complete letter.	<p>After meeting with several landowners the array layout originally provided in the August filing has been redesigned to further reduce visual impacts to surrounding landowners.</p> <p>The TSR will comply with all firebreaks, as recommended by Kittitas County. To maximum extent practicable, fire break shall be constructed to minimize impacts to existing vegetation and bordering trees. The TSR has prepared several management plans, including the vegetation and wildlife, that address impacts from construction and on-going operations</p>	<p>A Visual Impact Assessment is included as Attachment L of the Expanded SEPA Checklist Supplement.</p> <p>See All SEPA Attachments</p>
Comment 30	Deviation from current zoning	Land Use and Shoreline	Michael R. Hansen Resident of land adjacent to the proposed Solar Farm Parcel ID 14725, Tax Parcel Number 20-16-23000-0016	September 17, 2009	We moved to this property 10 years ago for peace of mind, understanding that Forest & Range zoning restricted development to logging, low density housing or open-space. My wife and I are quite alarmed to find that the county is considering a conditional use permit for an industrial power plant, which is not compatible with the zoning and is a violation of the protections zoning provides to the community. Located on our steep slopes, the farm will require a dense road structure and require retaining walls for the panel bases. This will add to the fixed and maintenance costs of the project and make it less likely to be profitable. Where is the study indicating the numbers of hours of cloudless days/hours around the year? Our ridge is on the edge between unpredictable mountain weather and desert weather. We have many days that are cloudy here when it is not cloudy to the east. The 900 acres proposed for this project is a very large and beautiful area that is unique along Cle Elum Ridge and unique in the county. This area is not steep unusable land. It is full of rolling forested areas, open meadows and wetlands. The area is valuable for recreation and development of low-density housing, where many can enjoy its beauty. See Attachment 4 for complete letter.	<p>The proposed project site has been managed as commercial timber land for over 100 years.</p> <p>The proposed site of the Teanaway Solar Reserve was selected for its south facing slope, maximizing the amount of sunlight the panels receive in the summer and winter; the annual 300 days of sunlight in the area; and its close proximity to major transmission lines which increases efficiency of energy transmission to the grid. The Bonneville Power Administration's (BPA) 345-kilovolt (kV) Rocky Reach-Maple Valley transmission line is in close proximity to the site, running east to west along the southern site boundary. Siting the project close to the existing BPA transmission line significantly minimizes the environmental impacts that could arise from using other sites further away from the line.</p> <p>In addition, the property is not occupied by any threatened or endangered species, such as the northern spotted owl, nor does it contain any high quality habitats, such shrub steppe grasslands. The site has been managed for commercial timber harvesting and has had frequent contact with machinery and human activity.</p>	See All SEPA Attachments

Comment Number	Issues Raised	SEPA Checklist Category	Commenter	Date Comment Received	Summarized Comment(s)	Response	Documents and Pages in which Comment is Addressed
Comment 31	Use type confusion	Land Use and Shoreline	Barbara M. Hodgson Box 68 Medina, WA 98039	October 1, 2009	This comment perfectly describes the Teanaway Solar Reserve's proposed development on Cle Elum Ridge, which is being rushed through the county's approval process with very little opportunity for public comment on an industrial use of land which is zoned "Forest and Range". The conditional use permit application and related documents were published September 3 with limited notice and the public was given 15 days to read over 600 pages of material and submit comments. To further discourage comment, the county stated that, unless strong opposition was encountered, they intended to issue a Determination of Non-significance. Given the fact that all the newspaper articles on the project have made it sound as though there would be no environmental or visual impact on the community, significant opposition is unlikely. These articles were based on information provided by the developer, some of which are not accurate. Public statements indicate that the land in question has been logged and has no useful purpose. In fact, the land has been selectively logged and still has many remaining trees. It is open pine forest and meadows that have been used through the years by many valley residents for hiking, orienteering, hunting, and horseback riding, all of which will be eliminated by restricted access. See Attachment 24 for complete letter.	<p>The proposed project site has been managed as commercial timber land for over 100 years.</p> <p>The proposed site of the Teanaway Solar Reserve was selected for its south facing slope, maximizing the amount of sunlight the panels receive in the summer and winter; the annual 300 days of sunlight in the area; and its close proximity to major transmission lines which increases efficiency of energy transmission to the grid. The Bonneville Power Administration's (BPA) 345-kilovolt (kV) Rocky Reach-Maple Valley transmission line is in close proximity to the site, running east to west along the southern site boundary. Siting the project close to the existing BPA transmission line significantly minimizes the environmental impacts that could arise from using other sites further away from the line.</p> <p>In addition, the property is not occupied by any threatened or endangered species, such as the northern spotted owl, nor does it contain any high quality habitats, such shrub steppe grasslands. The site has been managed for commercial timber harvesting and has had frequent contact with machinery and human activity.</p> <p>The proposed project will not include a fence; TSR proposes this as a mitigation measure for an MDNS. The proposed project will be built on leased land, not owned by TSR. Historically the landowner has allowed responsible uses of the land by anyone lawfully accessing the site, except for not allowing motorized vehicles on the property. Historically the road to the project site is gated to prevent access. TSR does not intend to change these policies. Responsible access through the project site will be allowed subject to conflicting requirements beyond TSR's control (such as insurance or fire protection), provided that individuals do not interfere with the construction, operations or maintenance of the project. Gating will continue to regulate motorized vehicles but a fence restricting access is not proposed</p>	See All SEPA Attachments

Comment Number	Issues Raised	SEPA Checklist Category	Commenter	Date Comment Received	Summarized Comment(s)	Response	Documents and Pages in which Comment is Addressed
Comment 32	Use type confusion	Land Use and Shoreline	Jack N. Hodgson PO Box 68 Medina, WA 98039	October 1, 2009	There has been some selective logging but numerous existing trees would have to be cut to make room for the installation of the panels. The developer's representation of the panel site shows a clear cut hillside. Removal of these trees will cause very serious runoff problems. Upon review of the zoning ordinances, I find no zoning called "Resource". It would be a stretch to say that this project would qualify as a conditional use if it were zoned "Commercial Forest". There are no conditional uses listed for "Forest and Range" which come close to resembling the proposal. This is an industrial use which is totally incompatible with the existing neighborhood. Let me be absolutely clear. I am not suggesting mitigation. I am recommending relocation and think there are many better and more suitable locations. See Attachment 25 for complete letter.	See the responses to comments 27 and 31, above.	See All SEPA Attachments
Comment 33	Adjacent landowner concern	Land Use and Shoreline	Lori Hinton 4000 SW Donovan St. Seattle, WA 98136 206-854-1685	October 5, 2009	My name is Lori Hinton and I recently purchased property in Kittitas County in 2007 because I love the rural atmosphere and wildlife. I am in the process of building my retirement home there on this property as this is where I am choosing to live because of these things. ... I heard word of a proposed solar project which would be sited in these very pristine areas I hold so sacred. I am 100% behind solar energy and all kinds of renewable energies, but I strongly believe the Teanaway is not the location to conduct such a project. It will forever negatively change this pristine area whether it fails or succeeds, and there are far more suitable locations further east along 1-90 that are not so treasured for wildlife and views yet have less snow and great sun exposure. Please consider this a vote against the TSR by a very concerned citizen, yet a push for solar energy in a more suitable Kittitas environment. See Attachment 27 for complete letter.	The proposed site of the Teanaway Solar Reserve was selected for its south facing slope, maximizing the amount of sunlight the panels receive in the summer and winter; the annual 300 days of sunlight in the area; and its close proximity to major transmission lines which increases efficiency of energy transmission to the grid. The Bonneville Power Administration's (BPA) 345-kilovolt (kV) Rocky Reach-Maple Valley transmission line is in close proximity to the site, running east to west along the southern site boundary. Siting the project close to the existing BPA transmission line significantly minimizes the environmental impacts that could arise from using other sites further away from the line. In addition, the property is not occupied by any threatened or endangered species, such as the northern spotted owl, nor does it contain any high quality habitats, such shrub steppe grasslands. The site has been managed for commercial timber harvesting and has had frequent contact with machinery and human activity.	See All SEPA Attachments
Comment 34	Project confusion	Land Use and Shoreline	Barb King Bill King Cle Elum, WA 98922	October 1, 2009	The Teanaway Solar Reserve (TSR) is corporation recently formed by Seattle-area businessmen. TSR is a spin-off business of the American Forest Land Company (AFLC), a Wyoming corporation, with offices in Bellingham. AFLC is also trying to create a large development cluster in the upper Teanaway while TSR is simultaneously trying to place the largest solar array in the United States right in our scenic valley. See Attachment 29 for complete letter.	TSR is leasing land for the proposed project area from two legally separate entities. For purposes of SEPA there are no environmental impacts relating to this leasing relationship.	See All SEPA Attachments

Comment Number	Issues Raised	SEPA Checklist Category	Commenter	Date Comment Received	Summarized Comment(s)	Response	Documents and Pages in which Comment is Addressed
Comment 35	Use type confusion	Land Use and Shoreline	Barb King Bill King Cle Elum, WA 98922	October 1, 2009	<p>The property is zoned for use as a Commercial Forrest. This means that if Kittitas County followed its own zoning practices, not more than 1 house could be built on 88 acres of land. However, the County is seriously considering approval of a conditional Use Permit (CUP) that would allow this use in direct contradiction of the County's current zoning. Most of us purchased our land and built our homes in this area to enjoy a rural lifestyle. We relied on the County's practice of zoning to cluster development in the cities and towns and keep the rural areas rural. Each solar panel is nearly the size of a car and the ridge will look like a parking lot for 400,000 of them. The County must not grant the CUP and this gross-misuse of our land-use policies must be stopped. You can help be [sic] letting your voice be heard. I believe in Solar Power and think we should invest in this important resource for our future. But the proper place for real solar power is NOT in the beautiful pine and fir forests of the Teanaway. Along with the Methow Valley, the Teanaway is one of this state's two most scenic watersheds. This Valley and watershed should be protected. The proper place for a solar array of this magnitude should be in the sage brush country toward vantage, near the wind farm or by Hanford. It's OK to be a fan of solar power but against the siting of this project. That makes sense and is not somehow "anti environment."</p> <p>Don't be afraid to protest. I would be the first to support a project that was properly cited. TSR's site location on the top of the Cle Elum Ridge is at approximately 2500 feet is a poor choice for a solar array of this size. The site averages 25-30 inches of snow in mid-winter and frequently has more than 3 feet of snow. In their application materials, TSR has no serious plan to keep the panels clear of snow. With a snow load on them, the panels PV cells will generate very little energy. As many of you know, the Teanaway is not a desert. The area receives 23 inches of rain per year. This is more than the San Juan Islands and twice as much as Hanford. The clouds that frequently hang over the Cascades make for a fair amount of cloudy days also make this site far less effective for PV cells than sunnier climates. To be sure, winter months with short cloudy days will hurt the ability of the PV cells to generate power. See Attachment 29 for complete letter.</p>	See the response to comment 33, above.	See All SEPA Attachments

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Comment 36	Use type confusion	Land Use and Shoreline	Barb King Bill King Cle Elum, WA 98922	October 1, 2009	AFLC and TSR are pushing this project for two reasons. The first is that they can no longer get much value for their land because the large trees have already been logged. (Many small trees exist with 12-15 inch trunks however). In short, one house per 88 acres doesn't fetch much profit for them if they were to sell it. TSR is trying to use a CUP and the promise of a renewable energy to convince the County planners to let them have a second "bite at the apple" and use their land for a quasi-industrial purpose. (That's really what it is--an industrial purpose. If this were any other business enterprise--other than "green" energy—it wouldn't even pass the laugh test. But somehow because it is Solar it seems to be nearly sacred. In the end, its still just an industrial use and a forest area). The second reason TSR is pushing this is that the state recently created some pretty big tax incentives for renewable energy. So the promise of cheap land and tax breaks makes it easy for TSR to make their proposal. They hope they can get the CUP from the county and then go shopping for investors world-wide to fund their project. They don't have the hundreds of millions now to pay the tab. Remember, this is essentially a timber company trying to run a solar business. If it doesn't work, the bones of their failure will remain long after they are gone for the rest of us to enjoy. The County seems to biting this hook, line and sinker. TSR has "promised" to establish a solar manufacturing plant in Cle Elum and the promise of hundreds of new jobs. However, as of the date of this e-mail no application for the actual plant in Cle Elum has been submitted. A source with the City Cle Elum believes that they don't ever really intend to build a plant at all and will truck PV cells and the towers from Moses Lake, a city in a different county. See Attachment 29 for complete letter.	See the response to comment 33, above.	See All SEPA Attachments
Comment 37	Incompatible land use	Land Use and Shoreline	Jim and Janet Brose 951 Loping Lane Cle Elum, WA	October 5, 2009	We are writing to respond to the short notice afforded us regarding the proposed Solar Reserve on some of the most beautiful forested countryside in Eastern Washington. Our understanding all along has been that we bordered land zoned forest and range, not lands designed for commercial use. From all appearances this would clearly impact home and property values. We are very concerned about the location selected for a number of reasons, but at the same time support the concept of developing alternative sources of energy. JUST NOT IN OUR BACKYARD!! Nor would you want it in YOURS! A solar reserve should be located in a flat open non forested and not residential area. The proposed clearing and location of the ten acres for the substation is of particular concern. Vandalism of our home and property damage are also of great concern. See Attachment 30 for complete letter.	See the response to comment 33, above.	See All SEPA Attachments

Comment Number	Issues Raised	SEPA Checklist Category	Commenter	Date Comment Received	Summarized Comment(s)	Response	Documents and Pages in which Comment is Addressed
Comment 38	Inconsistent land use	Land Use and Shoreline	Bill King	October 1, 2009	I guess I must have my head in the sand, to have this CUP get as far as it has without me getting involved [sic]. There has been a problem in the area that there doesn't seem to be much thought put into the overall effects of the different planning decisions. All of the previous development [sic] of this projected area has been residential (and pretty high end residential for the most part). It seems way off the track to put what is obviously a pretty high density commercial project into the middle of the area. It's hard for me to believe that there has not been a bunch of negative response from these neighbors. I can't help but think the reason for this development is because of the downturn in the real estate market that put a wrench in the original plan of the American Forest Land Co. which was to log and then develop [sic] this property by breaking it up into smaller residential pieces. I hate to say I envision them pulling in their 100 million dollars worth of investors, taking their share (which is probably a lot more than what they would have gotten with the original residential idea) and walking away either immediately [sic] or at the first winter when this sight proves unfeasible. I certainly know that I won't be one of the investors. See Attachment 31 for complete letter.	See the response to comment 33, above.	See All SEPA Attachments
Comment 39	Location concerns	Land Use and Shoreline	Bill Sparks PO Box 490 691 Quail Drive Cle Elum, WA 98922	October 3, 2009	I would like to record my opposition to the proposed solar installation in the Teanaway Valley. I live on 40 acres of land in the Teanaway Rifer valley directly below the proposed solar installation. When I first read the article in the paper I was incredulous that the largest solar installation in the world - according to the newspaper would be sited on a ridge in the foothills of the Cascade Mountain range. My first thought was that something other than common sense was driving this proposal. Somehow money, through tax incentives, or energy incentives, must be at the root of this misguided venture. I am all for energy production, whether by drilling for oil, natural gas, bio-fuel generators, wind, hydro, solar, etc., but to place the largest solar installation in the world in the Teanaway Valley does not compute. The only justifying reason is that there is a major power transmission line adjacent or on the property. Forty miles to the east of this location, where the present Wild Horse Wind Farm is located, the weather is dramatically different. We receive about 20-25 inches of precipitation a year, most of which is in the form of snow. I cannot imagine placing the largest solar location in the world in a location such as the Teanaway where we experience a considerable amount of inclement days as it relates to solar production. Arizona, New Mexico, Nevada, California, Texas, - I can understand siting the solar preserve in such places located where the basic necessities are present for maximum solar production, i.e. clear, sunny days. The only reason I can come up with for the siting of the solar preserve in the Teanaway is artificial financial inducement. I have seen many tax favored investments ultimately go bust and be a liability to tax payers when the basic tenet for the investment is strictly the tax incentives and not sound economic decision making. This is the wrong project in the wrong location and should not be approved. See Attachment 32 for the complete letter.	See the response to comment 33, above.	See All SEPA Attachments

Comment Number	Issues Raised	SEPA Checklist Category	Commenter	Date Comment Received	Summarized Comment(s)	Response	Documents and Pages in which Comment is Addressed
Comment 40	Inconsistent land use	Land Use and Shoreline	Richard Luchinsinger and Jane McClenney 9300 Brick Mill Road Ellensburg, WA 98926	October 3, 2009	We need to keep our forest lands AS forest land. These private timber companies have received big tax breaks to keep these lands in forest. They are always telling us on TV how they protect fish and wildlife. When are they going to do so? The Fish and Wildlife Department disagreed with the County and says that there would be a big impact if this development was allowed. Why not put a solar project of this magnitude in sagebrush area — where no trees need be destroyed, where sun is plentiful, snowfall is lighter? Where this is planned is in higher elevation with heavy snowfall. The panels will be virtually useless for 3 months of the year, where in sagebrush, they would not. The lots and development are in higher elevation which also means snowfall would need to be removed for these lots. And who would pay for this? See Attachment 33 for the complete letter.	See the response to comment 33, above.	See All SEPA Attachments
Comment 41	Land use de-designation	Land Use	Washington Department of Fish and Wildlife Mark S. Teske South Central Region Ellensburg District Office 201 N. Pearl Ellensburg, WA 98926	September 16, 2009	The application indicates a conflict with commercial forest ownership adjoining the proposed reserve. Kittitas County has no approved designation process to remove commercial forest designations. The proposed solar reserve is 982 acres and the actual footprint is 580 acres. Locating the 580 acres of solar panels in a manner that would avoid any conflicts with the commercial forest would also provide a buffer for wildlife species in the adjacent lands. See Attachment 2 for complete letter.	See the response to comment 33, above.	A Wildlife Mitigation Plan is included as Attachment H to the Expanded SEPA Checklist Supplement. See All SEPA Attachments
Comment 42	Possible negative impact to wetlands	Land Use and Shoreline	Jonathan M. Kemp (on behalf of CART), EnCo Environmental Corporation PO Box 1212 Puyallup WA 98371 Telephone: 253.841.9710	December 1, 2009 <i>Note: This comment was received after the public comment period had closed.</i>	Possible negative impacts to the functions and values of the wetlands and streams from the effects of the proposed development within and extending beyond the standard buffers were incomplete and not clearly discussed. See Attachment 39 for complete letter.	On site wetland and riparian buffers are in compliance with Kittitas County Code (Chapter 17A.04) and Washington State Wetland Rating System for Eastern Washington (Rev. 2007) to avoid negative impacts to the function and value of wetlands. In addition, a Geology and Soils Hazards Evaluation, a Hydrologic Analysis, and a Wetland Delineation Report, with additional BMPs have been developed to identify and avoid potential impacts to wetlands and streams as a result of sediment erosion.	A Geology and Soils Hazards Evaluation is included as Attachment D to the Expanded SEPA Checklist Supplement. A Wetland Delineation Report is included as Attachment B to the Expanded SEPA Checklist Supplement. A Hydrologic Analysis is included as Attachment F to the Expanded SEPA Checklist Supplement.
Comment 43	Setbacks	Land Use and Shoreline	Jonathan M. Kemp (on behalf of CART), EnCo Environmental Corporation PO Box 1212 Puyallup WA 98371 Telephone: 253.841.9710	December 1, 2009 <i>Note: This comment was received after the public comment period had closed.</i>	Provide further study to determine what the setbacks will be for the project. Setbacks need to be determined by combining fire protection, preservation of habitat and wildlife, security, preserving or enhancing functions and values or critical areas, and minimizing the loss of natural views to the adjacent landowners. See Attachment 39 for complete letter.	TSR has performed technical studies and analyses, prepared management plans and mitigation measures that address all of these concerns.	See all Attachments to SEPA.
Comment 44	Verifying riparian zones	Land Use and Shoreline	Jonathan M. Kemp (on behalf of CART), EnCo Environmental Corporation PO Box 1212 Puyallup WA 98371 Telephone: 253.841.9710	December 1, 2009 <i>Note: This comment was received after the public comment period had closed.</i>	The boundary flags associated with the twelve (12) wetland edges and the 6 stream ordinary high water marks, and the associated riparian zones to these streams were missing for field verification purposes. Boundary flags need to be placed on all critical areas and riparian zones, including those within about 300 feet from the project edge so that others can observe and verify these edges. See Attachment 39 for complete letter.	GPS units, not flagging, were used for delineations because they present a more reliable and comprehensive data set. During construction sensitive areas will be surrounded by construction fencing as necessary.	A Wetland Delineation Report is included as Attachment B to the Expanded SEPA Checklist Supplement.

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Comment 45	Marking land-use zones	Land Use and Shoreline	Jonathan M. Kemp (on behalf of CART), EnCo Environmental Corporation PO Box 1212 Puyallup WA 98371 Telephone: 253.841.9710	December 1, 2009 <i>Note: This comment was received after the public comment period had closed.</i>	Wetland/stream/riparian/upland test plot locations were not marked in the field for verification. These need to be depicted with flags or stakes in the field. See Attachment 39 for complete letter.	GPS units, not flagging, were used for delineations because they present a more reliable and comprehensive data set.	A Wetland Delineation Report in included as Attachment B to the Expanded SEPA Checklist Supplement.
Comment 46	Stream classification	Land Use and Shoreline	Jonathan M. Kemp (on behalf of CART), EnCo Environmental Corporation PO Box 1212 Puyallup WA 98371 Telephone: 253.841.9710	December 1, 2009 <i>Note: This comment was received after the public comment period had closed.</i>	Five of the six identified streams were classified by the applicant's consultant as "ephemeral" and one of the six being "intermittent". Five of these 6 streams were classified as "seasonal" by WDNR. These streams need to be further characterized (i.e. how long does water flow in the streams after precipitation events and how long do they flow in the early growing season after snow melt and spring rains) to see if they may or may not afford wider buffer protection based on their type. See Attachment 39 for complete letter.	TSR has prepared management plans and mitigation measures that address all of these concerns.	A Wetland Delineation Report in included as Attachment B to the Expanded SEPA Checklist Supplement.
Noise							
Comment 47	Noise impacts are not assessed.	Aesthetics	Charles Adams General Manager Pine Hills Ranch LLC	September 17, 2009	Applicant has not addressed construction related noise. Noise generated by 15,000 solar arrays moving to track the sun. Do 400,000 solar panels producing power produce sound? What noise impacts if you include the regular strong winds? Address noise in a full Environmental Impact Study. See Attachment 5 for complete letter.	TSR will comply with all noise standards provided in the Kittitas County's Noise Ordinance (Chapter 9.45, Sections 9.45.010). An exhaustive search of scientific literature revealed one noise study performed on a proposed solar facility of a similar size (60 MW) in Sarnia, Ontario. This study concluded that the potential daytime and nighttime operational noise associated with the approximately 60- MW project is not discernable at more than one hundred100 feet from the project boundary	Noise standards are addressed in the Environmental Health Element of the Expanded SEPA Checklist Supplement.
Comment 48	Noise Impacts	Aesthetics	Chuck Adams General Manager Pine Hills Ranch LLC	August 27, 2009	Also, I saw nothing about the motor noise generated by 400,000 solar panels rotating. Am I missing something? See Attachment 23 for the complete letter.	See the response to comment 47, above.	Noise standards are addressed in the Environmental Health Element of the Expanded SEPA Checklist Supplement.
Comment 49	Noise Impacts	Aesthetics	Jonathan M. Kemp Wildlife & Fisheries Biologist Principal, EnCo Environmental Corporation PO Box 1212 Puyallup WA 98371 Telephone: 253.841.9710	December 1, 2009 <i>Note: This comment was received after the public comment period had closed.</i>	The effects of noise during construction, operation, and maintenance needs to be further studied and mitigating measures undertaken. Study needs to include possible noise generated from the solar panels during operation, precipitation event, re-alignment, and wind movements over and under the panels. See Attachment 39 for complete letter.	See the response to comment 47, above.	Noise standards are addressed in the Environmental Health Element of the Expanded SEPA Checklist Supplement.
NPDES							
Comment 50	Flooding and water quality implications.	Earth/Water	Washington Department of Fish and Wildlife Mark S. Teske South Central Region Ellensburg District Office 201 N. Pearl Ellensburg, WA 98926	September 16, 2009	Solar panels create impervious surfaces and change the native vegetation. The snowmelt runoff coefficients, timing, distribution and infiltration of water across the site will be significantly altered as a result of the construction of this proposal. During the flood of January 2009 Red Bridge Road was significantly impacted. This road is directly south of the project. An increase in impervious surfaces may increase the flooding along this road. Teanaway River is 303(d) listed due to impaired flow and temperature. An increase in impervious surfaces will further hinder the quality of this river. Vegetation management will require disturbed surfaces and reduced vegetation to prevent shading and fire hazards. See Attachment 2 for complete letter.	A subsequent hydrologic analysis was conducted and is included as Attachment F to the Expanded SEPA Checklist. The solar panels and supporting facilities will be designed and placed to minimize impervious surfaces. Prior to construction TSR will apply for and obtain an NPDES Permit. TSR has performed technical studies and analyses, prepared management plans and mitigation measures that address all of these concerns.	A Geology and Soils Hazards Evaluation is included as Attachment D to the Expanded SEPA Checklist Supplement. A Hydrologic Analysis is included as Attachment F to the Expanded SEPA Checklist Supplement. A Vegetation Management Plan is included as Attachment G of the Expanded SEPA Checklist Supplement.

Comment Number	Issues Raised	SEPA Checklist Category	Commenter	Date Comment Received	Summarized Comment(s)	Response	Documents and Pages in which Comment is Addressed
Comment 51	Siltation, run-off, and chemicals will affect groundwater.	Earth	Charles Adams General Manager Pine Hills Ranch LLC	September 17, 2009	Applicant hardly mentions water run-off and siltation issues that will result from construction and maintenance of the facility which ultimately ends up in the Teanaway and Yakima Rivers. Run-off effect could also impact groundwater recharge, by not allowing the run-off to percolate slowly into groundwater. Ground water is already a major issue of contention between the county and the Dept of Ecology, with the resulting ban on new wells. Applicant has failed to address wash-off of the solar structures which would include pollutants from metals, alloys, plastics, lubricants, glues, etc. There is the same concern from herbicides use to control brush and grass. See Attachment 5 for complete letter.	A hydrologic analysis was conducted and is included as Attachment F to the Expanded SEPA Checklist. The solar panels and supporting facilities will be designed and placed to minimize impervious surfaces. Prior to construction TSR will apply for and obtain an NPDES Permit. TSR has performed technical studies and analyses, prepared management plans and mitigation measures that address all of these concerns.	A Hydrologic Analysis is included as Attachment F to the Expanded SEPA Checklist Supplement. A Vegetation Management Plan is included as Attachment G of the Expanded SEPA Checklist Supplement.
Comment 52	May cause water runoff and erosion	Water	Bart Fite 730 39 th Ave. Seattle, WA 98122	September 18, 2009	Removing trees and foliage and replacing it with thousands of panels and other impervious surfaces would greatly increase the risk of severe flooding down to Red Bridge Road and the valley below. The project would also impact the percolation rate into the groundwater, a serious issue in the area. Solvents, chemicals, lubricants, etc. used in the construction and maintenance of this industrial site would leach into the groundwater and Teanaway River. I understand efforts are being made to bring salmon runs to the Teanaway and any potential negative impacts to water quality attributable to the site should be fully examined. See Attachment 6 for complete letter.	A hydrologic analysis was conducted and is included as Attachment F to the Expanded SEPA Checklist Supplement. The solar panels and supporting facilities will be designed and placed to minimize impervious surfaces. Prior to construction TSR will apply for and obtain an NPDES Permit. TSR has performed technical studies and analyses, prepared management plans and mitigation measures that address all of these concerns.	A Hydrologic Analysis is included as Attachment F to the Expanded SEPA Checklist Supplement.
Comment 53	Several other permits may be required.	Water	Department of Ecology Gwen Clear Environmental Review Coordinator	September 18, 2009	Per 173-539A WAC, projects relying on new appropriations of groundwater must be determined by Ecology to be water budget neutral. Prospective groundwater users in the area affected by Chapter 173-539A WAC shall apply to Ecology for a permit to appropriate public groundwater or, if seeking to use the groundwater exemption, shall submit to Ecology a request for determination that the proposed exempt use would be water budget neutral. No new exempt uses under Section 90.44.050 RCW may commence unless Ecology has approved a request for determination that the proposed exempt use would be water budget neutral. Application states that water will either be trucked in or withdrawn from an onsite well. This must be clarified. If water is used for construction, the water purveyor is responsible for ensuring that the proposed uses are within the limitations of their water rights. Individual NPDES Construction Stormwater permit may be required for the project. Control of vegetation by herbicides in and around water courses, including intermittent streams and wetlands may require an aquatic herbicide permit. Solid wastes, solvents and solutions used in cleaning the panels require proper disposal. Exposure of materials and processes to weather may require an NPDES Industrial Permit. See Attachment 7 for complete letter.	A hydrologic analysis was conducted and is included as Attachment F to the Expanded SEPA Checklist Supplement. The solar panels and supporting facilities will be designed and placed to minimize impervious surfaces. Prior to construction TSR will apply for and obtain an NPDES Permit. TSR has performed technical studies and analyses, prepared management plans and mitigation measures that address all of these concerns. TSR does not propose to utilize groundwater during construction and operation.	A Geology and Soils Hazards Evaluation is included as Attachment D to the Expanded SEPA Checklist Supplement. A Hydrologic Analysis is included as Attachment F to the Expanded SEPA Checklist Supplement.

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Comment 54	More information about hydrology is needed	Water	Department of Ecology Gwen Clear Environmental Review Coordinator	September 23, 2009	More information about depth to groundwater is needed to rule out the proposed project's potential impact on wetland hydrology. A geotechnical report was not available for review, and soil mapping unit characteristics were not discussed to support the conclusion. This information should be included in the SEPA. If straw bales are being used as BMPs, weed free straw should be specified for use. See Attachment 9 for complete letter.	See the response to comment 53 above. Facilities have been micro sited to minimize impacts to wetlands and waters.	A Geology and Soils Hazards Evaluation is included as Attachment D to the Expanded SEPA Checklist Supplement. A Hydrologic Analysis is included as Attachment F to the Expanded SEPA Checklist Supplement. A Vegetation Management Plan is included as Attachment G of the Expanded SEPA Checklist Supplement.
Comment 55	Flooding concerns	Earth	Barbara M. Hodgson Box 68 Medina, WA 98039 bmhodgson@comcast.net	October 1, 2009	There are other issues that have not been addressed. Much of the run off that inundated Red Bridge and Wiehl Road during the "Pineapple Express" in January of 2009 came from the hillside where the panels will be placed. See Attachment 24 for complete letter.	See the response to comment 53, above.	A Hydrologic Analysis is included as Attachment F to the Expanded SEPA Checklist Supplement.
Comment 56	Water use questions	Water	Jack N. Hodgson PO Box 68 Medina, WA 98039	October 1, 2009	The need to keep the panels clean in order for them to function and access. The developer recognizes the need and likelihood that there may not be enough water on the property to do this. So, for purposes of the application, they assume water will be trucked to the site and the panels cleaned once a month. With eight panels per section, the 50,000 mounts (according to my math) will be 6-7 yards apart. This density would need to be diminished dramatically to get the necessary wiggle room for large trucks. How many truck loads and how many days does it take to rinse down 400,000 panels? Forget about summer, think about the winter months. The ground is frozen or muddy depending on the time of day and the temperature. Even with paving all of the roadways, how do trucks navigate the hillside? Snow must be plowed. Where does the snow get piled? Can the panels be sprayed in freezing conditions without being harmed? What percentage of the time in winter is the temperature such that the water will evaporate rather than freeze? Where does this much water go? See Attachment 25 for complete letter.	The facilities will be maintained on an as-needed basis. Maintenance activities will comply with applicable regulations and management plans. Any water required for panel maintenance and ongoing operations will be purchased offsite as needed and available.	A Hydrologic Analysis is included as Attachment F to the Expanded SEPA Checklist Supplement.

Comment Number	Issues Raised	SEPA Checklist Category	Commenter	Date Comment Received	Summarized Comment(s)	Response	Documents and Pages in which Comment is Addressed
Comment 57	Drainage	Earth	Reagan Dunn 1370 Loping Lane Cle Elum, Washington Mail To: Reagan Dunn 24488 SE 179 th Street Maple Valley, WA 98038	October 5, 2009	Proper draining for the road and culvert system must be added. The whole hillside along loping lane is unstable. I think something like 2 million dollars in FEMA money was used to rehab the site this spring. Even during normal winter snow runoff the creeks are all full and drain into the Teanaway River in a muddy mess. In January, the floods took out HWY 970 along with Red Bridge Road in a few spots. The applicant wants to put up numerous solar panels on the site. As I read the application, there will be a bunch of access roads and lots of trenching for power lines which will require all of the trees to be cut because the roots will be compromised or the trees are simply in the way. In addition, a buffer will be created. The first problem is that the solar panels don't allow water to pass through them and will act just like a big tarp. Second, clearing this huge amount of trees and other biomass will further reduce the ability of the land to absorb this run off. Believe me, this area already floods EVERY spring. Unless extraordinary measures are taken to mitigate, the flooding will be far worse. (Again, I don't want to stand in the way of this project but it might be wise for the County to consider a full Environment Impact Study for this project--especially with all this drainage running into the Teanaway River.) See Attachment 26 for complete letter.	See the response to comment 53, above.	A Hydrologic Analysis is included as Attachment F to the Expanded SEPA Checklist Supplement. A Vegetation Management Plan is included as Attachment G of the Expanded SEPA Checklist Supplement.
Comment 58	Impervious surfaces	Earth	Barb King Bill King Cle Elum, WA 98922	October 1, 2009	Imagine the drainage problems that nearly 1/2 square mile of impervious solar panels will create in Wiehl Road and Loping Lane. That slope is highly unstable and it failed in no less than four paces earlier this January. See Attachment 29 for complete letter.	See the response to comment 53, above.	A Geology and Soils Hazards Evaluation is included as Attachment D to the Expanded SEPA Checklist Supplement. A Hydrologic Analysis is included as Attachment F to the Expanded SEPA Checklist Supplement.
Comment 59	Drainage	Earth	Jim and Janet Brose 951 Loping Lane Cle Elum, WA	October 5, 2009	Just last spring county engineers roamed the surrounding properties because of severe water runoff and damage along Loping Lane to Red Bridge Rd. after the January 09 flood. The county engineers uncovered little to point to the reason for the flood damage. We personally incurred the loss of over half of our driveway which required fourteen trucks to replace the base that washed away. We can only image the greater threats if the natural vegetation is removed and replaced with panels causing even more erosion from the snow and rain run off. See Attachment 30 for complete letter.	See the response to comment 53, above.	A Geology and Soils Hazards Evaluation is included as Attachment D to the Expanded SEPA Checklist Supplement. A Hydrologic Analysis is included as Attachment F to the Expanded SEPA Checklist Supplement.

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Comment 60	Forest soil impacts, impervious surfaces	Earth	Richard Luchinsinger and Jane McClenney 9300 Brick Mill Road Ellensburg, WA 98926	October 3, 2009	Have you ever studied forest or soils? Hard surface runoff is 100% and immediate. Grasslands, much slower, with only about a 90% total runoff. And forest land is even longer yet, with only 75-80% runoff to the rivers. This is why so many rivers on the west side of the mountains flood even with only heavy rain. It is overdeveloped with a lot of hard surface runoff area. See Attachment 33 for complete letter.	See the response to comment 53, above.	A Geology and Soils Hazards Evaluation is included as Attachment D to the Expanded SEPA Checklist Supplement. A Hydrologic Analysis is included as Attachment F to the Expanded SEPA Checklist Supplement. A Vegetation Management Plan is included as Attachment G of the Expanded SEPA Checklist Supplement.
Comment 61	Stormwater runoff quantity	Water	Jonathan M. Kemp (on behalf of CART), EnCo Environmental Corporation PO Box 1212 Puyallup WA 98371 Telephone: 253.841.9710	December 1, 2009 <i>Note: This comment was received after the public comment period had closed.</i>	Stormwater runoff quantity flowing off of the impervious solar modules and other constructed impervious surfaces to the Teanaway River; a Section 303(d) river and to the Yakima River needs further investigation and assessment. See Attachment 39 for complete letter.	See the response to comment 53, above.	A Hydrologic Analysis is included as Attachment F to the Expanded SEPA Checklist Supplement.
Comment 62	Stormwater runoff quality	Water	Jonathan M. Kemp (on behalf of CART), EnCo Environmental Corporation PO Box 1212 Puyallup WA 98371 Telephone: 253.841.9710	December 1, 2009 <i>Note: This comment was received after the public comment period had closed.</i>	Stormwater runoff quality from washing/rinsing solar modules and the use and application of weed control measures (pesticide and herbicide use) needs further assessment and management. See Attachment 39 for complete letter.	See the response to comment 53, above.	A Hydrologic Analysis is included as Attachment F to the Expanded SEPA Checklist Supplement. A Vegetation Management Plan is included as Attachment G of the Expanded SEPA Checklist Supplement.
Comment 63	Hydrology patterns	Water	Jonathan M. Kemp (on behalf of CART), EnCo Environmental Corporation PO Box 1212 Puyallup WA 98371 Telephone: 253.841.9710	December 1, 2009 <i>Note: This comment was received after the public comment period had closed.</i>	Surface water hydrology patterns to maintain a drinking water source for animal use and to prevent documented and reported down slope flooding during the wet weather months needs further study and protection measures. See Attachment 39 for complete letter.	See the response to comment 53, above.	A Wetland Delineation Report is included as Attachment B to the Expanded SEPA Checklist Supplement. A Hydrologic Analysis is included as Attachment F to the Expanded SEPA Checklist Supplement.
Comment 64	Effects of stormwater runoff and infiltration on surface water	Water	Jonathan M. Kemp (on behalf of CART), EnCo Environmental Corporation PO Box 1212 Puyallup WA 98371 Telephone: 253.841.9710	December 1, 2009 <i>Note: This comment was received after the public comment period had closed.</i>	The effects of the near surface groundwater table and quality due to increased stormwater runoff and infiltration rates needs to be addressed. See Attachment 39 for complete letter.	See the response to comment 53, above.	A Geology and Soils Hazards Evaluation is included as Attachment D to the Expanded SEPA Checklist Supplement. A Hydrologic Analysis is included as Attachment F to the Expanded SEPA Checklist Supplement.

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Comment 65	Water well regulations and usage	Water	Jonathan M. Kemp (on behalf of CART), EnCo Environmental Corporation PO Box 1212 Puyallup WA 98371 Telephone: 253.841.9710	December 1, 2009 <i>Note: This comment was received after the public comment period had closed.</i>	Determine the status of local groundwater withdrawal moratoriums and if present, prohibit the installation of any groundwater well on the project site. Determine the status of any recorded water wells on the project site using the Washington State Well Log Database. Water storage may be needed on or near the project site to contain or extinguish potential grass or forest fires. This needs to be studied further. See Attachment 39 for complete letter.	See the response to comment 53, above.	A Hydrologic Analysis is included as Attachment F to the Expanded SEPA Checklist Supplement.
Recreation							
Comment 66	Proposed project will limit recreational opportunities on the private property of the proposed project.	Recreation	Charles Adams General Manager Pine Hills Ranch LLC	September 17, 2009	Orienteering, skiing, biking has occurred on the property over time. Proposed project will limit these recreational activities. "Hunters frequent the site during the hunting season, looking for deer, elk and bear, which has on occasion caused us problems when they stray on to our property where we do not allow hunting." See Attachment 5 for complete letter.	The proposed project will be built on private land. Historically the landowner has allowed responsible uses of the land by anyone lawfully accessing the site, except for not allowing motorized vehicles on the property. Historically the road to the project site is gated to prevent access. TSR does not intend to change these policies. Responsible access through the project site will be allowed subject to conflicting requirements beyond TSR's control (such as insurance or fire protection), provided that individuals do not interfere with the construction, operations or maintenance of the project. Gating will continue to regulate motorized vehicles but a fence restricting access is not proposed. Historic recreations uses of the site will be permitted to the maximum extent practicable.	Recreational uses are addressed in the Recreation Element of the Expanded SEPA Checklist Supplement.
Comment 67	Adverse Impacts to Orienteering.	Recreation	Mr. and Mrs. Jack Hodgson Partners, Pine Hills Ranch PO Box 68 Medina, WA 98039	September 14, 2009	Construction of the proposed project will not only obsolete this [orienteering] map, it will also terminate this activity entirely. See Attachment 1 for complete letter	See the response to comment 66, above.	Recreational uses are addressed in the Recreation Element of the Expanded SEPA Checklist Supplement.
Comment 68	Access concerns.	Recreation	Barb King Bill King Cle Elum, WA 98922	October 1, 2009	Imagine how you will feel when your access gets cut off to the AFLC property as early as next year. They say they won't but they will need to protect their construction and solar equipment. See Attachment 29 for complete letter.	See the response to comment 66, above.	Recreational uses are addressed in the Recreation Element of the Expanded SEPA Checklist Supplement.
Right of Way							
Comment 69	Supportive of project as long as ROW is not impacted.	Utilities	Lila Black Field Realty Specialist Bonneville Power Administration Ellensburg Maintenance District 14001 Wilson Creek Road Ellensburg, WA 98926	September 30, 2009	BPA does not have any objection to this project as long as any planned buildings and facilities remain off the BPA right-of-way. We do request, however, that the following statement be forwarded to the property owner to help ensure public safety and reliable operation of BPA's facilities. Portions of the property (Kittitas County parcel map number 20-16-27000-0009) located in Section 27, Township 20 North, Range 16 East, W.M., are encumbered by an easement for high-voltage transmission lines owned by the Bonneville Power Administration (BPA). BPA has acquired rights for these easements that limit the landowner's use of this area. BPA has the right of ingress and egress, the right to keep the easement free and clear of all brush, timber, structures and fire hazards, and rights associated with roads within the easement area. All activities planned within the BPA easement need to be reviewed by BPA prior to their occurrence. Do not build, dig, install utilities, plant, or burn within the easement area. For further questions or concerns regarding any proposed uses of the easement, you may contact BPA Real Estate Field Services at the address listed above or by calling (877) 417-9454. See Attachment 20 for the complete letter.	TSR will avoid impacts to the BPA right-of-way and the request will be forwarded to the property owner.	This is addressed in the Project Description of the Expanded SEPA Checklist Supplement.

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Comment 70	Road will be built on road easement	Transportation	Reagan Dunn 1370 Loping Lane Cle Elum, Washington Mail To: Reagan Dunn 24488 SE 179 th Street Maple Valley, WA 98038	October 5, 2009	I am the closest landowner to the site and the road will run THROUGH my property, across a road easement. Those trucks and construction workers will pass about 150 feet from the future home site (where I have spent a ton of money trenching power and phone etc nearly a quarter mile in homes of a pristine retirement home). See Attachment 26 for complete letter.	TSR has been working with the County to ensure proper road improvements and haul routes.	A Transportation Road Plan is included as Attachment I to the Expanded SEPA Checklist Supplement.
Support for Renewable Energy							
Comment 71	Supportive of project and renewable energy	Energy and Natural Resources	Carlos Arriola	September 29, 2009	As a property owner and taxpayer in Kittitas County, I STRONGLY SUPPORT The Teanaway Solar Power Reserve. See Attachment 14 for complete letter.	Comment acknowledged. TSR agrees, and appreciates the support for solar power and this project.	
Comment 72	Supportive of project and renewable energy	Energy and Natural Resources	Mike Haschak 225 19 th Place Kirkland, WA 98033	September 29, 2009	Dear Sirs, as a homeowner in Easton, WA. (51 Homestead Lane), I wanted to express my enthusiastic support of the Teanaway Solar Reserve out of Cle Elum. What a great environmental project. This could not only mean lots of jobs for Kittitas County, but possibly be a worldwide example of a way out of our dependence on oil and coal. See Attachment 15 for complete letter.	Comment acknowledged. TSR agrees, and appreciates the support for solar power and this project	
Comment 73	Supportive of project and renewable energy	Energy and Natural Resources	W. J. Bender Industrial and Engineering Technology Department 400 E. University Way Ellensburg WA 98926-7584	September 29, 2009	We would like to add our public support to the Teanaway Solar Reserve. We have met with Howard Trott and looked at their project description; we feel this is a great opportunity with clear benefits for CWU's department of Industrial and Engineering Technology. The Teanaway Solar Reserve has taken the steps to show its intent to build a much-needed power source while protecting the character and integrity of our natural forest lands. The added benefit of a solar panel manufacturer here in Kittitas County is of even greater importance to this project, because of the jobs and opportunities it provides to our students. The benefits of renewable energy and the jobs this project will bring to Kittitas County in general are immense. When this project becomes a reality we plan to perform applied research in support of the Teanaway Solar Reserve. We encourage you to weigh these benefits and approve a Conditional Use Permit for the Teanaway Solar Reserve. See Attachment 17 for complete letter.	Comment acknowledged. TSR agrees, and appreciates the support for solar power and this project	
Comment 74	Supportive of project and renewable energy, job creation	Energy and Natural Resources	A.K. Wintzer Project Manager Renewable Energy Workforce Training Needs Study 120 South 3 rd Street, Suite 299-A Yakima, WA 98901	September 30, 2009	I would like to express my support for the Teanaway Solar Reserve that is seeking to be developed in the Cle Elum area. It is my understanding that this private project will consist of 400,000 photovoltaic panels spread across 145 acres on a 900 acre of privately owned timberland. During construction this project will create up to 235 badly needed construction jobs. It will require around 35 full-time family wage jobs after construction is completed. As part of this project, the Reserve will require that their solar panel vender locate a manufacturing plant in Cle Elum. Please look favorably on this project so it can move forward and contribute to the economic base of Kittitas County. See Attachment 18 for complete letter.	Comment acknowledged. TSR agrees, and appreciates the support for solar power and this project	
Comment 75	Supportive of project and renewable energy	Energy and Natural Resources	Mike Haschak 225 19 th Place Kirkland, WA 98033	September 29, 2009	I would like to throw my complete support behind this project. As a homeowner in Easton (51 Homestead Lane), I think this would be good for the economy, good for the environment, and possibly have the eyes of the world looking to this project as how things should be done in the 21 st century. What a great opportunity for our area. See Attachment 19 for complete letter.	Comment acknowledged. TSR agrees, and appreciates the support for solar power and this project	

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Comment 76	Supportive of project and renewable energy	Energy and Natural Resources	K.C. Golden Policy Director Climate Solutions	September 15, 2009	The Teanaway Solar Reserve is an example of the kind of project we need many more of in our state. See Attachment 10 for complete letter.	Comment acknowledged. TSR agrees, and appreciates the support for solar power and this project	
Comment 77	Supportive of project and renewable energy	Energy and Natural Resources	Terry Walker	October 1, 2009	I am writing to endorse the Teanaway Solar Reserve project. As an architect I am concerned with the built environment and the expanding carbon footprint, the pollution from coal power plants and the associated waste and health issues. I endorse clean renewable solar power as an imperative step into the most desirable future state. I endorse the expanding green economy. I am in good company in endorsing this project, joined by Senator Murray, Senator Cantwell and U.S Rep. Jay Inslee. The project is rare in its bold vision and serves as a shining example of the promise embodied in the emergent green economy, to create clean energy jobs, renewable power, to lead the way for future projects, to strengthen the local community and to summon from the people of a small community the inspiration to lead a nation. To be among the pioneers who forge a new world is a rare opportunity. In a speech delivered September 22, 2009, President Obama said "No nation, however large or small, wealthy or poor, can escape the impact of climate change." The president of the United states has committed the United States to support renewable energy as a component of an international effort to address our shared global problems. In closing he called upon the people of this nation to take action saying: " So let us begin. For if we are flexible and pragmatic; if we can resolve to work tirelessly in common effort, then we will achieve our common purpose: a world that is safer, cleaner, and healthier than the one we found; and a future that is worthy of our children." I urge the people of Kittitas Co to rise to the moment and approve the Teanaway Solar Reserve Conditional Use Permit Application. To carry the torch and light the way for other communities in the State of Washington, to a clean and sustainable future. See Attachment 22 for complete letter.	Comment acknowledged. TSR agrees, and appreciates the support for solar power and this project	
Comment 78	Supportive of project and renewable energy	Energy and Natural Resources	Rob and Cheri Marusa PO Box 433 South Cle Elum, WA 98943	September 29, 2009	We would like to add our public support to the Teanaway Solar Reserve. Having spoken with Howard Trott and looked at theft project description, we feel this is a great opportunity with clear benefits for the Upper County. The Teanaway Solar Reserve has taken the steps to show its intent to build a much needed power source while protecting the character and integrity of our natural forest lands. The studies on plants and animals show minimal impact to these important resources. Additionally, the working families of our community need a new industry to replace the loss of the timber and mining jobs and slow-down in construction. The added benefit of a solar panel manufacturer here in Cle Hum is of even greater importance to this project. The benefits of renewable energy and the jobs this project will bring to the Cle Elum area and Kittitas County in general are immense. This project has the potential to keep a strong work-force here in the community and draw more projects of this type to the county. We encourage you to weigh these benefits and approve a Conditional Use Permit for the Teanaway Solar Reserve. See Attachment 35 for complete letter.	Comment acknowledged. TSR agrees, and appreciates the support for solar power and this project	

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Comment 79	Supportive of project and renewable energy	Energy and Natural Resources	Charles J. Glondo City of Cle Elum Mayor 119 West First Street Cle Elum, WA 98922	September 18, 2009	As Mayor of the City of Cle Elum I am writing to offer my unqualified support for the Teanaway Solar Reserve Project and respectfully request that the Board of Adjustment approve the Conditional Use Permit for this project. There is significant local interest in seeing this project realized, in terms of the economic and employment benefits to Kittitas County and the Cle Elum area specifically. This project will not only provide a local source of clean energy but will also provide new jobs in Kittitas County. The 200 plus construction jobs created by this project are very much needed in the Upper County and once Teanaway Solar receives permit approval from the County they will work to locate a manufacturing plant in the Cle Elum area which will translate into potentially hundreds of permanent jobs. In addition to the new jobs, there will be an increased demand in goods and services and increased tax revenues for Cle Elum and the County. Again, thank you for the opportunity to comment on this proposed conditional use permit and I urge the Board of Adjustment to approve this application. See Attachment 36 for complete letter.	Comment acknowledged. TSR agrees, and appreciates the support for solar power and this project	
Comment 80	Supportive of project and renewable energy	Energy and Natural Resources	Bill Hinkle Minority Whip State Representative 13 th District 401 John L O'Brien Building PO Box 40600 Olympia, WA 98504-0600	October 8, 2009	I would like to add my public support to the Teanaway Solar Reserve and their request for approval of a Conditional Use Permit for the Teanaway Solar Reserve. I have been briefed on the project and I feel this is a great opportunity with clear benefits for the Upper Kittitas County, and all of Kittitas County and Washington State. The Teanaway Solar Reserve will develop a high-quality renewable energy resource while providing needed economic development and jobs to the area. At the same time, the project will maintain the nature of the Teanaway Valley, which is important to local residents. I see this project as having the potential to develop related jobs and bring other renewable energy industries to our area. I encourage you to weigh these benefits while determining appropriate conditions. I hope you will ultimately approve a Conditional Use Permit in a timely manner. See Attachment 38 for complete letter.	Comment acknowledged. TSR agrees, and appreciates the support for solar power and this project	
Comment 81	Supportive of renewable energy, and of project if mitigation occurs	Energy and Natural Resources	John and Sarah Talley 3008 3 rd Street NE Tacoma, WA 98422	October 5, 2009	In general I'm a supporter of solar and wind power and am excited that there could be some serious jobs potential for the Cle Elum area. Specifically, I could be proud of a big solar electric plant nearby, and so would my kids. I do have some serious concerns about this particular project that I would like to see mitigated by any conditional use permit. See Attachment 37 for complete letter.	Comment acknowledged. TSR agrees. The TSR is working with the County, state agencies, and local landowners to mitigate negative impacts created by the project. While TSR has taken great lengths to consider a variety of factors in facility design and layout, not all impacts are avoidable.	
Traffic							
Comment 82	Will impact local roads	Transportation	Charles Adams General Manager Pine Hills Ranch LLC	September 17, 2009	Applicant paints a picture of very few homes and very little traffic on Wiehl Road, which is incorrect. The project would have very damaging impacts on both Wiehl Road and Loping Lane, due to trucks and heavy equipment making thousands of vehicle trips on these gravel roads. If project is approved, County should require improvement of Wiehl Road to paved County standards. See Attachment 5 for complete letter.	TSR met with the County on 9/23/09 to discuss the road standards improvements to Wiehl Road. Please see the Transportation and Road Plan for a more thorough analysis.	A Transportation Road Plan is included as Attachment I to the Expanded SEPA Checklist Supplement.
Comment 83	Increased traffic due to construction	Transportation	Bart Fite 730 39 th Ave. Seattle, WA 98122	September 18, 2009	...and increased traffic are just a few of the [impacts] that come to mind. See Attachment 6 for complete letter.	See the response to comment 82, above.	A Transportation Road Plan is included as Attachment I to the Expanded SEPA Checklist Supplement.

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Comment 84	Road drawings and details should be provided	Transportation	Department of Ecology Gwen Clear Environmental Review Coordinator	September 23, 2009	Unclear whether the road maps presented included proposed roads. If existing roads will be widened, the needed maximum width should be described. The areas where this would occur should be specifically identified or at least the rationale used to decide if new road is needed should be discussed. An estimate of how much more land disturbance is likely to be required for roads should be provided. Drawings of conceptual road cross-sections and cross-sections of stream crossings should be provided. Attachment 9 for complete letter.	See the response to comment 82, above.	A Transportation Road Plan is included as Attachment I to the Expanded SEPA Checklist Supplement.
Comment 85	Inadequate access roads	Transportation	Reagan Dunn 1370 Loping Lane Cle Elum, Washington Mail To: Reagan Dunn 24488 SE 179 th Street Maple Valley, WA 98038	October 5, 2009	The access road to the site is poor. Even in the spring I have required four wheel chains on full-size 4 wheel drive truck simply to get through the mud roads without snow. With snow I have been stuck no less than six times and required towing. The proposed access road to the site is wholly inadequate for the scale of the site and will need to be improved. Because of drainage problems, discussed later, the road should be a high quality gravel road with steps taken to keep the level of dust down. Culverts must be improved to handle the considerable drainage that runs off in many stream beds. If they are serious about getting vehicles up there from October until late April, the road improvements must be made by the applicant from Red Bridge Road all the way to the American Forrest Property Gate which sits on my property. The CUP should be conditioned on this improvement. See Attachment 26 for complete letter.	See the response to comment 82, above.	A Transportation Road Plan is included as Attachment I to the Expanded SEPA Checklist Supplement.
Comment 86	Adjacent owner threatens gating property	Transportation	Reagan Dunn 1370 Loping Lane Cle Elum, Washington Mail To: Reagan Dunn 24488 SE 179 th Street Maple Valley, WA 98038	October 5, 2009	I built and own the gate at the bottom of lot 1, this will need to be automated to allow construction and also homeowners access. The road easement is NOT a public one. I do not allow tress passing without written permission. The gate must be closed at all times when not actually letting vehicles in. If a passing area is required for trucks, construct it on Lot 2 under the power lines and try not to disturb the gate since it has a Ranch look to it and it was expensive. I don't believe a guard shack is necessary but if one is needed, I would place it by the lower gate (the one I built) just inside of lot two. I would prefer not to have a guard shack just behind my house and in view of it. Not only would he be a very lonely guy in the middle of the night, but it wouldn't make any sense if visitors couldn't get through the lower gate. I request to have a meaningful input as the applicant designs the gate and the policy for entry into the site. See Attachment 26 for complete letter.	TSR proposes to access the project through the use public roads and easement rights conveyed by the lessors. See the response to comment 82, above.	A Transportation Road Plan is included as Attachment I to the Expanded SEPA Checklist Supplement.
Comment 87	Will require written permission for access	Transportation	Reagan Dunn 1370 Loping Lane Cle Elum, Washington Mail To: Reagan Dunn 24488 SE 179 th Street Maple Valley, WA 98038	October 5, 2009	If all of the above is granted, my family will require written permission to access the site. See Attachment 26 for complete letter.	TSR proposes to access the project through the use public roads and easement rights conveyed by the lessors. See the response to comment 82, above.	A Transportation Road Plan is included as Attachment I to the Expanded SEPA Checklist Supplement.
Comment 88	Road improvement	Transportation	Barb King Bill King Cle Elum, WA 98922	October 1, 2009	For those of you who live on Red Bridge Road and Wiehl Road you will really suffer. You will have to endure at least three years of construction. TSR expects to bring up to 450 workers up your road system daily at the peak, with no proposals to fix the roads other than to "work with the Neighbors." See Attachment 29 for complete letter.	See the response to comment 82, above.	A Transportation Road Plan is included as Attachment I to the Expanded SEPA Checklist Supplement.

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Comment 89	Road improvements to support construction	Transportation	John and Sarah Talley 3008 3 rd Street NE Tacoma, WA 98422	October 5, 2009	I'm concerned about Wiehl Road from Red Bridge Road up to Loping Lane (assuming ALL construction traffic turns left at that point). The permit application has no compelling language detailing the extent to which Wiehl Road ought to be rebuilt in order to sustain the pounding of all the heavy trucks over all the seasons. There are a few in my neighborhood who take up collections of dollars, equipment, and many labor hours to patch together and snow plow Wiehl Road simply to keep the road together under a minimal amount of traffic. We know what is needed: Designate Wiehl Road from Red Bridge Road to Loping Lane as officially a "county maintained road" Negotiate a shared cost approach between the appropriate governmental agency and TSR, LLC and rebuild Wiehl Road to meet the true standard of what is needed to withstand multiple years of very heavy construction traffic, increased employee traffic and the heavy impact of snow and snow melt on this poorly built dirt road	TSR met with the County on 9/23/09 to discuss the road standards improvements to Wiehl Road. Please see the Transportation and Road Plan for a more thorough analysis. See the response to comment 82, above.	A Transportation Road Plan is included as Attachment I to the Expanded SEPA Checklist Supplement.
Comment 90	Solar panels will damage vegetation	Water	Charles Adams General Manager Pine Hills Ranch LLC	September 17, 2009	There are a number of meadows and wetlands on the site. Some of these areas dry up with the heat of late summer and some stay wet. In many areas that plan life stays green and the soil damp long after the surface water is gone. Area is habitat for wildlife. See Attachment 5 for complete letter.	TSR has performed technical studies and analyses, prepared management plans and mitigation measures that address all of these concerns.	<p>A Wetland Delineation Report is included as Attachment B to the Expanded SEPA Checklist Supplement.</p> <p>A Hydrologic Analysis is included as Attachment F to the Expanded SEPA Checklist Supplement.</p> <p>A Vegetation Management Plan is included as Attachment G of the Expanded SEPA Checklist Supplement.</p> <p>A Wildlife Mitigation Plan is included as Attachment H of the Expanded SEPA Checklist Supplement.</p>

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Comment 91	Will impact vegetation and cause run-off.	Plants	Charles Adams General Manager Pine Hills Ranch LLC	September 17, 2009	Seed trees would be removed from south slope eliminating habitat, views and buffers and creating substantial water run-off issues, which have not been addressed by the Applicant. See Attachment 5 for complete letter.	See the response to comment 90, above.	A Wetland Delineation Report is included as Attachment B to the Expanded SEPA Checklist Supplement. A Hydrologic Analysis is included as Attachment F to the Expanded SEPA Checklist Supplement. A Vegetation Management Plan is included as Attachment G of the Expanded SEPA Checklist Supplement. A Wildlife Mitigation Plan is included as Attachment H of the Expanded SEPA Checklist Supplement.
Comment 92	Project needs more analysis and supporting data. Is in support of alternative energy.	Plants	Cathie Conolly	September 17, 2009	The Colockum elk herd is present in the area. The project would require the clearing of most vegetation within a 400-acre site. Irrigation needs to be installed to promote the vegetation planted as part of the revegetation effort. Water trucks could be used to help the vegetation become established. See Attachment 12 for complete letter.	See the response to comment 90, above.	A Vegetation Management Plan is included as Attachment G of the Expanded SEPA Checklist Supplement. A Wildlife Mitigation Plan is included as Attachment H of the Expanded SEPA Checklist Supplement. A Transportation Road Plan is included as Attachment I of the Expanded SEPA Checklist Supplement.
Comment 93	Weed impacts.	Plants	Cathie Conolly	September 17, 2009	Spotted and Russian knapweed, mullein, ox-eye daisy, kochia, and perennial pepperweed are common to the site. The proposed project would increase the presence of weeds at the site. See Attachment 12 for complete letter.	See the response to comment 90, above.	A Vegetation Management Plan is included as Attachment G of the Expanded SEPA Checklist Supplement.
Comment 94	Wetland buffers are not adequate.	Water	Department of Ecology Gwen Clear Environmental Review Coordinator	September 23, 2009	More information about the field reconnaissance is needed. The wetland buffers are based on the 1994 County CAO, which is no longer based on the best available science. These buffers should be at least 150 ft. See Attachment 9 for complete letter.	See the response to comment 90, above.	A Wetland Delineation Report is included as Attachment B to the Expanded SEPA Checklist Supplement.
Comment 95	Concerns about clear cutting	Plants	Reagan Dunn 1370 Loping Lane Cle Elum, Washington Mail To: Reagan Dunn 24488 SE 179 th Street Maple Valley, WA 98038	October 5, 2009	Clear cutting to the property line with 100 foot setbacks for the solar panels is really cutting it close, not to make a pun. Setbacks should be at least 500 feet from the property lines and 1000 feet from existing structures or developed home sites like mine. I could accept less if they would work with me on site lines for the solar panels and other structures. See Attachment 26 for complete letter.	TSR will comply with all setbacks outlined in the Kittitas County Code requirements (Chapter 17.56).	A Vegetation Management Plan is included as Attachment G of the Expanded SEPA Checklist Supplement.

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Comment 96	Concerns about clear cutting	Plants	Barb King Bill King Cle Elum, WA 98922	October 1, 2009	If you border the AFLC, they plan on clear-culling a 100 foot wide fire line right to the edge of your property line and only set the solar panels back 100 feet.	The TSR has worked with the County Fire Marshal's Office to develop a vegetation plan to avoid clear-cutting a 100-foot wide fire lines. In most cases, the trees would be "limbed" up to 12 feet per the Fire Code so that the seed source could remain intact. Small shrubs and herbs (<3 feet in height) will be left in place where possible to reduce the potential for storm water runoff.	A Vegetation Management Plan is included as Attachment G of the Expanded SEPA Checklist Supplement. See Attachment M of the Expanded SEPA Checklist Supplement.
Comment 97	More detailed plant survey needed	Plants	Jonathan M. Kemp (on behalf of CART), EnCo Environmental Corporation PO Box 1212 Puyallup WA 98371 Telephone: 253.841.9710	December 1, 2009 <i>Note: This comment was received after the public comment period had closed.</i>	Intuitive and complete native plant floristic surveys were not performed in the springtime when many of the wild flowering plants can be adequately observed and keyed. A more detailed sensitive/priority plant survey needs to be undertaken at the appropriate time(s) of the year. Also local plant enthusiasts, naturalists, and botanists should be consulted. See Attachment 39 for complete letter.	See the response to comment 90, above.	A Sensitive Species Report is included as Attachment A of the Expanded SEPA Checklist Supplement.
Comment 98	Aspen stand evaluation needed	Water/Plants	Jonathan M. Kemp (on behalf of CART), EnCo Environmental Corporation PO Box 1212 Puyallup WA 98371 Telephone: 253.841.9710	December 1, 2009 <i>Note: This comment was received after the public comment period had closed.</i>	The aspen stand needs to be characterized, measured, and protected or mitigated if it is determined to be a priority area. The entire drainage corridor containing the aspen stand needs to be studied in more detail to determine if it meets the criteria for being a wetland. See Attachment 39 for complete letter.	Development will not impact the aspen stand. During construction sensitive areas will be surrounded by construction fencing as necessary.	A Sensitive Species Report is included as Attachment A of the Expanded SEPA Checklist Supplement.
Comment 99	Effects of de-vegetation	Plants	Jonathan M. Kemp (on behalf of CART), EnCo Environmental Corporation PO Box 1212 Puyallup WA 98371 Telephone: 253.841.9710	December 1, 2009 <i>Note: This comment was received after the public comment period had closed.</i>	Specific details on mitigating measures were not clearly identified from the effects of the planned clearing and de-vegetation to the priority and/or sensitive native vegetation and wildlife habitat. See Attachment 39 for complete letter.	See the response to comment 90, above.	A Wildlife Mitigation Report is included as Attachment H to the Expanded SEPA Checklist Supplement.
Comment 100	Vegetation management plan	Plants	Jonathan M. Kemp (on behalf of CART), EnCo Environmental Corporation PO Box 1212 Puyallup WA 98371 Telephone: 253.841.9710	December 1, 2009 <i>Note: This comment was received after the public comment period had closed.</i>	A vegetation management plan needs to be prepared to protect natural areas from over growth and spreading of nuisance, exotic, or non-indigenous native vegetation from standard seed mixtures to be planted for erosion and sediment control and beneath the solar panels. In addition, non-native vegetation growing. See Attachment 39 for complete letter.	See the response to comment 90, above.	A Vegetation Management Plan is included as Attachment G of the Expanded SEPA Checklist Supplement.
Comment 101	Visual impacts to adjacent property owners.	Light and Glare	Michael R. Hansen Resident of land adjacent to the proposed Solar Farm Parcel ID 14725, Tax Parcel Number 20-16-23000-0016	September 17, 2009	The current development agreement calls for cutting down all trees up to my property line, creating an open space for a fire break, with vast clusters of shiny solar panels connected by roads just beyond. See Attachment 4 for complete letter.	TSR has performed technical studies and analyses, prepared management plans and mitigation measures that address all of these concerns.	A Vegetation Management Plan is included as Attachment G of the Expanded SEPA Checklist Supplement. A Transportation and Road Plan is included as Attachment I of the Expanded SEPA Checklist Supplement. The Kittitas County Fire District 7 Contract for Services is included as Attachment M of the Expanded SEPA Checklist Supplement.

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Comment 102	Visual impacts to adjacent property owner	Aesthetic	Michael R. Hansen Resident of land adjacent to the proposed Solar Farm Parcel ID 14725, Tax Parcel Number 20-16-23000-0016	September 17, 2009	Our neighborhood will be drastically affected by this project. The plant will be an extreme eyesore. They intend to cut down all trees in a 100' firebreak (and elk fence?) adjacent to our properties and to cut down most of the rest of the trees. A 2,000' side of the proposed farm is visible from our house all the way up to the ridge top – over half a mile, where they will cut all trees on the crest as well. 650' of the project is adjacent to our property. See Attachment 4 for complete letter.	Please see the response to comment 101, above. TSR will comply with all setbacks outlined in the Kittitas County Code requirements (Chapter 17.56).	A Vegetation Management Plan is included as Attachment G of the Expanded SEPA Checklist Supplement. A Potential Visual Impact Assessment is included as Attachment L of the Expanded SEPA Checklist Supplement. The Kittitas County Fire District 7 Contract for Services is included as Attachment M of the Expanded SEPA Checklist Supplement.
Comment 103	Visual Impacts.	Aesthetic	Charles Adams General Manager Pine Hills Ranch LLC	September 17, 2009	Applicant downplays visual impact of its constructed facility. Neighbors along the south line will be looking directly at a hillside lined with solar arrays with minimal setbacks. Visual issues should be evaluated in a full EIS. See Attachment 5 for complete letter.	Please see the response to comment 101, above.	A Potential Visual Impact Assessment is included as Attachment L of the Expanded SEPA Checklist Supplement.
Comment 104	Visual impacts to adjacent property owners.	Aesthetic	Bart Fite 730 39 th Ave. Seattle, WA 98122	September 18, 2009	...visual impacts from nearby and across the valley... See Attachment 6 for complete letter.	Please see the response to comment 101, above.	A Potential Visual Impact Assessment is included as Attachment L of the Expanded SEPA Checklist Supplement.
Comment 105	Adjacent property owners will see the site.	Aesthetic	Mr. and Mrs. Jack Hodgson Partners, Pine Hills Ranch PO Box 68 Medina, WA 98039	September 14, 2009	The developer's press release claims that no one can see the site. <u>This is not true</u> . Everyone nearby will feel its presence. It will be seen from the half dozen or so houses in the immediate area <u>and</u> by others located across the valley. To resemble the site illustration in the Application, most of these trees would have to be cleared. This would have a very negative effect on the view of the Ridge from below and from across the valley. We request that everyone participating in the approval process visit the site in person with members of our ownership group and these maps and photographs so they can validate these facts for themselves. See Attachment 1 for complete letter	Please see the response to comment 101, above.	A Potential Visual Impact Assessment is included as Attachment L of the Expanded SEPA Checklist Supplement.
Comment 106	Wants a 200-ft vegetated buffer to reduce impacts	Aesthetic	Cathie Conolly	September 17, 2009	Request that the project provide a 200-foot buffer of existing trees and vegetation for the properties to the south. The visual impact technical memo did not address impacts to the closest properties. See Attachment 12 for complete letter.	Please see the response to comment 101, above.	A Vegetation Management Plan is included as Attachment G of the Expanded SEPA Checklist Supplement. A Potential Visual Impact Assessment is included as Attachment L of the Expanded SEPA Checklist Supplement.

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Comment 107	Visual impacts	Aesthetic	Barbara M. Hodgson Box 68 Medina, WA 98039	October 1, 2009	The public has been led to believe that no one can see the solar area except by plane. Based on the conceptual placement of the panels outlined in the document, this is not true. There are seven or eight houses on adjoining property which will look directly onto a hillside of panels with minimal setbacks and screening. The proposed area that would include solar panels and infrastructure is over 500 acres. It's a HUGE piece of property. In addition to the visual impact on neighboring properties, it is obvious that some of this solar paneled area will be seen from the valley, I90, and from the hills across the valley. See Attachment 24 for complete letter.	Please see the response to comment 101, above.	A Potential Visual Impact Assessment is included as Attachment L of the Expanded SEPA Checklist Supplement.
Comment 108	Visual impacts	Aesthetic	Jack N. Hodgsontel PO Box 68 Medina, WA 98039	October 1, 2009	Not only are there homes abutting the proposed site some of which are new and substantial, you can stand on the property and look across the valley and see many other homes and I90. What you can see can see you. See Attachment 25 for complete letter.	Please see the response to comment 101, above.	A Potential Visual Impact Assessment is included as Attachment L of the Expanded SEPA Checklist Supplement.
Comment 109	Visual impacts due to transmission lines	Aesthetic	Reagan Dunn 1370 Loping Lane Cle Elum, Washington Mail To: Reagan Dunn 24488 SE 179 th Street Maple Valley, WA 98038	October 5, 2009	They should be buried, regardless of the cost. If not buried, they should be as low to the ground as possible with the fewest trees cut as possible. Also, they should be required to use the brown/rusty single power polls that look like tree trunks. A 300 foot wide clear cut with huge power polls would really kill the rural feel up there and it doesn't need to if properly designed. See Attachment 26 for complete letter.	Please see the response to comment 101, above.	Potential Visual Impact Assessment is included as Attachment L of the Expanded SEPA Checklist Supplement.
Comment 110	Visual impacts due to substation	Aesthetic	Reagan Dunn 1370 Loping Lane Cle Elum, Washington Mail To: Reagan Dunn 24488 SE 179 th Street Maple Valley, WA 98038	October 5, 2009	This feature should be placed WELL back into the applicant's property out of site from all landowners at least 1000 feet. I could handle some power lines, but an substation that is fenced is in sight of the home site is unnecessary. Applicant should bear the cost of adding a few more feet of power lines and place it well back on the American Forrest property and nowhere near lots 1, 2 and 3. Not on lot 2, where the access road exists. An appropriate fence should be as small as possible should be used to hide the station and minimize its appearance to neighboring properties.	Please see the response to comment 101, above.	A Potential Visual Impact Assessment is included as Attachment L of the Expanded SEPA Checklist Supplement.
Comment 111	Visual impacts	Light and Glare	Barb King Bill King Cle Elum, WA 98922	October 1, 2009	400,000 solar panels will be perched on top of Cle Elum Ridge directly above SR 970. The site will consist of shiny solar arrays nearly TWO MILES across. These arrays will be visible in ALL directions for up to 8 miles, including from 1-90, SR 970, and even parts of Cle Elum! Imagine what 400,000 shiny solar panels will look like 100 feet behind your fence with a clear cut between you and them.	Please see the response to comment 101, above.	A Potential Visual Impact Assessment is included as Attachment L of the Expanded SEPA Checklist Supplement.

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Comment 112	Visual Impacts	Aesthetic	Jim and Janet Brose 951 Loping Lane Cle Elum, WA	October 5, 2009	Directly behind our home is a southern facing hillside which appears slated to be populated with hundreds of these panels? The articles we have read have repeatedly suggested the panels would not be visible to anyone except from the air. Yet, if the program proceeds why must it be located directly out our door?	<p>Please see the response to comment 101, above.</p> <p>The proposed site of the Teanaway Solar Reserve was selected for its south facing slope, maximizing the amount of sunlight the panels receive in the summer and winter; the annual 300 days of sunlight in the area; and its close proximity to major transmission lines which increases efficiency of energy transmission to the grid. The Bonneville Power Administration's (BPA) 345-kilovolt (kV) Rocky Reach-Maple Valley transmission line is in close proximity to the site, running east to west along the southern site boundary. Siting the project close to the existing BPA transmission line significantly minimizes the environmental impacts that could arise from using other sites further away from the line.</p> <p>In addition, the property is not occupied by any threatened or endangered species, such as the northern spotted owl, nor does it contain any high quality habitats, such as shrub steppe grasslands. The site has been managed for commercial timber harvesting and has had frequent contact with machinery and human activity.</p>	A Potential Visual Impact Assessment is included as Attachment L of the Expanded SEPA Checklist Supplement.
Comment 113	Visual impacts	Aesthetic	Bill King	October 1, 2009	My wife and I have a home straight across 970 and, if this is built, it will be ruining one of the most beautiful views of the Stewart Mountains in the area. (Althoug [sic] all of our neighbors would probably say theirs is the best). It would surprise me that you haven't heard from them. You would be more than welcome to come to our place and sit with us in the front yard and try to picture the change to our view. This will certainly have a negative effect on the value of our home, See Attachment 31 for complete letter.	Please see the response to comment 112, above.	A Potential Visual Impact Assessment is included as Attachment L of the Expanded SEPA Checklist Supplement.
Comment 114	Visual impacts	Aesthetic	Richard Luchinsinger and Jane McClenney 9300 Brick Mill Road Ellensburg, WA 98926	October 3, 2009	And finally, this would be a blight on the landscape for visual reasons. See Attachment 33 for complete letter.	Please see the response to comment 101, above.	A Potential Visual Impact Assessment is included as Attachment L of the Expanded SEPA Checklist Supplement.

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Comment 115	Visual Impacts	Aesthetic	John and Sarah Talley 3008 3 rd Street NE Tacoma, WA 98422	October 5, 2009	The TSR marketing pronouncements and public statements are not matching up with the details in the permit application. I specifically recall them saying that the area was already logged there were trees all around the perimeter nearby homeowners would not even see the panels. The early PR work (quoted on the company's website) gives the distinct impression that the project will be non-invasive and hardly noticeable – <i>"It was logged for so there's a row of trees left around it so we have a great natural buffer," said Trott. (Aug 9, 2009). Also.... "The site has been heavily logged in the past, but is surrounded by Ponderosa pine forest that will screen the array from view, Trott said."</i> But the application that I and others read on-line show that the company plans to clear-cut a 100 foot fire protection rim around the border and then install panels right up to that point. That will produce a starkly visible industrial plant footprint that will be glaringly visible. Speaking of glare, the permit application contains language denying that these photovoltaic panels will produce glare. That is much less than hard to believe. My neighbors and I would greatly prefer that IF the conditional use permit is granted that some conditions be imposed on the TSR LLC – keeping a negotiated healthy size border of trees around the panels (as implied by the company originally) and somehow visually softening up any clearcutting of a 100' fire boundary. Naturally my neighbors and I are concerned about the southern border directly above the Goodwins, Hansen, and Milt Kuolt property up to the Pine Hill Ranch eastern border. See Attachment 37 for complete letter.	Please see the response to comment 101, above.	A Vegetation Management Plan is included as Attachment G of the Expanded SEPA Checklist Supplement. A Potential Visual Impact Assessment is included as Attachment L of the Expanded SEPA Checklist Supplement. The Kittitas County Fire District 7 Contract for Services is included as Attachment M of the Expanded SEPA Checklist Supplement.
Wildlife							
Comment 116	Will block migratory routes.	Animals	Mr. and Mrs. Jack Hodgson Partners, Pine Hills Ranch PO Box 68 Medina, WA 98039	September 14, 2009	Because of steep cliffs to the East and West, the proposed "industrial site" blocks the primary access from which game enters our property. Game will not walk through such a grid regardless of how high the panels are raised. See Attachment 1 for complete letter.	TSR has performed technical studies and analyses, prepared management plans and mitigation measures that address all of these concerns.	A Wildlife Mitigation Report is included as Attachment H of the Expanded SEPA Checklist Supplement.
Comment 117	Impacts to elk and deer habitat.	Animals	Washington Department of Fish and Wildlife Mark S. Teske South Central Region Ellensburg District Office 201 N. Pearl Ellensburg, WA 98926	September 16, 2009	This area is key winter range for deer and elk. The amount of winter range dictates how many animals an area can support. Preventing the reestablishment of vegetation reduces habitat. Bull elk rubbing antlers on solar panels may cause damage and lead to a fence, further cutting off wintering habitat. No mitigation is currently proposed to off-set these aspects. Kittitas County has not updated their CAO. The proposed project is in an area that WDFW will propose as a critical area in the future. A cautious approach is warranted if potential critical habitat is at risk of elimination especially when reduced habitat availability is already limiting wildlife populations. Locating the panels in a manner that avoids any conflict with commercial forest would also be a buffer for wildlife species in the adjacent lands. See Attachment 2 for complete letter.	Please see the response to comment 116, above.	A Wildlife Mitigation Report is included as Attachment H of the Expanded SEPA Checklist Supplement.
Comment 118	Impacts to elk and deer habitat.	Animals	Sam and Claudette Maybo 5607 169 th Pl. S.W. Lynnwood, WA 98037	September 17, 2009	The project "will be interfering with the natural migrating path and breeding area for many animals," including elk and deer. See Attachment 3 for complete letter.	Please see the response to comment 116, above.	A Wildlife Mitigation Report is included as Attachment H of the Expanded SEPA Checklist Supplement.

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Comment 119	Project will disrupt wildlife corridor.	Animals	Michael R. Hansen Resident of land adjacent to the proposed Solar Farm Parcel ID 14725, Tax Parcel Number 20-16-23000-0016	September 17, 2009	There needs to be written language in the development agreement regarding no fences and retention of a suitable amount of tree clusters and vegetation to support the large amount of wildlife and provide a wildlife corridor. See Attachment 4 for complete letter.	Please see the response to comment 116, above. TSR does not currently propose to install a fence around the facility.	A Wildlife Mitigation Report is included as Attachment H of the Expanded SEPA Checklist Supplement.
Comment 120	Will impact wildlife	Animals	Charles Adams General Manager Pine Hills Ranch LLC	September 17, 2009	Wildlife are not concerned with property lines, unless there is fencing, and there currently no fencing. Fencing cannot be addressed in a "conceptual" manner. We do not know if there are spotted owls or other endangered birds on the site, but the Applicant's brief and superficial survey does not adequately address this possibility. Applicant's wildlife field studies also failed to establish wildlife baselines for the different seasons of the year, even though the variety and number of a given species can change dramatically by season. Applicant's wildlife study conducted over a five day period is inadequate to truly gage the impact of this project on animals in the area. See Attachment 5 for complete letter.	Please see the response to comment 119, above.	A Wildlife Mitigation Report is included as Attachment H of the Expanded SEPA Checklist Supplement.
Comment 121	Impact to wildlife habitat and corridors	Animals	Bart Fite 730 39 th Ave. Seattle, WA 98122	September 18, 2009	An array of thousands of panels sitting on concrete and steel bases and requiring regular maintenance would destroy habitat and form a significant barrier to wildlife, include the elk, deer, coyote, bear, cougar, and various other small animals that frequent the area. The applicants state it will not fence the property, but this seems unlikely as the applicant would want to protect its investment- and fencing would clearly have severe impacts to wildlife corridors. Significant numbers of trees and other foliage would have to be clear cut, denuding the site area of valuable shade cover, bird and wildlife habitat, and erosion control. See Attachment 6 for complete letter.	Please see the response to comment 119, above.	A Wildlife Mitigation Report is included as Attachment H of the Expanded SEPA Checklist Supplement.
Comment 122	Fence could impact elk and deer habitat.	Animals	Richard Robbins 154 Lake Washington Blvd. East Seattle, WA 98112	September 18, 2009	Member of Pine Hills Ranch who states that he is generally in favor of renewable energy projects. Opposes the project due to its location and environmental impacts. The site should be protected from vandals by a fence; however, a fence would restrict wildlife movement. See Attachment 11 for complete letter.	Please see the response to comment 119, above.	A Wildlife Mitigation Report is included as Attachment H of the Expanded SEPA Checklist Supplement.
Comment 123	Project needs more analysis and supporting data.	Animals	Cathie Conolly	September 18, 2009	Information from the Rocky Mountain Elk Foundation shows that elk are unlikely to move underneath the panels. Only one corridor is planned between the two main portions of the solar panels and it does not connect with properties to the south and east of the site, where elk movement is common. Incorporation of additional wildlife corridors is necessary. See Attachment 12 for complete letter.	Please see the response to comment 116, above.	A Wildlife Mitigation Report is included as Attachment H of the Expanded SEPA Checklist Supplement.
Comment 124	Wildlife impacts	Animals	Bonnie Robbins 154 Lake Washington Blvd. East Seattle, WA 98112	September 17, 2009	Impacts to the diversity of wildlife in the area would be disastrous. Elk movement would be disrupted. The development would impact the cougars in the area.	Please see the response to comment 116, above.	A Wildlife Mitigation Report is included as Attachment H of the Expanded SEPA Checklist Supplement.

Comment Number	Issues Raised	SEPA Checklist Category	Commenter	Date Comment Received	Summarized Comment(s)	Response	Documents and Pages in which Comment is Addressed
Comment 125	Cougar information	Animals	Perry Harvester 1701 South 24 th Avenue Yakima, Washington 98902-5720	September 28, 2009	Concern has been expressed regarding what is depicted in the map titled "Cougar locations in vicinity of proposed solar reserve", which was attached to and submitted with our comment letter. The data is from "Project CAT", a research project, involving Washington Department of Fish and Wildlife (WDFW) scientists, a carnivore research institute, and the Cle Elum School District. There were 2116 total cougar locations (shown as red dots) identified from GPS collars in the map. The collars were set to provide location signals at four to six hour intervals. The data has not been analyzed or interpreted yet. See Attachment 21 for complete letter.	Comment acknowledged.	
Comment 126	Elk concerns	Animals	Chuck Adams General Manager Pine Hills Ranch LLC	August 27, 2009	As adjoining neighbors, we see a lot of the elk herd, and some of the company environmental statements about the herd seem erroneous to us. See Attachment 23 for complete letter	Please see the response to comment 116, above.	A Wildlife Mitigation Report is included as Attachment H of the Expanded SEPA Checklist Supplement.
Comment 127	Wildlife impacts	Animals	Barbara M. Hodgson Box 68 Medina, WA 98039	October 1, 2009	The document states that there is no wildlife of note on the property. In fact, a large elk herd is present in the area from mid- October to May, and we have seen significant birdlife, deer, cougar, coyotes, and an occasional bear and turkey. None of this wildlife is likely to wander through a maze of concrete pillars topped with solar panels spaced about six yards apart. No fences are proposed at this time but given the value of the panels, one can not be sure that fences won't be required in the future. See Attachment 24 for complete letter.	Please see the response to comment 116, above.	A Wildlife Mitigation Report is included as Attachment H of the Expanded SEPA Checklist Supplement.
Comment 128	Elk impacts	Animals	Jack N. Hodgson PO Box 68, Medina, WA 98039	October 1, 2009	There is an estimate for the cost of the panels at \$300,000,000 and a statement that access must be restricted but the area would not be fenced so the elk can move through. But how can all of this equipment be secured from man without a fence or full time guard force of considerable numbers? We are dealing with a minimum perimeter of 2.5 miles. I can't imagine elk walking through this maze of concrete and metal with or without a fence. This is not just a migratory route for elk. It is their home for most of the year excluding the summer months. See Attachment 25 for complete letter.	Please see the response to comment 116, above.	A Wildlife Mitigation Report is included as Attachment H of the Expanded SEPA Checklist Supplement.
Comment 129	Wildlife impacts	Animals	Jim and Janet Brose 951 Loping Lane Cle Elum, WA	October 5, 2009	We also question how easily the impact to the natural wildlife has been dismissed in the presentations of these plans for the solar reserve. We have the good fortune to enjoy much of the animal population, yet the removal of their natural habitat will certainly change our lives and theirs especially. To reestablish the lost vegetation as a result of the construction will take years. The idea of a fence in the area further limiting food for the wildlife and significantly changing the rural appeal just boggles our minds. What are these commissioners thinking? See Attachment 30 for complete letter.	Please see the response to comment 116, above.	A Wildlife Mitigation Report is included as Attachment H of the Expanded SEPA Checklist Supplement.

Comment Number	Issues Raised	SEPA Checklist Category	Commenter	Date Comment Received	Summarized Comment(s)	Response	Documents and Pages in which Comment is Addressed
Comment 130	Wildlife impacts	Animals	Richard Luchinsinger and Jane McClenney 9300 Brick Mill Road Ellensburg, WA 98926	October 3, 2009	Deer, elk, and other wildlife would be totally displaced. Look at what's even happening with Suncadia. They are having trouble with deer and elk there, which would force even more wildlife onto 1-90. We also have to remember tree, shrubs and other plants is the only true air conditioning this earth has. Their development would destroy all this. We would have to cut down even more trees as more houses were built and power lines go in. If you want to really be "green" pass laws that make all new building and remodels have solar and some type of wind power. Other countries are already doing so, and eventually we will have to get there as well. See Attachment 33 for complete letter.	Please see the response to comment 116, above.	A Wildlife Mitigation Report is included as Attachment H of the Expanded SEPA Checklist Supplement.
Comment 131	Elk Impacts	Animals	Jonathan M. Kemp (on behalf of CART), EnCo Environmental Corporation PO Box 1212 Puyallup WA 98371 Telephone: 253.841.9710	December 1, 2009 <i>Note: This comment was received after the public comment period had closed.</i>	Perform a more detailed assessment of the elk populations on the project site during the months when they would be expected to be present. See Attachment 39 for complete letter.	Please see the response to comment 116, above.	A Wildlife Mitigation Report is included as Attachment H of the Expanded SEPA Checklist Supplement.
Comment 132	Bird Impacts	Animals	Jonathan M. Kemp (on behalf of CART), EnCo Environmental Corporation PO Box 1212 Puyallup WA 98371 Telephone: 253.841.9710	December 1, 2009 <i>Note: This comment was received after the public comment period had closed.</i>	Perform a more detailed bird study on the project site to include the identification and mapping of owl, quail, turkey, blue bird, heron, eagle, hawks, songbirds, woodpeckers, or other sensitive birds. See Attachment 39 for complete letter.	Per standard field survey protocol for biological surveys, experienced biologists first conducted a desk top survey of the relevant databases and data maintained by state and federal agencies. The conclusion from this review was that federal or state listed species (endangered or threatened) species were unlikely to occur on the project site. Biologists conducted field surveys for such species and compiled a list of all bird species observed within the project site.	A Wildlife Mitigation Report is included as Attachment H of the Expanded SEPA Checklist Supplement.
Comment 133	Insect Impacts	Animals	Jonathan M. Kemp (on behalf of CART), EnCo Environmental Corporation PO Box 1212 Puyallup WA 98371 Telephone: 253.841.9710	December 1, 2009 <i>Note: This comment was received after the public comment period had closed.</i>	A detailed insect survey should be undertaken and the results presented. See Attachment 39 for complete letter.	Please see the response to comment 132, above.	A Wildlife Mitigation Report is included as Attachment H of the Expanded SEPA Checklist Supplement.
Comment 134	Bat Impacts	Animals	Jonathan M. Kemp (on behalf of CART), EnCo Environmental Corporation PO Box 1212 Puyallup WA 98371 Telephone: 253.841.9710	December 1, 2009 <i>Note: This comment was received after the public comment period had closed.</i>	A bat habitat assessment should be undertaken and results presented. See Attachment 39 for complete letter.	Please see the response to comment 132, above.	A Wildlife Mitigation Report is included as Attachment H of the Expanded SEPA Checklist Supplement.
Comment 135	Protect wildlife corridors from light	Animals/Lighting	Jonathan M. Kemp (on behalf of CART), EnCo Environmental Corporation PO Box 1212 Puyallup WA 98371 Telephone: 253.841.9710	December 1, 2009 <i>Note: This comment was received after the public comment period had closed.</i>	Wildlife corridors will need protection from lighting features by installing or incorporating mitigation measures such as: installing blinds, fences, or by positioning and aligning lights so not to be directed into natural areas. See Attachment 39 for complete letter.	Please see the response to comment 116, above.	A Wildlife Mitigation Report is included as Attachment H of the Expanded SEPA Checklist Supplement.
Comment 136	Wildlife impacts	Animals	Jonathan M. Kemp (on behalf of CART), EnCo Environmental Corporation PO Box 1212 Puyallup WA 98371 Telephone: 253.841.9710	December 1, 2009 <i>Note: This comment was received after the public comment period had closed.</i>	Prohibit fencing in areas frequented by migrating wildlife such as elk. See Attachment 39 for complete letter.	Please see the response to comment 119, above.	A Wildlife Mitigation Report is included as Attachment H of the Expanded SEPA Checklist Supplement.
Comment 137	Wildlife Impacts	Animals	Jonathan M. Kemp (on behalf of CART), EnCo Environmental Corporation PO Box 1212 Puyallup WA 98371 Telephone: 253.841.9710	December 1, 2009 <i>Note: This comment was received after the public comment period had closed.</i>	The possible effects of burning cleared and grubbed vegetation to surrounding wildlife and humans needs to be studied and controlled in a safe manner. See Attachment 39 for complete letter.	It is TSR's intent not to burn woody debris, slash, or logging refuse. Any woody debris chipped on site will be put to a beneficial use (e.g. chipped material will be sent to a compost facility, used for paper or ground cover). If burning is necessary, TSR will secure the necessary permits from the Department of Ecology and no more than approximately 130 consumable tons of material will be burned.	This beneficial reuse statement is included in the Air Element and in the Vegetation Management Plan as Attachment G in the Expanded SEPA Checklist Supplement.

Attachment 1

Mr. & Mrs. Jack Hodgson
Partners, Pine Hills Ranch
PO Box 68, Medina, WA
98039

September 14, 2009

Ms. Anna Nelson
Kittitas County Community Services Department
411 N. Ruby St. Ste 2
Ellensburg, WA 98926

Dear Ms. Nelson

Barbara and I are members of the Pine Hills Ranch Partnership which owns 500 acres abutting the South and East boundaries of the proposed Teanaway Solar Reserve construction site on Cle Elum Ridge. Pine Hills Partnership, formed in 1980, is owned by 11 families, including approximately 100 individuals in three generations. There are three residences on the property: a homesteader's cabin which may be 100 years old, a cottage, and a log cabin built 25 years ago by children of the partners. The residences are powered by generators and served by a common well.

We own the property because of its pastoral setting which is ideally suited for:

- Family activities

- Hiking and cross country skiing

- Having wild game around including a large herd of elk during the fall and winter months, deer, bears, cougars, coyotes, and one wild turkey

- Orienteering

- Attending work parties to repair and maintain the property and its accoutrements.

Thirty years ago, the Cascade Orienteering Club obtained our permission to include Pine Hills Ranch on a map which they produced for competition. This map includes the Teanaway Solar Reserve site as well. It was produced by a cartographer, Debbie Newell, from the University of Washington who worked with US Geodetic survey maps and aerial photographs and two Swedish Orienteerers who flew here and spent 30 days on the property by horseback and foot mapping all rocks and depressions of any significance. This map is officially recognized by the United States Orienteering Federation and has been very costly to create and maintain. The first meet in 1980 was an International competition. Subsequent orienteering meets have been hosted by the Cascade Orienteering Club, the Ellensburg Orienteering Club, the Sammamish Orienteering Club, and our Partnership. We have had over 200 participants compete in a single meet. Construction of the proposed project will not only obsolete this map, it will also terminate this activity entirely.

The Developer's project would also severely restrict the amenities we and the neighborhood enjoy. Because of steep cliffs to the East and West, the proposed "industrial site" blocks the primary access from which game enters our property. Make no mistake about it. What looks like an industrial activity is an industrial activity and this use is inconsistent with all of the present uses in this neighborhood. We do not dispute that the project is a worthwhile endeavor. It just seems that locating the Thermal Reserve elsewhere such as between Hanford and Vantage or in other locations proximate to transmission lines would better serve everyone's needs. Though the effect would be similar, no one would approve storing nearly 100,000 Volkswagens on the site. (Please see Attachment "Site Math".)

Visualize just how big 400 acres is. It's the size of the University of Washington campus without the sports fields and parking lot. Across the valley from the south slope there is a large previously cut timber tract which looks huge. But, it is about half the size of the proposed Thermal Reserve. The developer's press release claims that no one can see the site. This is not true. Everyone nearby will feel its presence. It will be seen from the half dozen or so houses in the immediate area and by others located across the valley. You can even see I 90 from the site. 400,000 panels 3.3' x 5.3' in sections of eight will cover 40% of the site and, on this basis, there will be only 6.2 yards between the 50,000 panel pedestals which are fairly bulky. Game will not walk through such a grid regardless of how high the panels are raised.

Further in these regards, the Developer's press release says that the area in question was clear cut in 2000 and is south facing on Cle Elum Ridge. These statements are incorrect. The only logging accomplished was selective and some of the proposed usage areas were not logged at all. We cannot access the western portion of the site because access is barred by a locked gate located on Loping Road where it crosses under the power lines but we can state the following: The area formed by the rectangle in the far northeast corner is north of Cle Elum Ridge and slopes to the east and north. For approximately the next 800 yards Westerly on the south side of the Ridge there is no evidence of recent logging. This land is a glade of fairly large trees and open space. To resemble the site illustration in the Application, most of these trees would have to be cleared. This would have a very negative effect on the view of the Ridge from below and from across the valley. We do not know yet what happens further west on the site but we would like to be permitted access via Loping Road so we could see the impact on that property albeit it is less visible from off the site than is the easterly portion. (A letter being prepared by our partnership as a whole will include a map and photographs which depict and verify these conditions.)

We request that everyone participating in the approval process visit the site in person with members of our ownership group and these maps and photographs so they can validate these facts for themselves.

At least one thousand "consultant days" were probably expended in preparing the hundreds of pages included in the Application and SEPA documents. There has been limited publicity about the opportunity for citizen response. What is mentioned in the official documents is not seen by the vast majority of interested individuals who would respond singly. It seems very unreasonable to provide an individual or family but 15 days of response time to comment on the Conditional Use Permit. We had about 10 days once we learned of the end date. We know the property and have access to it. This is not a reasonable period of time for input from the general public. We hope you will extend this period of time for response and deliberation.

In summary, we think this project, if approved, would be like a drive-in movie theater: Perhaps good for the town BUT terrible for the neighborhood. We hope the project could be placed in a more suitable location and still retain the same economic and access advantages as this site may have. We expect that the other home and land owners nearby whom you have identified feel the same way. Upon further investigation, we believe you and the notables who have come out in favor of this Project will find it to be more “Brown” than “Green.”

Thank you for the opportunity to comment.

Sincerely,

Jack and Barbara Hodgson

cc: Mr. Kirk Holmes, Interim Director
Kittitas County Community Services Department
411 N. Ruby St. Ste. 2,
Ellensburg, WA 98926

Attachment: Site Math

400 acres = 17,424,000 sq.ft.

400,000 panels times 3.3' x 5.3' per panel = 6,996,000 sq.ft.

This equates to 40% site coverage assuming no new roads are required and that all of the space is usable.

Assuming panels of 8, there would be 50,000 panels. This amounts to 348 sq. ft. per panel and 6.2 yards separation between panel pedestals in each direction over the entire site.

A Volkswagen Beattle is 76 sq. ft. This means you could park 95,000 cars using the same 40% site coverage factor. 95,000 Beattles! That's a lot !

Attachment 2



State of Washington

Department of Fish and Wildlife

South Central Region – Ellensburg District Office, 201 North Pearl, Ellensburg, WA 98926

Phone: (509) 962-3421, Fax (509) 925-4702

September 16, 2009

Ms. Anna Nelson
Kittitas County
Community Development Services
411 N. Ruby St. Suite 2
Ellensburg, WA 98926

RECEIVED
SEP 16 2009
Kittitas County
CDS

RE: Teanaway Solar Reserve (CU -09-00005)

The Washington State Department of Fish and Wildlife appreciates the opportunity to provide comments to Kittitas County regarding the proposed Solar Reserve within the Teanaway River Watershed.

This proposed site is approximately 1,000 acres in size and is undeveloped. There is a long history of commercial forestry and forest management on the site. The site is currently forested with an under story of grasses, forbs and shrubs. It is bordered by designated resource land, namely, forest land of long-term commercial significance/commercial forest.

Impervious Surfaces

A large array of solar panels are to be constructed on and occupy 580 acres of the 982 acre solar reserve. These panels possess different properties than does the native vegetation and soil that currently characterize the location. Rain and snow will be intercepted by the impervious surface of the structures, access roads, and devegetated land beneath the solar panels. The snowmelt runoff coefficients, timing, distribution and infiltration of water across the site will be significantly altered as a result of the construction of this proposal. A cursory review of precipitation data for the Cle Elum area indicate annual quantities totaling 22.84 inches.

<http://www.idicide.com/weather/wa/cle-elum.htm>

January 2009 Flooding

During the January 2009 flood event, WDFW personnel spent considerable time in northern Kittitas County assisting Washington State Department of Transportation (WSDOT) maintenance personnel with flood response as well as interacting with and assisting landowners that were responding to flooding and flood damage. One of the locations where we encountered a

surprisingly large amount of floodwater was Red Bridge Road. Red Bridge Road is immediately south of the proposed solar reserve. Red Bridge Road and Wehl Road are identified in the application as the proposed main access routes to the proposed solar reserve location. Streams emanating from the proposed reserve area were the source of this flooding. Red Bridge Road was impassable during the flood at multiple locations due to the depth and velocity of flood flows or from the landslides/debris torrents that covered the road with rocks and mud. It is important to note that this flooding occurred with the headwaters of the associated streams in an undeveloped state, exhibiting characteristics most suited to retain, infiltrate, and release water in a controlled manner. This proposal will result in hundreds of acres of impervious surfaces with these same watersheds. It is unreasonable to conclude that the hydrology of these streams, that already create significant runoff and flooding, would be unchanged or that it would be improved by erecting solar panels, constructing roads and structures associated with operation and maintenance, and creating compacted denuded soils, over such a large area. We include with this correspondence a Powerpoint presentation (attached) of some of the pictures taken during the flooding that occurred in the vicinity of the proposed solar reserve in January of 2009.

The Teanaway River

The Teanaway River is on the Washington State Department of Ecology (DOE) 303(d) list due to compromised water quality. It is included on that list because it is a flow and temperature impaired water body. Ecology has developed a plan specific to the Teanaway River Basin to address the impairment issues. The plan is called a total maximum daily load (TMDL) detailed implementation plan (DIP). Within the DIP, four sources of elevated water temperature were identified.

The sources are:

- Lack of streamside shade,
- Increased channel width: depth ratio
- Instability of streambanks
- Low summer instream flows

The DIP provides possible solutions to the problem. The following solutions are common to all four of the deficiencies listed above.

The solutions are:

- To reconnect the river to historic channels
- Increase sinuosity
- Increase use of hyporheic zone

Generally speaking, the hyporheic zone is the flowing groundwater associated with the active channel on the floodplain. It may extend vertically and a considerable horizontal distance out from the active channel. It is a source of cool water so it can benefit a stream's water quality and quantity. It also appears to be important habitat for other biota that are important to the ecology of the stream and the food web that fish need to survive.

Low summer in-stream flows negatively effect fish life. Low flows can impede migration, physically preventing movement of fish across shallow or dry riffles. It can also result in water that is so warm in a stream segment that it is avoided entirely by fish, preventing them from penetrating further into the watershed. A thermal barrier can result, effectively functioning as a physical barrier. Additionally, water temperatures can be so warm as to be lethal to fish. These conditions may or may not occur every year, but when they do occur, they impact the overall population. This impact can persist for generations and must be recognized. Listed bull trout and steelhead as well as resident fish inhabit the Teaway River.

These low flows are, in part, the result of water being routed out of the watershed more rapidly and earlier than would have occurred naturally. Impervious surfaces, roading, and deforestation have conclusively been shown to alter the hydrology of a drainage. The January 2009 flood pictures we are providing in the accompanying Powerpoint Presentation demonstrate the routing of water to the Teaway River from the project area. In the area of the proposed solar reserve, it is reasonable to anticipate a significant change in the frequency, timing, and severity of high water events over background levels. A flashier (higher highs, lower lows) hydrograph and incremental acceleration of the timing of runoff run counter to objectives in Ecology's DIP that was formulated to address the impairment issues identified in the drainage. Sediment transport and erosion from the watershed is currently evident and is expected to increase. Increased transport of sediment to the Teaway River could affect survival of incubating eggs and alevins of salmon and steelhead. Actions that have the potential to exacerbate the water quality problem in an impaired drainage warrant thorough scrutiny and scoping in an Environmental Impact Statement.

Vegetation Management

The project application materials indicate that the panels will be positioned three (3) feet above the ground. Grass, shrubs and trees will be eliminated during the construction process when excavation for the footings to support the panels will occur. Clearing and trenching for placement of cables as well as the road network will require extensive soil disturbance, further elimination of vegetation, and expose erosive soils. Post construction, vegetation will not be permitted to reestablish as it would conflict with energy generation since shade producing vegetation would reduce energy generation. Additionally, allowing vegetation to grow would result in a fuel source that could carry fire and prove hazardous to the above ground infrastructure. High winds in the area will require a significant buffer distance between the panels and trees to prevent ice and tree limbs from damaging panels. This further increases disturbed area, wildlife impacts, and hydrology.

Wildlife Impacts

This area is key winter range for deer and elk. The importance of winter range in maintaining wildlife is difficult to overstate. The amount of winter range dictates how many animals an area can support. All wildlife need vegetation for food and security so the removal and active

management against reestablishment of vegetation across the project will eliminate wildlife habitat permanently from a significant portion of the proposed solar reserve. We anticipate fencing off of the area as well which would prove an impediment to movement and migration across the area. Bull elk rubbing antlers on solar panels is a problem we anticipate that would prompt fencing. We have experience with this behavior on irrigation systems. Animals can be forced to other ownerships and cause conflicts were none formerly existed. We have data indicating extensive use of the area by cougars, which reflects the high densities of wintering big game in the area. Winter range is already lacking within this area due to past development of historic winter range. The 1000 acre footprint of the project proposal and perpetual disturbance and displacement of wildlife associated with development and operation and maintenance of the solar facility will result in the direct loss of a significant amount of forest habitat and winter range. No mitigation is currently proposed to off-set these impacts.

Kittitas County's Critical Areas Ordinance (CAO)

Kittitas has not updated their critical areas ordinance. The location of the proposed solar reserve is a location that WDFW would submit for designation as a critical area and a habitat of local importance for wintering deer and elk. Currently, Kittitas County code recognizes winter range only on public lands. Important habitat, especially winter range, occurs outside of public ownership. Kittitas County's Critical Areas Ordinance does not reflect the best available science (BAS) which is a requirement of the Growth Management A. A cautious approach is warranted if potential critical habitat is at risk of elimination especially when reduced habitat availability is already limiting wildlife populations.

Commercial Forest

The application indicates a conflict with commercial forest on ownership adjoining the proposed solar reserve. Kittitas County has no approved de-designation process to remove commercial forest designations. The proposed solar reserve is 982 acres and the actual footprint is 580 acres. Locating the 580 acres of solar panels in a manner that avoid any conflict with commercial forest would also provide a buffer for wildlife species in the adjacent lands.

Conclusion

The scale of this proposal, the loss of critical habitat, the permanent nature of associated impacts, the significant alteration of hydrology, the access road flooding risk, storm water issues, as well as the expected water quality, quantity and changes in runoff timing in the impaired Teaway River, are cumulatively significant and warrant a thorough review in an environmental impact statement (EIS). None of the above expected impacts were identified, addressed or mitigated in the project proposal. Thus, it is our recommendation that Kittitas County issue a Determination of Significance for the proposed solar reserve.

Teaway Solar Reserve
September 16, 2009
Page 5 of 5

Thank you for the opportunity to provide these comments. If you have any questions regarding these comments, please feel free to contact me at (509) 962-3421.

Sincerely,

A handwritten signature in cursive script that reads "Mark S. Teske".

Mark S. Teske, WDFW Habitat

CC: Perry Harvester, WDFW Habitat Program Manager, Region 3

Enclosure: Powerpoint presentation of January 2009 flooding and Cougar Distribution Data.

Photo Taken from
Red Bridge Rd,
water source,
stream with origin
in proposed solar
reserve Jan 09

Teanaway River



Taken from Red Bridge Rd debris torrent buckles garage door. Torrent of muddy water delivered to Teanaway River. Stream originates in proposed solar reserve.



Taken from Red Bridge Rd. Jan 09
stream source proposed solar
reserve. Flows delivering to
Teanaway River



Photo taken from Red Bridge Rd.
looking upstream. Debris torrent
and floodwater across Red Bridge
Rd closing road. Stream origin is
proposed solar reserve.

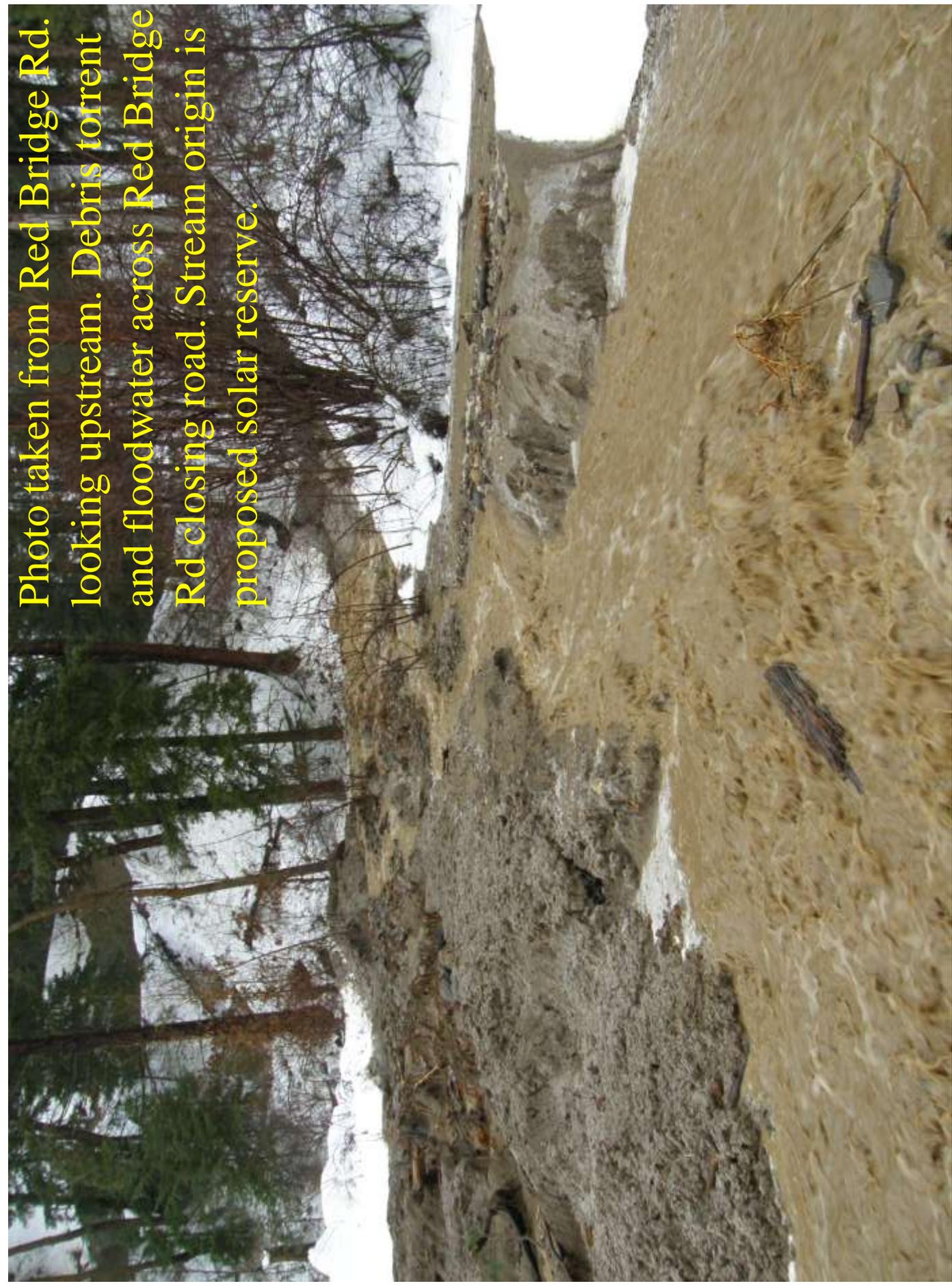
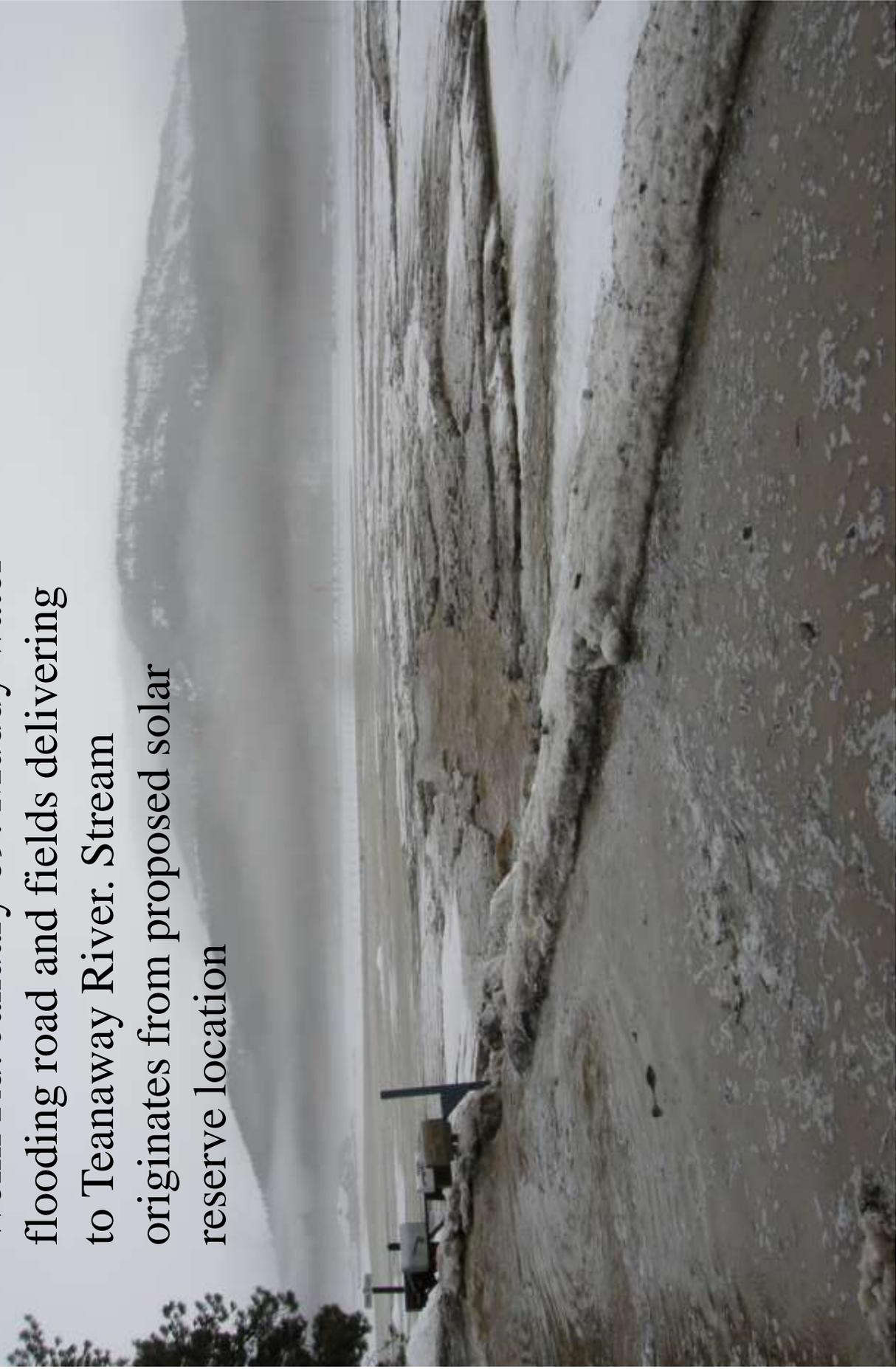


Photo taken from Red Bridge Rd at
Weihl Rd. January 09. Muddy water
flooding road and fields delivering
to Teanaway River. Stream
originates from proposed solar
reserve location



The intersection of Weihl Road and Red Bridge Road January 09





Intersection of Red
Bridge Rd. and Weihl
Rd. January 2009

Floodwater heading to the Teanaway River
photo taken from Red Bridge Rd. Jan. 09



Photo taken from Red
Bridge Road January 09



Photo taken from Red Bridge
Road water heading to Teanaway
River January 09



**Red Bridge Road Jan. 09
between Blackburns
property and Wehl Road**



Debris torrent across Red Bridge
Road closing road ~ at Blackburns.
Headwaters of source stream is
proposed solar reserve, delivered to
Teaway River



**PROPOSED SOLAR RESERVE
AREA**

**Red Bridge
Road**



Signature of Weihl Road flooding



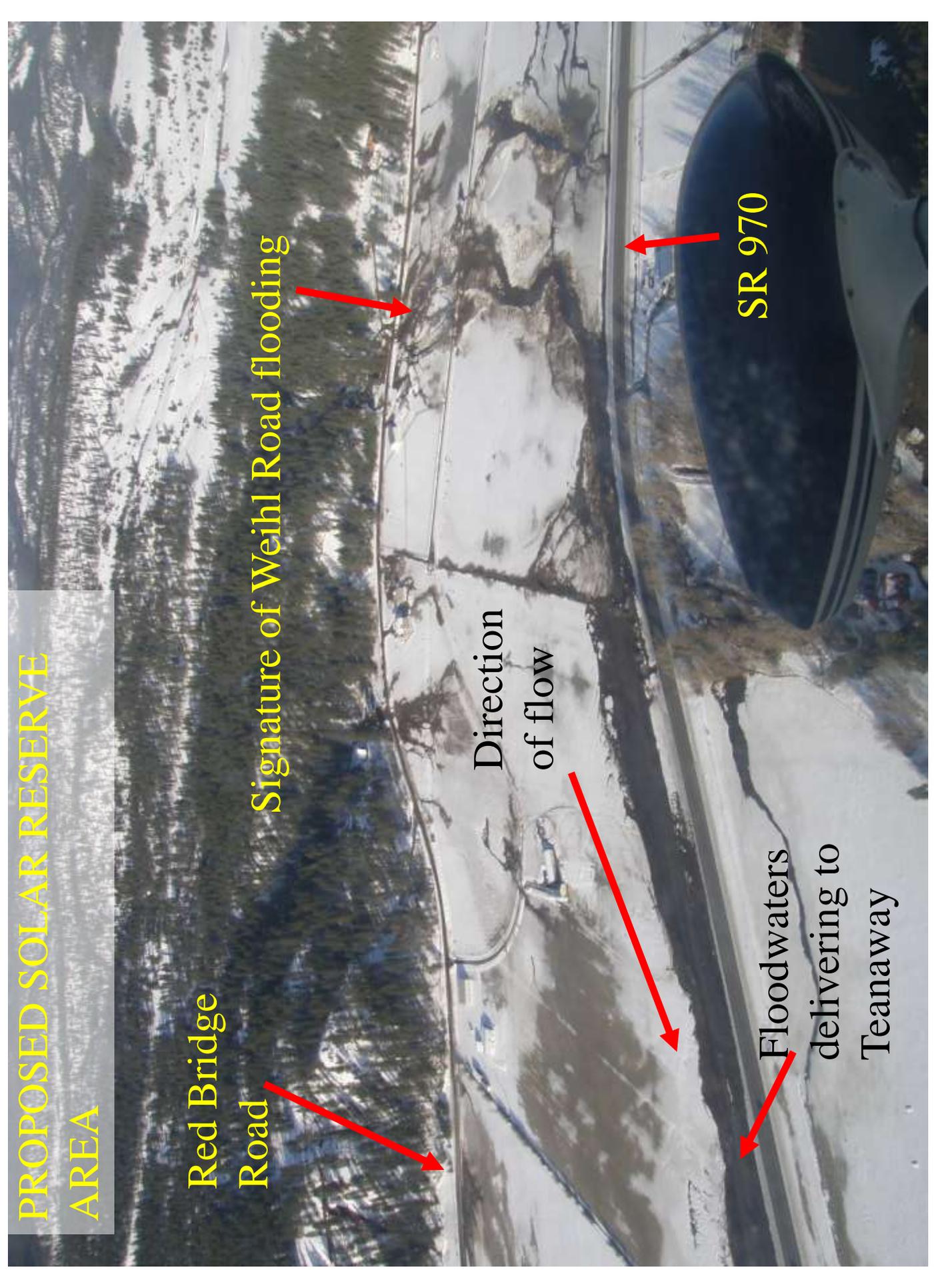
**Direction
of flow**



**Floodwaters
delivering to
Teaway**



SR 970



Water flowing off Red Bridge Road
toward Teanaway River creating
headcut into road prism



Taken from Red Bridge Road

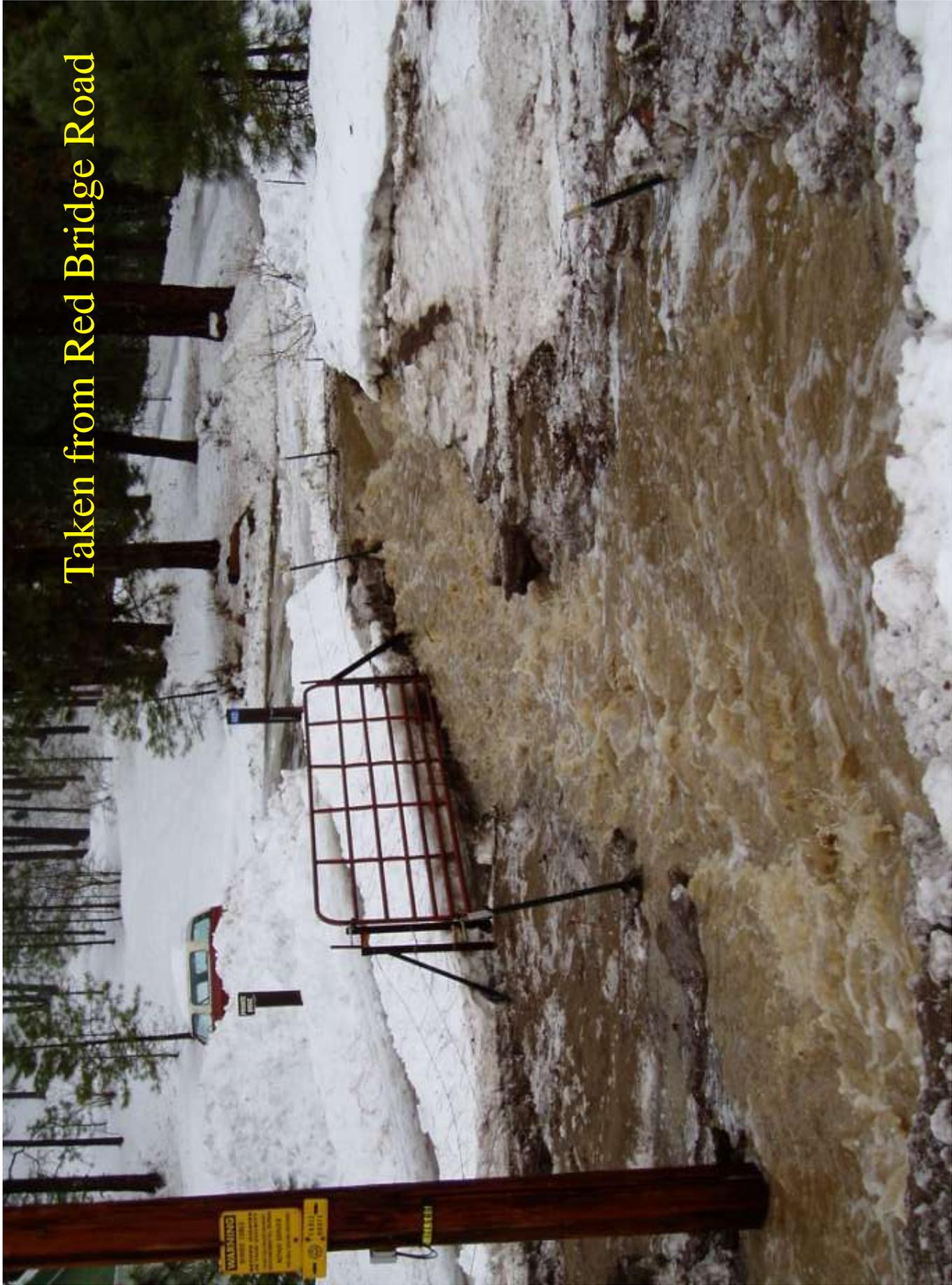
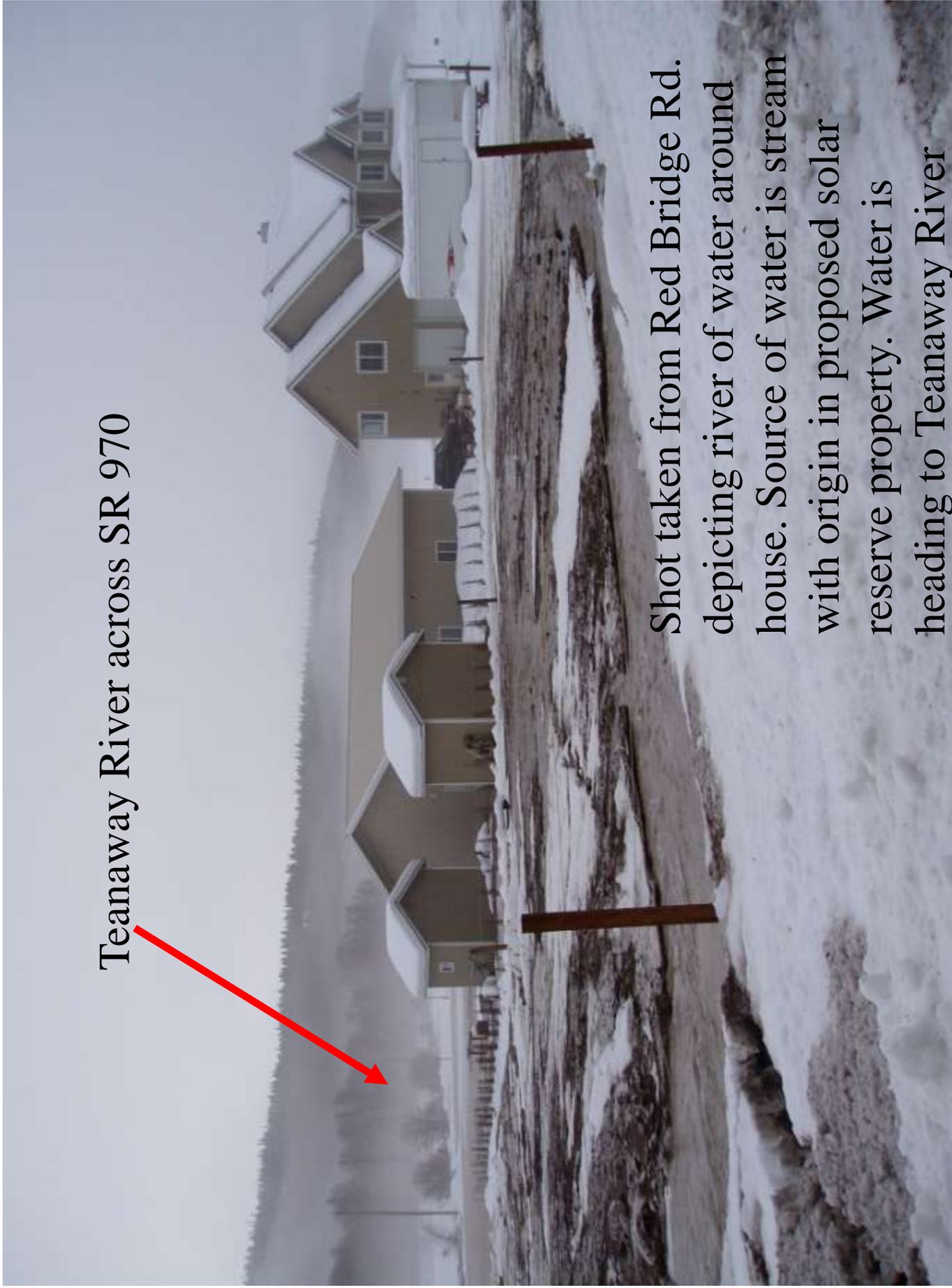


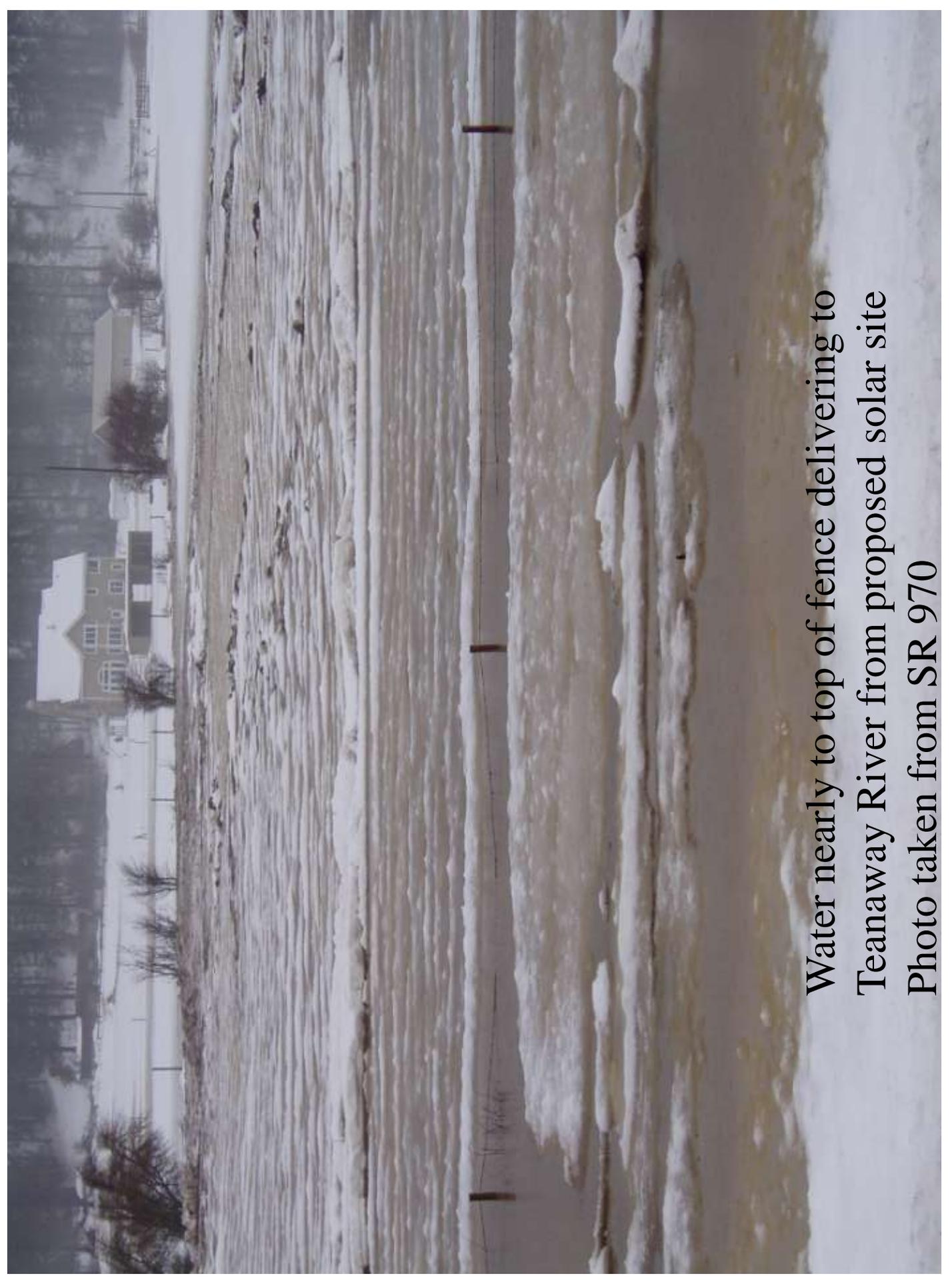
Photo taken from Red Bridge Rd looking
toward Teanaway River



Teanaway River across SR 970



Shot taken from Red Bridge Rd. depicting river of water around house. Source of water is stream with origin in proposed solar reserve property. Water is heading to Teanaway River

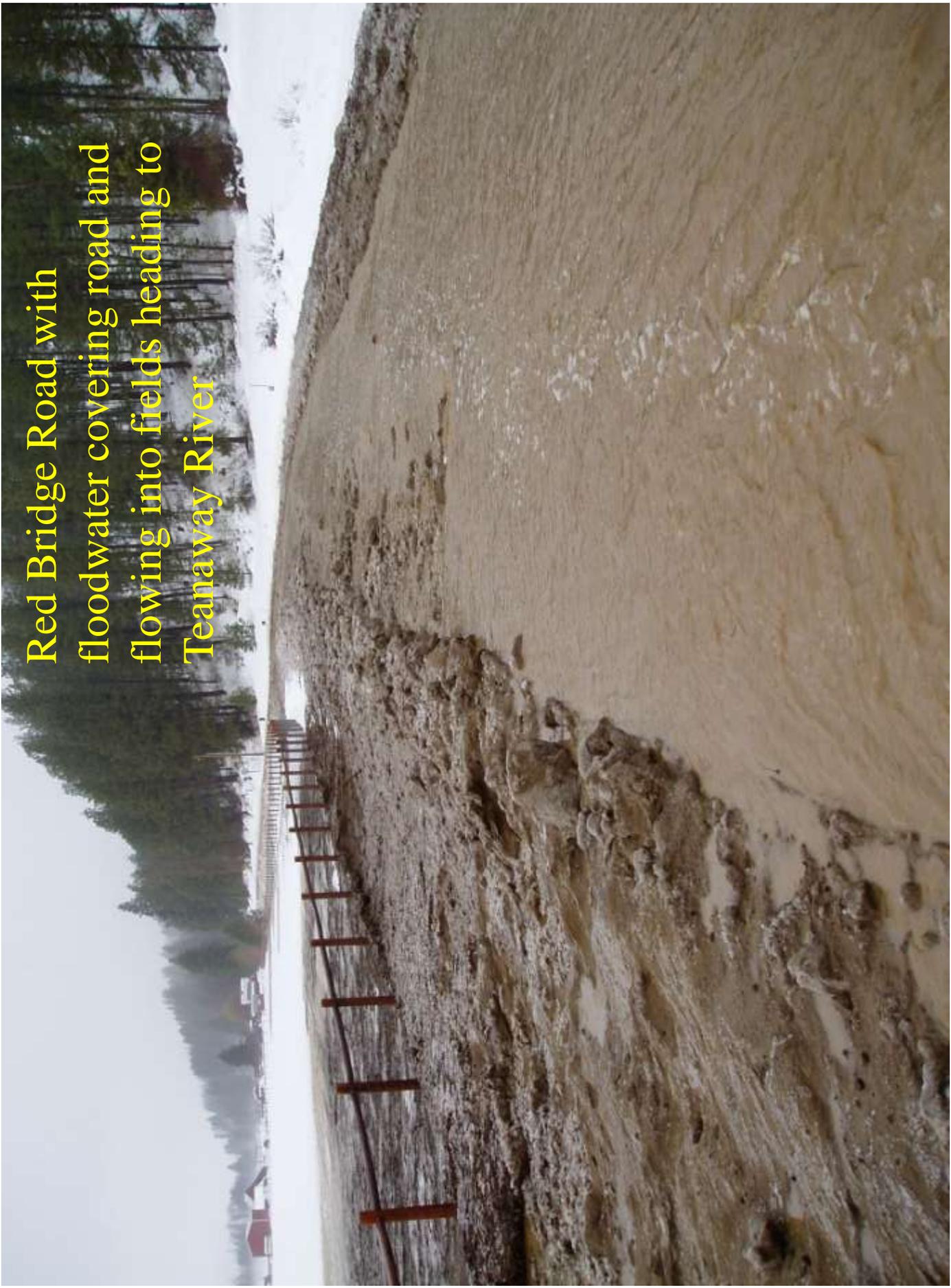


Water nearly to top of fence delivering to
Teaway River from proposed solar site
Photo taken from SR 970

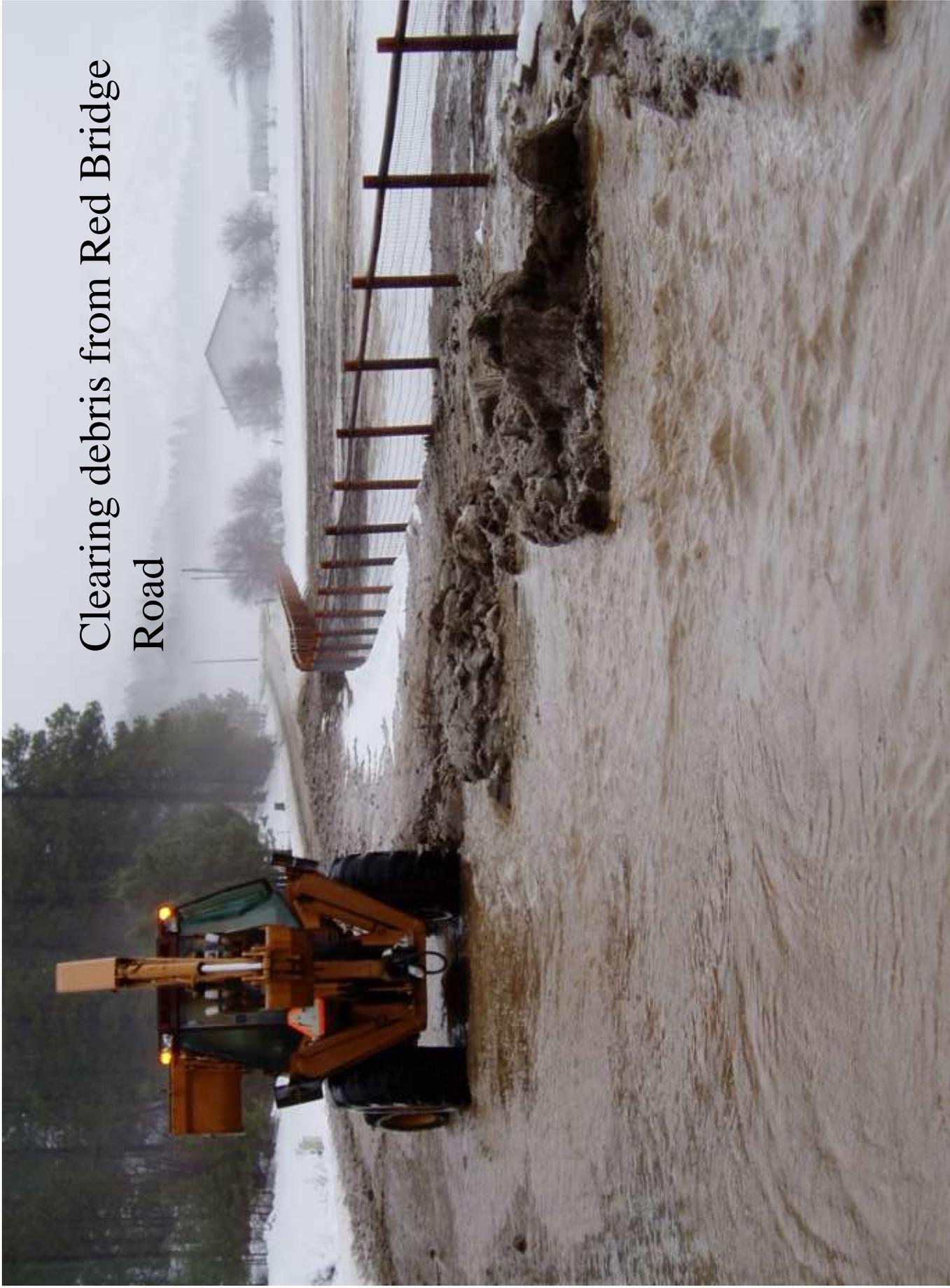
Standing wave and water
flooding Red Bridge Rd.
heading to Teanaway
River

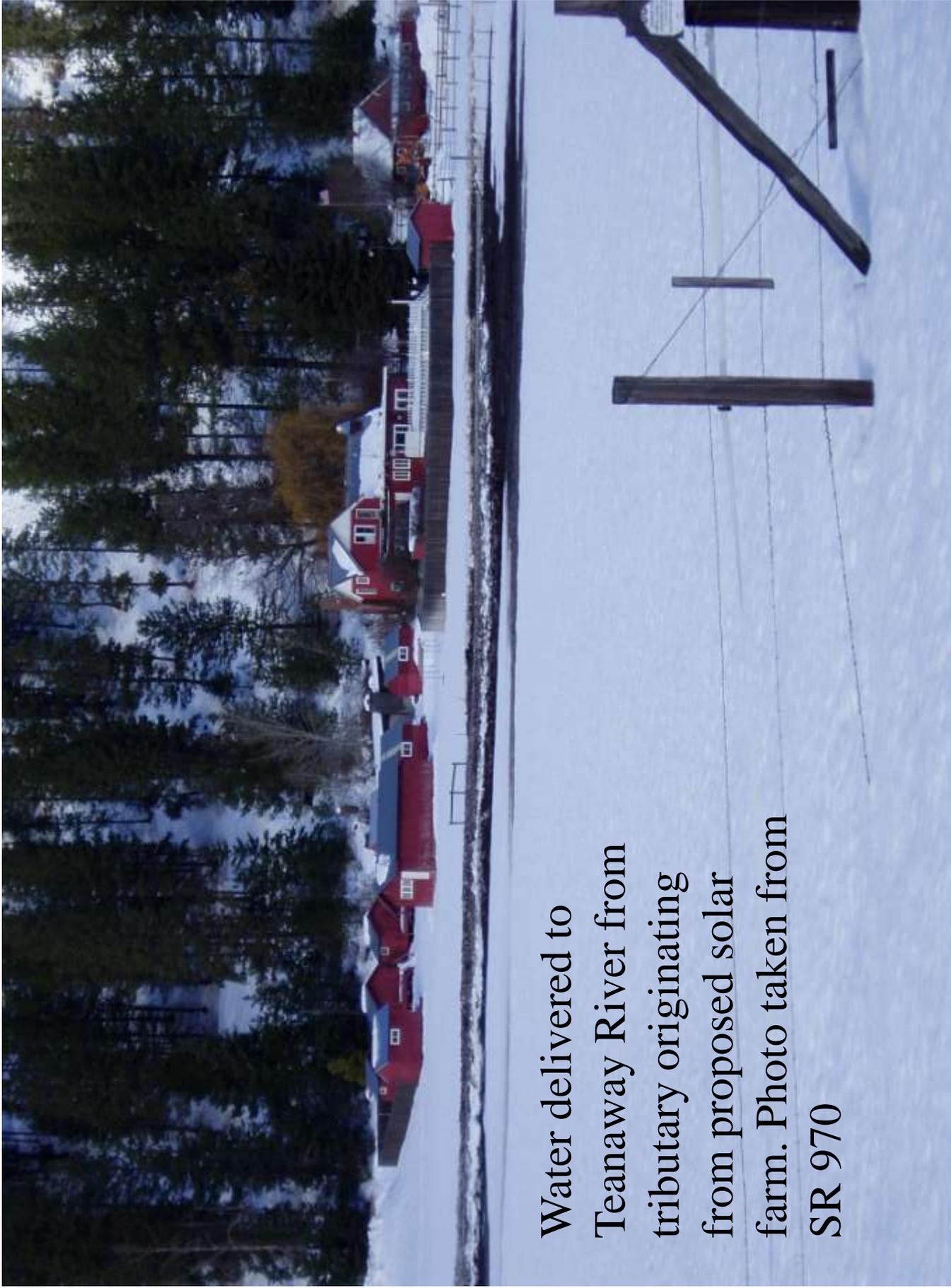


Red Bridge Road with
floodwater covering road and
flowing into fields heading to
Teanaway River

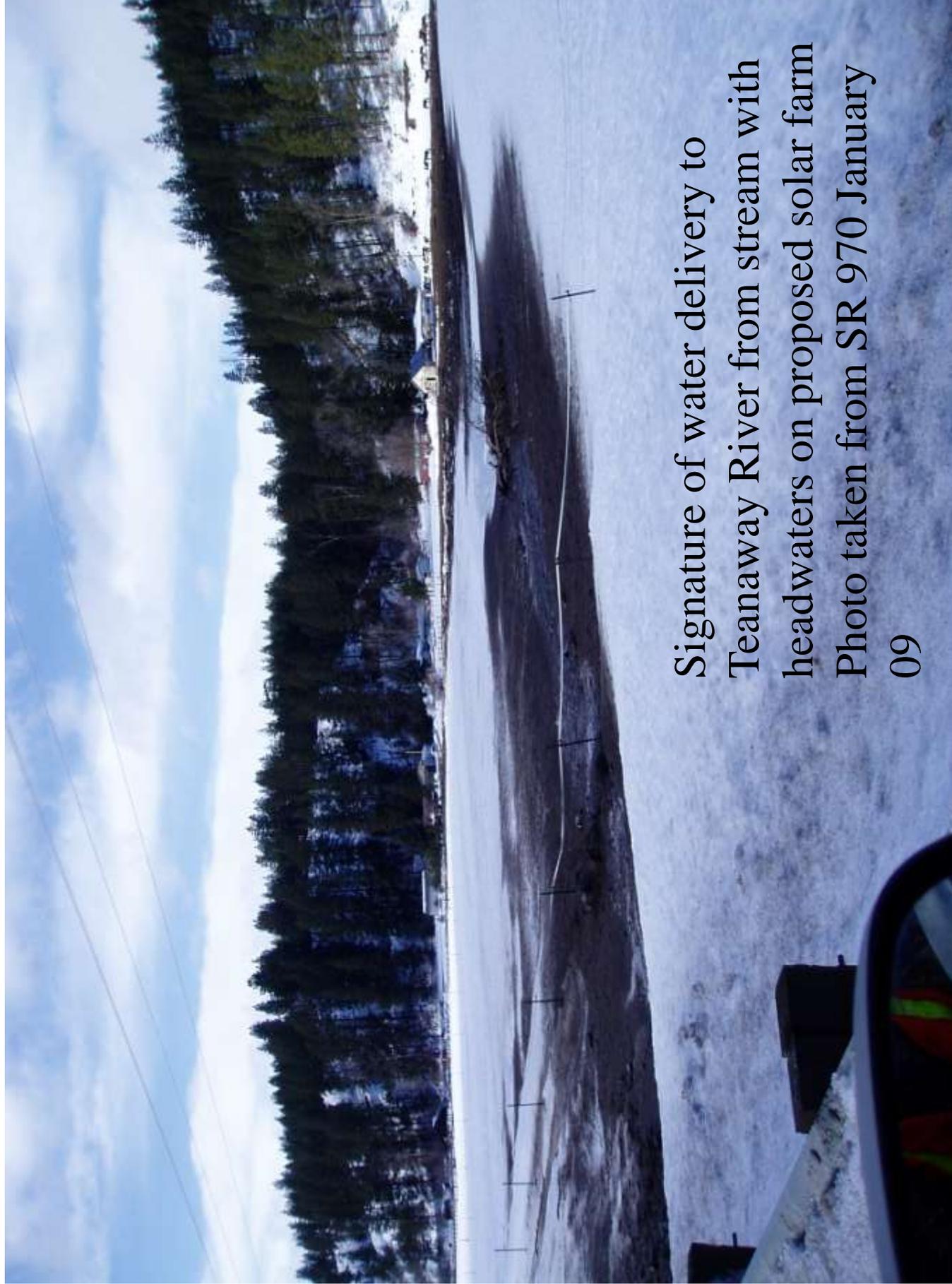


Clearing debris from Red Bridge Road





Water delivered to
Teaway River from
tributary originating
from proposed solar
farm. Photo taken from
SR 970



Signature of water delivery to
Teaway River from stream with
headwaters on proposed solar farm
Photo taken from SR 970 January
09

A delivery point to
Teanaway River
from streams that
originate on
proposed solar
reserve

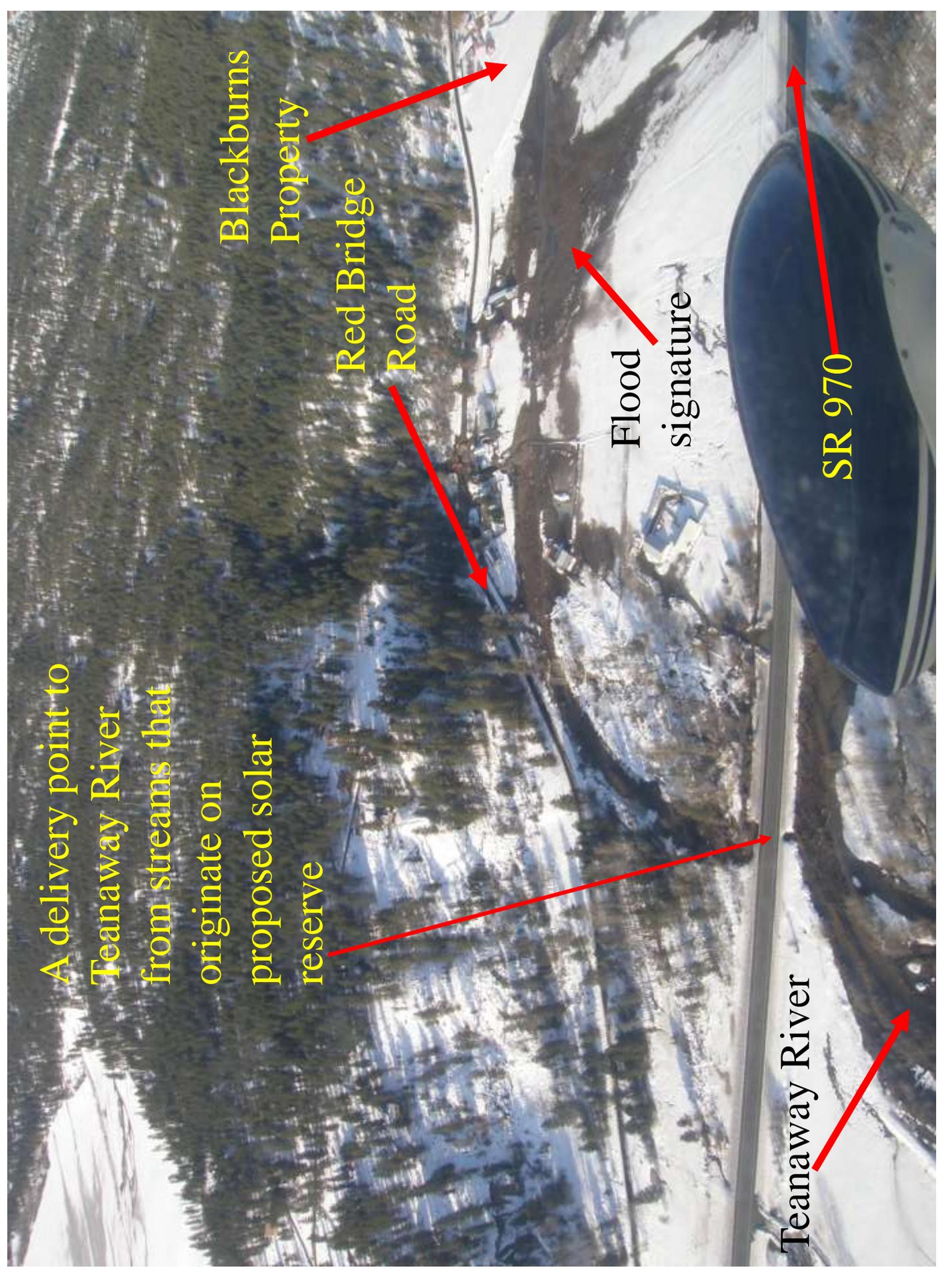
Blackburns
Property

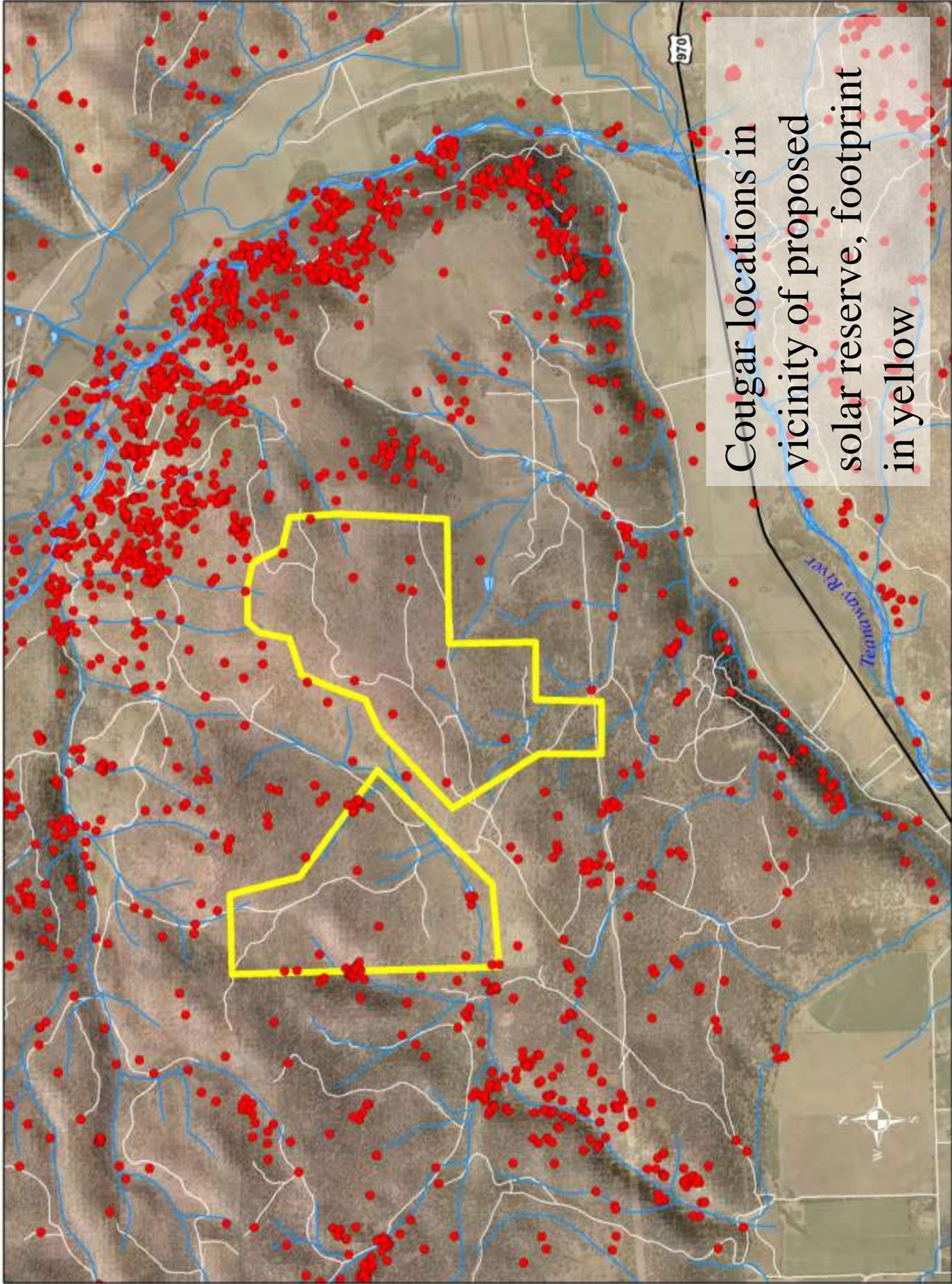
Red Bridge
Road

Flood
signature

SR 970

Teanaway River





Cougar locations in vicinity of proposed solar reserve, footprint in yellow

Attachment 3

From: JOSEPH MAYBO [mailto:sammaybo@msn.com]
Sent: Thursday, September 17, 2009 9:35 PM
To: Anna Nelson
Subject: Teanaway Solar Reserve!

From: Sam and Claudette Maybo
5607 169th Pl. S.W.
Lynnwood, WA 98037
sammaybo@msn.com

To: Anna Nelson (Contract Planner) for **Teanaway Solar Reserve:**

My wife and I have owned property in section 23 for the past thirty some years. It breaks our hearts to see another part of the upper county turned into something other than a *Natural Setting* for our abundance of wildlife. Over the years we have seen in sections 20 through 24 the following animals: elk, deer, coyote, bobcat, bear, owl, porcupine, turkey, squirrel, grouse, quail and other numerous birds and small animals. Yes, there is also cougar.

As you know, "Suncadia" and "Sapphire Skies" have changed the environment for the upper county forever. Now we have the "Upper Teanaway Subarea" in process which involves over 50,000 acres. Is there no end in site? I can only assume the reason the developer of the solar farm has chosen section 22 and 23 in because of the close proximity of the power lines and the willingness of American Timber or US Timber (not sure who the owner is) to accept a long term lease of the property. Also because of the open areas through out the property with a southern exposure. Is there nothing available between Ellensburg and Yakima or even the area east of Ellensburg towards Vantage?

I've seen a herd of over 100 elk in section 23, "Pine Hills Ranch", where we currently own property. They migrate back and forth from the Masterson Ranch in a draw on the southern side of section 22 and 23. I would be glad to show you where this is. Additional elk and deer migrate down from the upper forks of the Teanaway Valley in later November as snow begins to fall and can be found in any area of section 22 and 23.. Of course there are not always herds of 100 but many smaller groupings. Last November I saw a grouping of eleven in section 22. One bull and ten cows. Deer usually remain there year round depending on snow fall. If I can find the picture of the 100+ elk that I took I will e-mail it to you. I don't want you to get the impression that there aren't many elk or deer in the proposed solar farm area. You won't see a lot in July.

You probably know by now that both my wife, Claudette, and I are totally against the solar farm. You will be interfering with the natural migrating path and breeding area for many animals.

Thank you for understanding our concerns.

Sam and Claudette Maybo

Attachment 4

Letter from Michael R. Hansen
Resident of land adjacent to the proposed Solar Farm
Parcel ID 14725, Tax Parcel Number 20-16-23000-0016

9/17/09

To whom it may concern,

The announcement of this project has come as quite a surprise to me. Being adjacent to the proposed power plant, I use the area regularly. Although I understand the need for green energy, I oppose the plant for the following good reasons.

The development agreement does not recognize that people ARE living adjacent to the property and will be affected dramatically.

Zoning

We moved to this property 10 years ago for peace of mind, understanding that Forest & Range zoning restricted development to logging, low density housing or open-space. My wife and I are quite alarmed to find that the county is considering a conditional use permit for an industrial power plant, which is not compatible with the zoning and is a violation of the protections zoning provides to the community.

Location

The location is odd. Why not build adjacent to the power lines in the desert or on the Northern slope of Ellensburg where the land is flat and individual solar panel clusters are easily accessible? Located on our steep slopes, the farm will require a dense road structure and require retaining walls for the panel bases. This will add to the fixed and maintenance costs of the project and make it less likely to be profitable.

Where is the study indicating the numbers of hours of cloudless days/hours around the year? Our ridge is on the edge between unpredictable mountain weather and desert weather. We have many days that are cloudy here when it is not cloudy to the east.

Destruction of a Major County Asset

The 900 acres proposed for this project is a very large and beautiful area that is unique along Cle Elum Ridge and unique in the county. This area is not steep unusable land. It is full of rolling forested areas, open meadows and wetlands. The area is valuable for recreation and development of low-density housing, where many can enjoy it's beauty.

The project will denude the area, install 33,000 yards of concrete, 150 inverter buildings and an excessive network of roads. It will disrupt a major wildlife habitat and corridor.

It takes 80 years for trees to grow to the size they are now. The logging in 2001 was reasonable and left many mature trees with some open space that is rapidly filling with new trees. What happens when the project fails?

The development agreement has decommissioning and reclamation requirements. What is the enforcement ability for this when a company goes out of business? There is none.

The county will be stuck with an area that at one time was a major asset for all its citizens and will have become a desolate wasteland without trees, populated with thousands of concrete pads and inverter buildings, a massive network of roads and no possible use or value to anyone. This should be of major concern to the County, which does not own the land but is responsible for authorizing its use.

Feasibility

Given the destruction of the property for any other use should the project fail, the County has the obligation and its citizens the right to fully understand the profitability of the project both short and long-term.

Where are the construction and operational cost analyses?

What is the financial commitment of the people behind this? Is their motivation for a quick buck? What happens when the panels need replacing in 10 years and there is not money for that?

Jobs

The application says 2 to 4 maintenance employees will be needed. This is not significant to the county to warrant destruction of the area. The additional jobs for a panel assembly plant are positive but what is the connection between the farm and panel assembly?

To save money, would not the owners simply outsource panel construction to China? Could that assembly plant be moved once the plant is in place and the owners say they need to cut costs or close down?

Nuisance

Our neighborhood will be drastically affected by this project. The plant will be an extreme eyesore. They intend to cut down all trees in a 100' firebreak (and elk fence?) adjacent to our properties and to cut down most of the rest of the trees. A 2,000' side of the proposed farm is visible from our house all the way up to the ridge top – over half a mile, where they will cut all trees on the crest as well. 650' of the project is adjacent to our property. I am concerned about noise levels of motorized panels.

Thank you,

Michael Hansen

Letter from Michael R. Hansen
Resident of land adjacent to the proposed Solar Farm
Parcel ID 14725, Tax Parcel Number 20-16-23000-0016

9/17/09

To whom it may concern,

My property shares a 650' border with the plant from which I have a view of a lightly forested ridge 2500' wide by 4000' in depth, all of which is designated for solar panels. The current development agreement calls for cutting down all trees up to my property line, creating an open space for a fire break, with vast clusters of shiny solar panels connected by roads just beyond.

The proposed solar farm is a gross deviation from the current Forest & Range zoning and a violation of the protections that zoning provides to adjacent land owners. If the County follows through with the plant, it will be a major eyesore and cause a large loss in the value of my 20 acre parcel. To minimize this loss, the County should require the following accommodations.

Setbacks and Fencing

It is fair that the County require forested setbacks for adjacent property owners in which the trees are not to be touched. The plant has 900 acres on which to build.

It is also reasonable that there be no fencing on the property line, preferably none at all. A lack of fencing should provide access through the farm to the forest beyond.

The area is a major recreational area for horseback riding, hiking, snowmobile access to the backcountry and hunting.

Vegetation

The owners must reestablish natural vegetation and control weeds such as the noxious Russian Knapweed we have spreading in the area.

Thank you,

Michael Hansen

Letter from Michael R. Hansen
Resident of land adjacent to the proposed Solar Farm
Parcel ID 14725, Tax Parcel Number 20-16-23000-0016

9/17/09

To whom it may concern,

I am concerned that the County has issues Mitigated Determination of Non-Significance for the Solar Farm. The application is very smart regarding wetlands but it does not address the rich wildlife in the area.

There needs to be written language in the development agreement regarding no fences and retention of a suitable amount of tree clusters and vegetation to support the large amount of wildlife and provide a wildlife corridor.

Thank you,

Michael Hansen

Attachment 5

September 17, 2009

Ms. Anna Nelson
Kittitas County Community Development Services
411 N. Ruby, Suite 2
Ellensburg, WA 98926

RECEIVED

SEP 18 2009

Kittitas County
CDS

3-20-09

Re: Application of Teanaway Solar Reserve LLC
For Conditional Use Permit (CUP)
Teanaway Solar Reserve (CU-09-00005)

Statement of Position: The Application to site a massive photovoltaic solar generating project, including 400,000 solar panels on 1.5 square miles of beautiful and productive forest land which is prime habitat for many birds and animal species, including the large Teanaway elk herd, is inappropriate and should be denied. A 15 day public comment period for this Application is totally inadequate and should be extended to 90 days. In addition, the expanded SEPA checklist filed by the Applicant is inadequate and flawed. The Applicant should be required to conduct a full environmental impact study (EIS) for its proposed project with ample opportunity for public review and comment before any determination on the Conditional Use Permit is made.

Dear Ms. Nelson:

This letter is written in response to the Notice of Application of Teanaway Solar Reserve LLC for a CUP to build a major industrial solar reserve power plant on 982 acres of land, which is located on land zoned Forest and Range. Pine Hills Ranch is the owner of 500 acres immediately adjacent to the east boundary of the proposed solar site. While we recognize the importance of solar and other alternative energy technologies for meeting our future energy needs, we believe the site chosen is inappropriate and incompatible with the historical character of the whole area, with the current uses of the site, with the important wildlife habitat that the site and surrounding area provide and with the current uses of the surrounding property ownerships.

The project area as described by the Applicant consists of 982 acres, or about 1.5 square miles. The surface of the panels alone would cover about 160 acres (400,000 panel x 17.1 square feet per panel / 43560 square feet per acre) without even considering the added panel structures, posts, concrete footings, substations, access roads and other infrastructure related to the project, which will be sited on south sloping (in some cases steep) terrain. This industrial project will have a devastating impact upon the wildlife and mixed Ponderosa forest and meadows on the site and cause severe impacts on its surrounding neighbors and the general area, including potentially the Teanaway River.

In light of these impacts, it is totally inappropriate to allow only 15 days for comment on the CUP Application and expanded SEPA checklist for this project, which will be huge in scope and, according to the Applicant, will be the largest of its kind in the United States and possibly

world. The current comment period should be enlarged to 90 days to give the public reasonable opportunity to comment. It is also inappropriate for the County to apparently prejudge the SEPA review by stating in the Notice that "the County expects to issue a Determination of Non-Significance (DNS)" when the Application with its hundreds of pages of documentation was just received on August 18, 2009, and other parties have not even had a chance to comment, let alone read it. This statement is particularly egregious because the Applicants filing contains many "conceptual" representations, which make analysis of the impacts of where and how the proposed improvements will actually be constructed difficult, if not impossible, for both the County and impacted property owners to evaluate. Many of the SEPA responses provided by Applicant are either incomplete or inaccurate, and the Applicant has made no attempt to verify their data.. The construction of a huge industrial energy production facility in the middle of a beautiful and productive forest and meadow ecosystem which hosts a large wildlife population is not appropriate. This type of project requires the undertaking of a full environmental impact review (EIS) for the project.

Given the short time period for responses and the unclear dividing line between issues relating to the Conditional Use Permit, the Development Agreement, and the SEPA review, our comments will be general and will apply to all of these documents. Pine Hills Ranch, specifically and without limitation, reserves the ability to raise new issues as they arise. Further, Pine Hills Ranch, specifically and without limitation, reserves and does not waive its ability to appeal all aspects of this project, including the County's procedural and substantive SEPA decisions, the Board of Adjustments approval of the project and the County's entry into the Development Agreement.

A. Pine Hills Ranch. Pine Hills Ranch LLC consists of 3 cabins located on about 500 acres of forest and meadow, extending from Weihl Road on the south to the Teanaway River on the north. Our road access is from Weihl Road.. We abut the solar reserve as proposed on its east and northeast borders. Our property, which has been used for forestry, open space, agriculture and recreation is owned by 11 families. The property was acquired in the late 1960s, so we have a long term familiarity with the proposed solar site, as well as our own property. In the early years, cattle were grazed on our property and the solar site (Boise Cascade property then) by a local rancher. Over the years we have hiked, skied, and biked on the proposed site. We have also held or hosted a number of orienteering meets using the site in conjunction with our own property. In fact, the Cascade Orienteering Club created a very detailed and expensive map (with several recent updates) of the whole area for a national meet held there and for many subsequent meets, all done with the permission of the land owner. In excess of 2000 participants have crossed the site during these events. A copy of the revised 1994 orienteering map with Applicant's Figure 5 Conceptual Site Layout placed on it is provided as Attachment A. (Please note that an arrow indicates True North, while the map's vertical lines are oriented to magnetic north for orienteering purposes). Over the years, Boise Cascade did some of the logging on our property, and on several occasions we allowed them to move their logs across our property. We love the land and try to manage it in an environmentally sound manner. We do not allow hunting on our property, and it therefore is somewhat of a sanctuary for the abundant wildlife that lives on and crosses our property, much of it coming from or going to or through the proposed solar site.

B. Proposed Solar Site. Contrary to the discussion in some of the Applicant's supporting materials, the proposed site is a special property with an open pine forest with lovely wetlands and meadows. In the spring, the land is green and full of flowers. As discussed in a later section, birds and animals can be found throughout the area. This land has always been used as commercial forest with some cattle grazing. In recent years, the pine forest has been badly overcut in our opinion, and particularly on the south, dry slopes it has suffered. Trees grow slowly at this elevation, but the property is beginning to heal, with many new seedlings coming up. Aerial photographs of the site provided by the Applicant give the appearance of very few trees, but there is much more cover when viewed from ground level. As noted previously, the site has been overcut, but there are still many trees of various ages, and it remains an open Teanaway ponderosa forest. Looking at aerial photographs in the Applicant's filing, our property line is obvious because of the denser forest cover on our side. See Attachment B (Applicant's Figure 5, Conceptual Site Layout). Forestry requires a long term horizon in the Teanaway area. As detailed in the next section, in addition to its uses as a commercial forest, the property has been and is continuously used for recreation by neighbors and many in the Cle Elum community.

C. Recreational Uses. As opposed to the discussion in Applicant's Application (see SEPA Checklist p.36), the site area has been used by neighbors and people from the Cle Elum community for recreation in ways that don't interfere with forestry operations for as long as we have been neighbors, and probably long before. The site is often hiked, biked and visited by bird and flower enthusiasts. Many ride horses through it, including Flying Horseshoe Ranch down in the valley and other horse groups. Hunters frequent the site during hunting season, looking for deer, elk and bear, which has on occasion caused us problems when they stray on to our property where we do not allow hunting. As previously discussed, many orienteering meets have been held on the property. Thus, if the Applicant actually enforces a prohibition on public access to the site, there will be a significant loss of public access and recreational opportunities.

D. Plant Life. We are not in a position in this short comment period to comment on endangered plants on the site (unlike the Applicant, we have not had unlimited time to prepare materials for this proceeding). However, as noted by Applicant, there are a number of meadows and wetlands on the site. Some of these areas dry up with the heat of late summer and some stay wet. In many areas the plant life stays green and the soil damp long after the surface water is gone. They again recharge with the fall rains. These areas are frequented by wildlife. If these areas are surrounded by arrays of solar panels, roads and other solar infrastructure, they will be substantially impacted either by the flash run-off of water from solid surfaces or by the diversion of water resulting from these structures. (See also G. Hydrology). It is also doubtful that these sites will continue to attract the deer and elk, and this issue should be studied as part of an EIS.

E. Animals. The area of the proposed solar site has sizable populations of birds, reptiles and mammals. The site is generally similar to our property in terms of the wildlife on the site. Wildlife are not concerned with property lines, unless there is fencing, and there currently is no fencing. During the day, one regularly sees red-tail hawks soaring over the site looking for mice or other small animals, and at night it is the sound of owls hooting. All sorts of birds, raptors including hawks, owls and occasional eagles, quail, wild turkey, deer, elk, coyotes, cougar and bear frequent the site. We do not know if there are spotted owls or other endangered birds on the

site, but Applicant's brief and superficial survey does not adequately address this possibility.

Applicant's wildlife field studies also failed to establish wildlife baselines for the different seasons of the year, even though the variety and numbers of a given species can change dramatically by season. For example, that is a major reason why in Applicant's SEPA checklist, its consultants found few deer and elk on the site. They conducted animal field studies on June 16-19 and July 9, 2009, which is the beginning of the hot summer months, particularly on the site's south facing slopes. While the many small mammals may stay put during the day and wait for cooler evenings, the larger mammals such as deer and elk that do stay around simply move back and forth to avoid the heat of the day. They will then move through Applicant's site, as they do on our property, in the evening or in the early morning and then move to the cooler, more heavily forested areas on the north facing slopes or down to the Teanaway River during the heat of the day. Consequently, it is not surprising to see few deer or elk, let alone predators, during the day during hot summer months.

Of course, some of the deer and many of the elk do migrate to the higher country during the summer months, but they are on the proposed solar site and our property more months than they are gone. We typically see the larger herds move back in early October, and many remain into June, with some stragglers staying through most of the summer. Animal field studies done in late June and July will therefore miss, as they did in this case, the big herds that are resident for much of the year.

Applicant's characterization that the elk winter down by the Teanaway River is also only partially true, and it depends a great deal on the snow cover. With increasing development in the valley and along the Teanaway River, they appear to have moved more into the uplands, which include the solar site. The south facing slopes of the solar site often lose their snow cover early which provides easier access to food. It is not unusual to count 40-50 elk in our field, and on one occasion I lost count at 130 elk. The elk don't care about property lines, and they move daily across our property and the solar site, as well as other properties. The tracks from the herd leading in to the solar site are easy to spot in the snow.

The solar site also provides habitat for predatory animals such as coyotes, cougar and bear, which frequent the proposed site along with our property. I have observed a coyote den on the site within the proposed eastern setback area near our property line. We have also observed cougar tracks and bear scat on the site. Cougar have large territories and tend to follow the movements of the deer and elk herds. We have seen them on our property, and I have confirmed their presence on our and the adjacent site through the tracking program of Project CAT. We found 5 winter kills of deer or baby elk on our property alone this spring.

The bottom line of this discussion is that deer and elk and their associated predators are far more prevalent on the solar site for much more of the year than indicated by Applicant's field studies. And the species and number of birds will also vary with the season. For example, we see and hear more owls in the late fall and winter when the Great Horned Owls move south. If the Applicant's animal study had been done at various intervals throughout the year, there would have been significantly more large mammals observed. We believe that Applicant's study conducted over a five day period in one year is wholly inadequate to truly gauge the impact of this huge project on animals in the area .

F. Fencing/Access. The issue of fencing is a very important issue in the discussion of the effects of the project on wildlife. As we have already discussed, there are large populations of deer and

elk, as well as the predators that follow them, that move on a daily basis on and across the site. Some of these animals also seasonally migrate in the late spring to the higher country and return in early fall. The 982 acre project site extends from the populated south side located around the upper end of Wehl Road up across Cle Elum ridge and down to the Teanaway River, or about a mile. The site extends east-west almost 2 miles at its widest point. If the site was fenced, the wildlife on and around the site would be decimated.

On the other hand, Applicant states that there will not be public access to the site and that the gate will be locked. Without fences, how will the Applicant keep out the same public that has traditionally used the site in the past, when they state that the same 'no public access' policy was in effect?. A major difference, of course, is that in the past there were only trees on the site. The proposed project will place millions of dollars of solar panels, wiring, buildings, transmission lines and other equipment on the site. How will this be protected from vandalism, theft, target shooting? Will Applicant seek to change this policy in the future?

This issue cannot be addressed in a 'conceptual' manner. If Applicant agrees that no fences will ever be built on the site, this must be explicitly stated as an enforceable condition of the permit.

Even in the absence of fencing, Applicant has provided no evidence that deer and elk will spend much time walking or grazing under huge arrays of solar panels and between thousands of supporting structures, with maintenance and security vehicles in the area. Fire protection will require cleared areas around and under the equipment. Thus wildlife, both birds and mammals will effectively be displaced from 500+ acres of the site. The impacts of this displacement must be evaluated as part of an EIS, which addresses the issues of wildlife corridors, buffers and open areas in designing the project. We have been informed by WFW that the elk herd is currently below target levels and that there is a shortage of habitat. Applicant's project would further reduce that habitat.

In an attempt to be more specific about elk movements, regardless of the season, I have marked on attachment B (Applicant's Figure 5 Conceptual Site Layout0) our general observations of the main elk movements, both daily and seasonally, which cross our property on to the east/northeast corner of the solar site. Although they cross at virtually all points, in a general sense they move up Cle Elum ridge to the upper meadows and also onto the north facing slopes above the Teanaway River. The deer cross on to the site in more random fashion.

As attachment B shows, Applicant's "conceptual" design shows about a 500 foot setback along its eastern boundary and very little development proposed in the northeast part of their site. This fact is probably due primarily to the north facing nature of the land as it slopes down toward the Teanaway River in much of this area. Regardless of the reason, if the CUP is approved, this setback along its boundary and the northeast part of the site should be left in its natural state and set aside as wildlife corridor and wildlife open space to protect the elk, deer and predator populations. We are not very familiar with the western portions of Applicant's site and therefore do not comment on it specifically, other than to note that it is all part of the same ecosystem, and it also should be studied as part of an overall EIS.

G. Forestry. As discussed previously, the solar site has been used over the years primarily to grow timber, and the site has been logged many times. The site currently suffers the result of over-aggressive logging, but it remains valuable for forestry as well as habitat, as long as one takes a long term view of forestry. It is our understanding that the land owner wanted to cut more aggressively on the south facing slopes of the site, but was not allowed to do so. Consequently,

there remain quite a few trees serving both as seed trees and animal habitat. The solar project would presumably remove most of the remaining trees on these slopes to make way for solar panel arrays, roads and other solar infrastructure, thus eliminating valuable animal habitat, eliminating views and buffers, and creating substantial water run-off issues, which have not been addressed by Applicant.

The "artist's conception" pictures of the site distributed by Applicant as part of its public relations program show a lovely pine forest with intermingled solar panels. This is not the real life view of what this industrial site would look like after construction.

H. Hydrology. Applicant's depiction of the developed portion of its site places the majority of its panel arrays on the south facing slopes, which makes sense for photovoltaic power generation. In fact, some of these south facing slopes are quite steep. However, Applicant hardly mentions the water run-off and siltation issues that will result from the construction and maintenance of this solar facility. This run-off and silt will ultimately end up in the Teanaway River, a river that has species of fish, including Bull Trout, that are listed as threatened and/or endangered under the Endangered Species Act. Both the Teanaway and Yakima Rivers are also currently the focus of state and federal efforts to restore salmon runs.

Picture a heavy rain or snowfall, or even a combination of the two, falling on these slopes denuded of most of their trees and covered with about 160 acres of solar panels plus many additional acres of impervious surfaces for roads and other structures. The water will sheet off of the site on to properties downhill and ultimately to Red Bridge Road, the valley and the Teanaway River.

If this scenario sounds familiar, it is exactly what happened last January when the large Chinook or Pineapple Express hit the upper County, causing extensive damage to Red Bridge Road, Weihl Road, and surrounding properties and access roads, including our road. The whole hillside was a river of water and snow flowing toward the Teanaway and Yakima Rivers. And this occurred before any solar project was built! Although last January's 'event' was extreme, we have seen a number of January/February Chinooks over the years, and global warming projections indicate that there will be more of them.

The flash run-off effect of the project may also negatively impact ground water recharge. Water running rapidly off of this huge site, which has been denuded of tree cover, will not percolate slowly into the ground water, where it slowly will work its way to the valley and the Teanaway River, feeding wells along the way. This issue is already a major issue of contention between the County and the Department of Ecology, with the resulting ban on new wells.

Finally, we also have serious concerns with pollutants from the metal, alloys, plastics, lubricants, glues, etc. which may wash off of the solar structures from this huge scale project into surface water, into the wetland areas, and potentially into ground water. We have the same concern with the herbicides used to control brush and grass around and under the panels that will wash off the site.

Applicant has failed to address these issues in any meaningful way and they need to be addressed in an EIS..

I. Access. The proposed road access to the solar site comes up the lower portion of Wiehl Road and then branches west on to Loping Lane past a number of homes and undeveloped properties before reaching Applicant's gate. Weihl Road continues beyond Loping Lane for a substantial distance and provides access to a large number of homes, plus a number of subdivided lots which

have not yet been developed. Weihl Road is a public right-of-way, but it is not currently maintained by the County. It is a gravel road maintained intermittently by various land owners, but it has been in very poor condition since the January storm. We do not know the ownership of Loping Lane. Applicant paints a picture of very few homes and very little traffic on Weihl Road, which is not correct.

The proposed development of the solar site would have a very damaging impact on both Weihl Road and Loping Lane. The transit of large numbers of trucks and other heavy equipment making thousands of vehicle trips on these gravel roads over a number of years of construction and then ensuing maintenance of the facility will tear them up in the long mud and ice season and will turn them to dust storms in the dry season.

If the County decides to approve the solar project, it must require the developer to improve Weihl Road to paved County standards and the County should then accept the road and maintain it. Logic would suggest that the same should be done for Loping Lane, but we will let those owners address that issue. It should also require that Applicant provide a secondary access to its site as it requires in other developments.

J. Proposed Setbacks. Applicant has only provided a "conceptual" view of the actual solar panel placement on its site and the related project setbacks from its property lines. This conceptual representation is included as Attachment B. This attachment shows about a 500 foot setback along our joint property line. Because this is only a conceptual representation, we have no way to determine if this setback is adequate to mitigate the impacts to our property.

We believe that a larger setback will not only help to shield our property from some of the negative effects of the project but also help to provide a buffer and corridor for deer, elk and other wildlife to move up the slope to the north facing areas of the site, where Applicant shows no construction and where we have observed the most deer and elk activity. These setbacks should be made a condition of any permit and not something to be applied in Applicant's discretion.

Applicant also shows only a minimum setback of 100 feet along portions of its southern boundary which pass close to a number of substantial homes. Although we assume that this issue will be addressed by those neighbors, this minimum setback seems unreasonable in light of its direct visual impact.

K. Noise. Applicant is silent on issues about noise resulting from the project. Obviously, if the project is approved, there will be considerable machinery noise from excavators, cement trucks, dump trucks and other equipment working on, in some cases, steep hillsides during the years of the construction phase. This issues needs to be addressed.

However, nothing has been said about the noise that might be generated by 15,000 solar panel arrays moving to track the sun, resetting at the end of the day, and potentially turning in unison to dump snow load in the winter. And do 400,000 solar panels producing power on a sunny day produce a sound?

In addition, anyone familiar with the upper County is aware of the strong winds that regularly blow through the area and along the hillsides of the proposed site. Just the afternoon wind is almost a daily occurrence. What noise does the wind make when it blows through 400,000 solar panels and 15,000 solar panel arrays? Does it whistle, shriek or just sound like the wind? We don't know the answer, and Applicant hasn't addressed it, but it could have a very serious impact on neighbors, surrounding land values and wildlife.

Applicant has bragged about the size of this project as being the biggest in the United States

and maybe the world, yet it has said nothing about the noise which may be generated by the size of its project. The noise issues are required to be addressed now under our understanding of the SEPA process. Applicant should be directed to address these noise issues as part of a full Environmental Impact Study.

L. View. Applicant downplays the visual impact of its constructed solar facility in its Application. This is definitely not the case for neighbors along the south line of the project who will be looking directly at a hillside lined with solar arrays with minimal setbacks or screening. As best as we can ascertain, the visual impact of the project should not be a major issue for us, once we are on our property, provided that adequate setbacks are imposed. However, it will be very apparent to us or anyone driving on the upper portion of Weihl Road. Attachment C is a panorama picture taken from our gate on Weihl Road looking up the ridge in a northwest direction. It shows several of the homes along the south border of the project, and more are out of sight up the hill to the west. It appears that most of the trees on and close to the ridge line in the right center portion of the picture will be removed and replaced with solar panel arrays.

In addition, since we can see our property from several high points along I-90 going to or from Ellensburg, the site will be visible from a large distance once the trees adjacent to us are replaced with massive arrays of solar panels. The site will also be visible to many properties that have an elevated view of Cle Elum Ridge, which covers a considerable territory. These issues should also be evaluated in the context of a full EIS.

M. Fire Danger. Fire is a concern to all who live in or near the woods and grasslands in the Teanaway area, particularly with its summer hot, dry and windy conditions. Applicant will have a huge number of wires, electrical connections, transformers, electric substations, a transmission intertie and other electrical equipment in close proximity with acres of dry grass under its approximately 160 acres of solar panels. What facilities such as water storage, pumping facilities and fire response equipment will Applicant have on site to respond to any fires that may start on its site, so that they do not quickly spread to adjacent properties before the fire district can respond? Applicant should be required to respond to this concern as part of a full environmental impact study.

Conclusion: Applicant promotes this huge solar project as a 'green' project. We submit that it is not a 'green' project, since it displaces a productive, carbon-fixing forest and meadow ecosystem containing important and healthy wildlife habitat, including large herds of deer and elk. If this project were located in the open, arid lands by Vantage or further east or on the Hanford Reservation, it would be 'green'. Since Applicant has chosen to place its project on this inappropriate site, its proposed project and the many damaging impacts that it would create must be fully examined with a thorough environmental impact statement.

Respectfully submitted



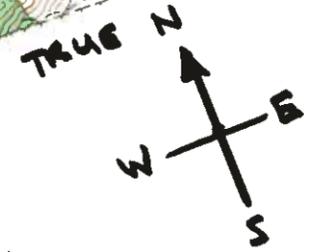
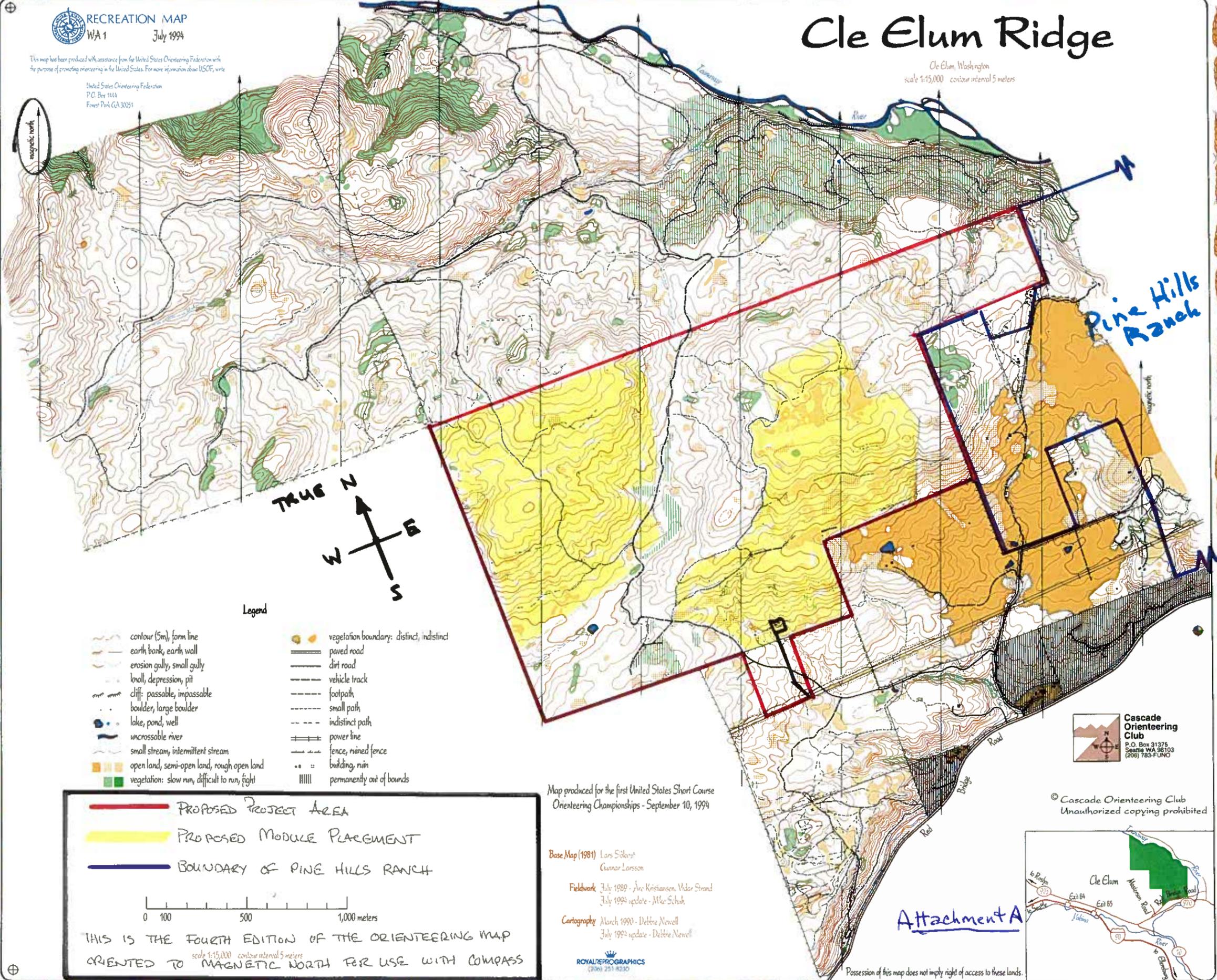
Charles Adams
General Manager
Pine Hills Ranch LLC

This map has been produced with assistance from the United States Orienteering Federation with the purpose of promoting orienteering in the United States. For more information about USOF, write:

United States Orienteering Federation
P.O. Box 1644
Forest Park GA 30051

Cle Elum Ridge

Cle Elum, Washington
scale 1:15,000 contour interval 5 meters



Legend

- | | |
|---|---|
| contour (5m), form line | vegetation boundary: distinct, indistinct |
| earth bank, earth wall | paved road |
| erosion gully, small gully | dirt road |
| knoll, depression, pit | vehicle track |
| cliff: passable, impassable | footpath |
| boulder, large boulder | small path |
| lake, pond, well | indistinct path |
| uncrossable river | power line |
| small stream, intermittent stream | fence, ruined fence |
| open land, semi-open land, rough open land | building, ruin |
| vegetation: slow run, difficult to run, fight | permanently out of bounds |

PROPOSED PROJECT AREA

PROPOSED MODULE PLACEMENT

BOUNDARY OF PINE HILLS RANCH

0 100 500 1,000 meters

THIS IS THE FOURTH EDITION OF THE ORIENTEERING MAP
scale 1:15,000 contour interval 5 meters
ORIENTED TO MAGNETIC NORTH FOR USE WITH COMPASS

Map produced for the first United States Short Course Orienteering Championships - September 10, 1994

Base Map (1981) Lars Silovst
Cunnar Larsson

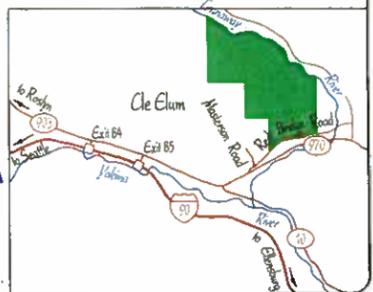
Fieldwork July 1989 - Åke Kristiansen, Vidar Strand
July 1994 update - Mike Schuh

Cartography March 1990 - Debbie Newell
July 1992 update - Debbie Newell



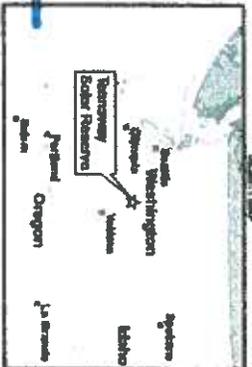
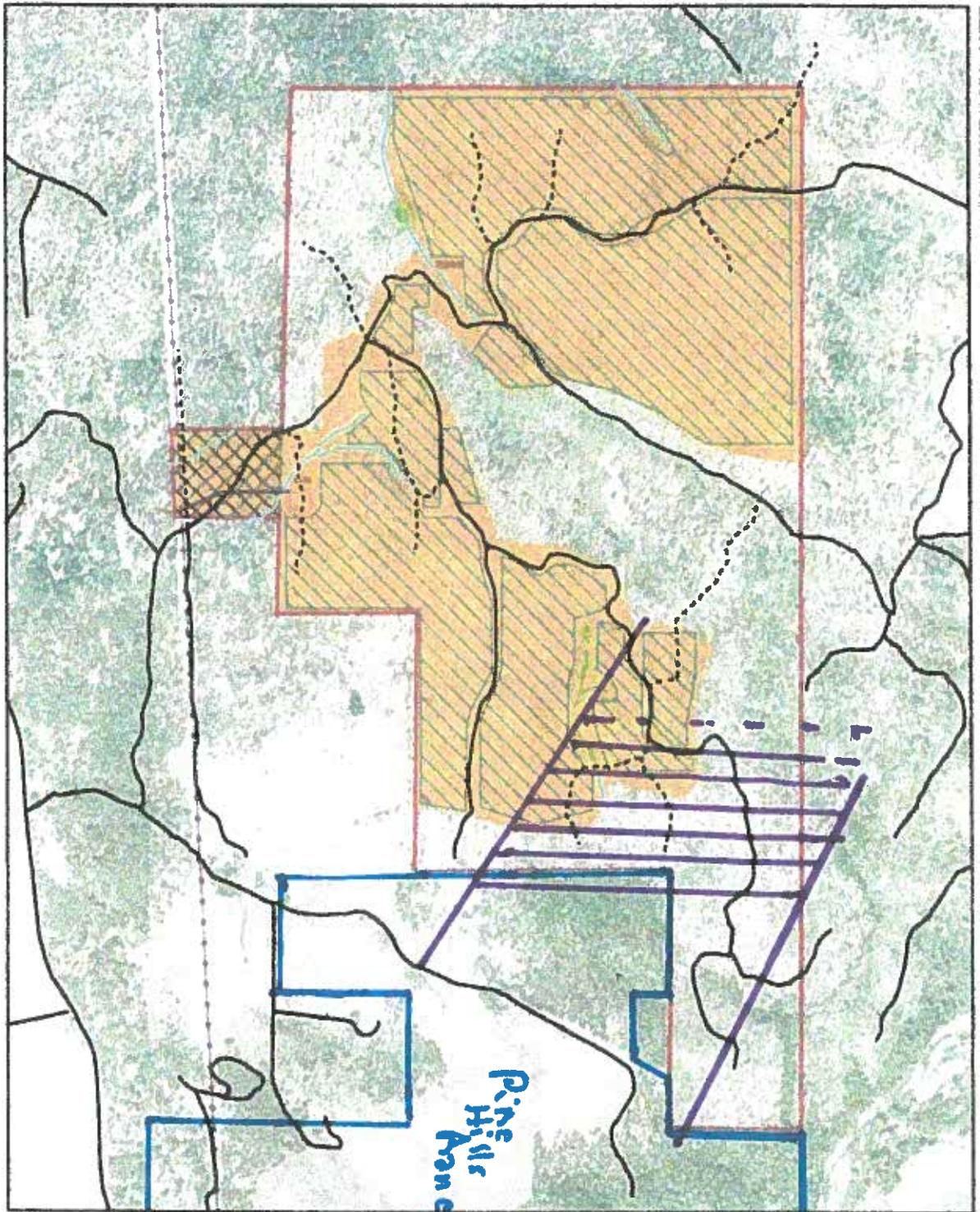
Cascade Orienteering Club
P.O. Box 31375
Seattle WA 98103
(206) 783-FUNO

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Unauthorized copying prohibited



Attachment A

Possession of this map does not imply right of access to these lands.



- LEGEND**
- Proposed Project Area
 - Proposed Project Site (560 acres)
 - Proposed Powerline Route to Grid
 - Potential Module Placement Area
 - Proposed O&M Facility
 - Proposed Substation
 - Proposed Switchgear
 - Transmission and Access Corridor
 - Existing Transmission Line
 - Road
 - Minor Dirt Road
 - Wetland
 - Wetland Buffer
 - Stream
 - Stream Buffer
- Note:
1. Aerial Imagery: 2005 1m NAIP.
- Scale:
1 inch = 1,000 feet

FIGURE B
Conceptual Site Layout
 Skagit County, Washington

Attachment B

Large Panarama Picture from Pine
Hills Ranch gate looking at hillside
of solar site.

Not attached.

Attachment C

Attachment 6

Dan Valoff

From: Bart Fite [bartfite@mandarinblue.com]
Sent: Friday, September 18, 2009 11:21 AM
To: anelson@GordonDurr.com; Dan Valoff
Subject: Application of Teanaway Solar Reserve LLC for CUP (CU-09-00005)

Dear Ms. Nelson and Mr. Valoff,

I am writing in response to your request for comments on the environmental impacts of the proposed Teanaway Solar Reserve Project.

As a frequent visitor to the area, I am very familiar with the proposed site and surrounding area. Despite Teanaway Solar's comments to the contrary, an industrial project like the one envisioned would be spectacularly out of character with what is now a beautiful forest and range environment. Our need for alternative sources of energy are well known. But to bring an industrial project to the kind of lands we want to protect when there are much better alternative locations that are already developed or capable of development with far fewer impacts (e.g. Hanford or even sites in already developed areas of Cle Elum) would be bad precedent and bad public policy. Urban growth area boundaries are designed to concentrate urban and industrial uses that have harmful environmental impacts in specific areas so they can be contained and managed. Allowing this project would be a signal that industrial developments could be allowed almost anywhere, to the detriment of the environment and long term urban planning throughout the county and state.

This is also not a case where ideal conditions for solar dictate the choice of this site. Anyone familiar with the area knows this is not Arizona. Short, cloudy days are the norm for much of the winter and regular snowfall would certainly impact the project. It appears the main drivers of the project are a confluence of a willing lessor and serious tax subsidies allowing for a quick private profit while they last. As we have seen with Ethanol and other programs with tax distorted economics, an inefficient and unsustainable gold rush benefitting a few with unanticipated negative consequences comes at the expense of the taxpayer.

An industrial project touted as perhaps the largest of its kind in the world would have several severe environmental impacts to the site and surrounding area, including:

1. **Loss of wildlife habitat and corridors.** An array of thousands of panels sitting on concrete and steel bases and requiring regular maintenance would destroy habitat and form a significant barrier to wildlife, including the elk, deer, coyote, bear, cougar, and various other small animals that frequent the area. The applicant states it will not fence the property, but this seems unlikely as the applicant would want to protect its investment – and fencing would clearly have severe impacts to wildlife corridors. Significant numbers of trees and other foliage would have to be clear cut, denuding the site area of valuable shade cover, bird and wildlife habitat, and erosion control.
2. **Water runoff and erosion.** Removing trees and foliage and replacing it with thousands of panels and other impervious surfaces would greatly increase the risk of severe flooding down to Red Bridge Road and the valley below. The project would also impact the percolation rate into the groundwater, a serious issue in the area. Finally, solvents, chemicals, lubricants, etc. used in the construction and maintenance of this industrial site would leach into the groundwater and Teanaway River. I understand efforts are being made to bring salmon runs to the Teanaway and any potential negative impacts to water quality attributable to the site should be fully examined.
3. **Other impacts.** The current character of the area is forest and range lands; a quiet, bucolic environment with significant wildlife, trees, and wildflowers. The proposed project would place a large scale industrial site squarely in the middle of this environment and be totally out of character with the surrounding area. Significant noise, dust, and pollution would be generated during construction. After construction, who can say what the environmental impacts of thousands of panels arrayed on this hillside would create. Noise, visual impacts from nearby and across the valley, and increased traffic are just a few that come to mind.

An industrial project of the size and scale proposed must be examined further and more time granted for a public review of the applicant's phone book thick application. Moreover, much of the applicant's proposals are "conceptual". Without knowing what the applicant intends to build and how, how can the county properly examine its impacts? At the very least, the applicant needs to first flesh out the details of what it is actually proposing, and then a full environmental impact statement must be required to examine the serious negative impacts of the project.

As a matter of public policy, industrial projects of this size and scope should not be sited in the kind of pristine, forested areas we should be trying to protect from industrial sprawl. While a strong case for solar energy being "green" can be made, and I am a firm supporter of alternative energy, this project would be built at the expense of existing "green" habitat. This is a mistake and a horrible precedent to set for future development. This is especially true when other far more appropriate sites are available. My understanding is that this project is only economically viable through significant government subsidies through tax breaks. What would happen if these subsidies were reduced or eliminated, but this mammoth project was already built out? Does Kittitas County want a rusting 900 acre concrete, steel, and silicon blight on an otherwise forested hillside? A solar site in northern latitudes with short, cloudy winter days and at an elevation that would require frequent snow removal is not economically viable on its own merits. This is a public/private project that would be partially paid for by taxpayers. Our public representatives should insist taxpayer money is well spent on sites that make sense, not on a site where the applicant would reap subsidized private economic benefits at the cost of significant negative public environmental impacts.

Sincerely,

Bart Fite
730 39th Ave.
Seattle, WA 98122

Attachment 7



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

15 W Yakima Ave, Ste 200 • Yakima, WA 98902-3452 • (509) 575-2490

September 18, 2009

Kirk Holmes
Kittitas County Community Development
411 N. Ruby St., Suite 2
Ellensburg, WA 98926

Dear Mr. Holmes:

Thank you for the opportunity to comment during the optional determination of nonsignificance process for the development of a solar farm, proposed by Teanaway Solar Reserve, LLC [CU-09-00005]. We have reviewed the documents and have the following comments.

AIR QUALITY

Air-emission producing activities during the construction phase of this project:

- Assembly activities such as welding, re-melting, soldering, metal fabrication for support structures.
- Non-road engines.
- Concrete batch plant. Include a discussion of potential local suppliers of concrete if on-site concrete batch plant is not used.
- Rock crushing. As with concrete batch plant, include a discussion of potential local supplier.
- Dust generation. Kittitas County is especially sensitive to dust generation. A dust control plan will be crucial.
- Woody debris disposal. Ecology and Kittitas County will prefer that the applicant sign a beneficial reuse statement. However, if the site is in an area that permits



burning and the applicant chooses that option, an analysis of impacts from burning needs to be in the SEPA.

Air-emission producing activities during the operation phase of this project:

- Non-road engines. Ecology will want to know how the applicant proposes to power the operational buildings on site.

Ecology recommends mitigation measures for the above stated activities.

If you have any questions concerning the Air Quality comments, please contact David Ogulei at (509) 454-7899.

WATER RESOURCES

The subject land lies within an area currently under a groundwater moratorium. Chapter 173-539A WAC, known as the Upper Kittitas Emergency Ground Water Rule, withdraws all new appropriations of groundwater within the upper Kittitas County during the pendency of a groundwater study. The rule does allow for new uses of groundwater if a building permit has been granted and vested prior to July 16, 2009, or for projects which are determined by Ecology to be water budget neutral.

Prospective groundwater users in the area affected by Chapter 173-539A WAC shall apply to Ecology for a permit to appropriate public groundwater or, if seeking to use the groundwater exemption, shall submit to Ecology a request for determination that the proposed exempt use would be water budget neutral. No new exempt uses under Section 90.44.050 RCW may commence unless Ecology has approved a request for determination that the proposed exempt use would be water budget neutral.

In 'Summary of Construction Activities and Components,' the applicant indicates that water will be needed for dust control and module cleaning. The applicant indicates that water will be trucked in or withdrawn from on site wells. If water will be trucked in, the water purveyor is responsible for ensuring that the proposed use(s) are within the limitations of their water rights. No new exempt uses under Section 90.44.050 RCW may commence unless Ecology has approved a request for determination that the proposed exempt use would be water budget neutral (Chapter 173-539A WAC.)

Mr. Holmes
September 18, 2009
Page 3 of 4

In 'Summary of Operations and Maintenance Activities and Components,' the applicant describes using water for cleaning the solar modules or other purposes. Because the project lies within an area affected by Chapter 173-539A WAC, the applicant may not use groundwater under the exemption (90.44.050 RCW.) If water will be trucked in, the water purveyor is responsible for ensuring that the proposed use(s) are within the limitations of their water rights.

In the checklist, Environmental Elements, Water, Surface 5, the applicant indicates that the project will not require any new surface water withdrawals or diversions. It is not clear whether surface water will be used. If any surface water will be used for the project, the applicant must provide a description, purpose, and approximate quantities of surface water to be used. All uses of surface water require a water right. If the applicant plans to use a surface water right, such use must be consistent with that water right.

Also in the checklist, Environmental Elements, Water, Ground 1, the applicant indicates that groundwater for construction may be used from a source with an existing water right. If so, the water purveyor is responsible for ensuring that the proposed use(s) are within the limitations of their water rights. If the proposal's actions are different than the existing water right (source, purpose, the place of use, or period of use), then it is subject to approval from the Department of Ecology pursuant to Sections 90.03.380 RCW and 90.44.100 RCW.

If you have any questions concerning the Water Resources comments, please contact Kurt Walker at (509) 454-4237.

WATER QUALITY

- The size and complexity of the proposed project may require that an individual NPDES Construction Stormwater Permit be obtained. Please contact Lynda Jamison at (509) 575-2434 for further information.
- Control of vegetation by herbicides in and around water courses, including intermittent streams and wetlands may require an aquatic herbicide permit. Please contact: Jon Jennings, joje461@ecy.wa.gov or by phone at (360) 407-6283.

Mr. Holmes
September 18, 2009
Page 4 of 4

- Solid wastes, solvents and solutions used in cleaning the panels require proper disposal.
- The exposure of materials and processes to weather may require an NPDES Industrial Stormwater Permit. Please contact Ray Latham, (509) 575-2807 for further information.

SHORELANDS/ENVIRONMENTAL ASSISTANCE

Cathy Reed is currently reviewing the Wetland Delineation report and will provide comment to Kittitas County Development Services in the near future.

WASTE 2 RESOURCES

Construction, demolition and land clearing (CDL) debris can often be recycled for less than it costs to landfill the materials. Call Ecology's 1-800-RECYCLE or contact Gary Bleeker at (509) 575-2837 to see if there are facilities in the area that will accept the demolition wastes.

Sincerely,



Gwen Clear
Environmental Review Coordinator
Central Regional Office
(509) 575-2012

Attachment 8



KITTITAS COUNTY FIRE MARSHAL'S OFFICE

411 N. Ruby St., Suite 2, Ellensburg, WA 98926

Office (509) 962-7657 Fax (509) 962-7682

September 23, 2009

Anna Nelson
Community Development Services
411 N. Ruby Street, Suite 2
Ellensburg, WA 98926

Re: Teanaway Solar Reserve Project

Dear Mrs. Nelson:

After conducting the pre-application review of the above named project, I have the following comments:

- The minimum road width shall not be less than 20' in width. In the event that the roadway infringes on a critical area, i.e. wetland, etc., provisions may be made to allow for a narrower road width in that area.
- All cul-de-sacs must have a minimum turning radius of no less than 50'.
- All development, design & construction shall comply with Kittitas County Code, Kittitas County Zoning and the 2006 International Fire & Building Codes.
- Due to the remote nature and topography of proposed project in this area, all new structures shall comply with the Wild-land Urban Interface Code requirements for defensible space and ignition resistant construction materials.
- In the event that sprinkler suppression systems and/or alarm systems are to be installed within the buildings, each system requires a separate permit from the Fire Marshal's Office,
- Review of the final project submittals may include further requirements.

This letter in no way constitutes a formal review of this project. The requirements listed above are not all inclusive and are subject to change pending full review of this project. If you have further questions, please do not hesitate to contact me at 509-962-7000.

Sincerely,

Brenda Larsen
Fire Marshal

Attachment 9



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

15 W Yakima Ave, Ste 200 • Yakima, WA 98902-3452 • (509) 575-2490

September 23, 2009

Kirk Holmes
Kittitas County Community Development
411 N. Ruby St., Suite 2
Ellensburg, WA 98926

Dear Mr. Holmes:

Thank you for the opportunity to comment during the optional determination of nonsignificance process for the Teanaway Solar Reserve, LLC solar project [CU-09-00005]. An earlier comment letter for this project was submitted on September 18, 2009. Upon further review of the project documents we have the following supplementary comments.

Shorelands/Environmental Assistance

Wetland delineation report

More information regarding field reconnaissance should be provided in the wetland report about methods used in the site wetland survey. There appears to have been a good review using remote sensing methods and existing information, but because the wetlands on site are relatively small, and the site is so large, it would be easy to miss them if ground-truthing were not extensive. Were all break points in land topography and swale areas on site walked?

Wetland and stream buffers

Maps show large buffers around site wetlands, but the submitted SEPA ODNs checklist on page 30 lists 25-foot buffers for wetlands smaller than 10,000 square feet and 80-foot buffers for the larger wetland areas. *These buffers are not adequate* to protect the animals that are likely to be using the wetlands and buffer areas and will not be adequate



Mr. Holmes
September 23, 2009
Page 2 of 3

to filter sediments if there is grading of the adjacent terrain in order to install the solar array. The smaller buffers mentioned are consistent with Kittitas County requirements, but County requirements are based on their CAO adopted in 1994 and are not based on Best Available Science as we understand it today. Smaller wetlands in arid areas provide critical habitat for invertebrates and amphibians and an assortment of other animals.

The applicant should provide information on how the proposed wetland buffers will adequately support current wetland functions, including amphibian habitat. The wetland consultant, CH2MHill, performed several types of ratings on the wetlands to help determine their function in the landscape. All wetlands were rated as Category III and all wetlands (regardless of size) were considered to have high potential and opportunity to provide amphibian habitat. ***Buffers around category III wetlands that support amphibians should be intact and be at least 150 feet*** and possibly more depending on specific species of amphibian: Buffers less than this pose a high risk for the loss of amphibian use within the wetland. Mitigation measures need to be taken to create habitat areas or assure that there is adequate hiding cover with intact corridors to other habitat areas during and after construction. In particular, woody debris and other detritus that could be used as hiding cover by small animals within corridors should remain after initial clearing. Corridors and appropriate buffers also need to be protected from construction activities by the placement of visual markers around wetlands and their buffers

Indirect impacts/groundwater

The wetland delineation report states that precipitation is the source of hydrology for the site wetlands. No information was presented regarding depth to groundwater on site to rule out its potential influence on wetland hydrology. A geotechnical report was not available for review, and soil mapping unit characteristics were not discussed to support the conclusion. Information on the potential impact on groundwater resources from on-site trenching and post placement should be presented in the SEPA documents.

Access roads

Maps of roads were provided, but it was unclear whether the road maps presented included proposed roads. Statements were made in the text of the application that existing roads would be used, but that some additional road-building or widening may be

Mr. Holmes
September 23, 2009
Page 3 of 3

required. If existing roads will be widened, the needed maximum width should be described. The areas where this would occur should be specifically identified or at least the rationale used to decide if a new road is needed should be discussed. An estimate of how much more land disturbance is likely to be required for roads should be provided. Drawings of conceptual road cross-sections and cross-sections of stream crossings should be provided.

BMPs which specify use of straw bales

If straw bales are used for erosion control, weed free straw should be specified for use. Recent studies have shown that use of straw bales for water quality protection requires a high degree of maintenance to be effective. Straw and baling twine quickly deteriorate in a wet environment, and bales need to be checked regularly (especially after rain or snow-melt events) in order to assure effectiveness. If straw bales are to be used, there should be a written maintenance schedule for the responsible party.

If you have any questions concerning the Shorelands/Environmental Assistance comments, please contact Catherine Reed at (509) 575-2616.

Sincerely,



Gwen Clear
Environmental Review Coordinator
Central Regional Office
(509) 575-2012

Attachment 10



Climate Solutions.

1 PARTIAL RECYCLED PAPER WITH 10% POST-CONSUMER WASTE

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SEP 18 2009

Kittitas County
CDS

September 15, 2009

Ms. Anna Nelson
Kittitas County Community Services Department
411 N. Ruby St. Ste 2
Ellensburg, WA 98926

Lead Planner Anna Nelson:

Climate Solutions' mission is to accelerate practical and profitable solutions to global warming by galvanizing leadership, growing investment and bridging divides. We work with business, agriculture, environmentalists, government, and public interest groups to create practical and profitable climate and clean-energy policies that work for the environment and the economy. Here in Washington State, our work focuses on policies and projects that will create new sources of clean energy and attractive, family-wage jobs.

The Teanaway Solar Reserve is an example of the kind of project we need many more of in our state. We are writing you in full support of the Teanaway Solar Reserve's request for a Conditional Land Use Permit for the construction of their 75 MW photovoltaic solar reserve. Granting the permit will give the project the opportunity to move forward and bring new renewable energy to the state and new jobs to the county. Kittitas County has the potential to become a hub of clean and renewable energy projects, making the vital transition to the use of its abundant natural resources in a way that can sustain the community and the environment. We urge you to move the project swiftly and successfully through the permitting process.

Sincerely,

K.C. Golden
Policy Director
Climate Solutions

Climate Solutions, Inc.

Olympia
219 Legion Way SW, Ste 201, Olympia, WA 98501
p 360.352.1763
f 360.943.4977

Seattle
1402 3rd Ave Ste 1305, Seattle, WA 98101
p 206.443.9570
f 206.624.2022

info@climatesolutions.org



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Attachment 11

Ms. Anna Nelson

Kittitas County Community Services Dept.

All N. Ruby Street, SW 2, Ellensburg, WA 98926

Dear Ms Nelson

1/5
RECEIVED

SEP 18 2009

I and my wife Bonnie are ~~one~~ ^{Kittitas County} among the

original partners who organized our 500 Acres plot of land on the Cle Elum Ridge as a Timber Growing, recreational and wild life refuge. We have owned this land since the mid 1970's. We call the parcel "Pine Hills Ranch" (PHR). We have three cabins on the PHR property and a group of eleven families who use it on a regular basis.

We have recently learned that our immediate neighbor to the ^{North and} NW, abutting directly on our borders will be the Teamaway Solar Reserve who have leased the land from the current owners for the purpose of building a "thermal Solar generating site

for the generation of electrical energy to be fed to the high voltage power grid.

I am a strong advocate of ~~at~~ the development of non petroleum alternative electrical energy sources - especially within the North West USA. I believe the concept has merit and applaud the concept of such a generating facility. An important feature is that such a site ~~should~~ which will require ^a very large tract of land and the installation of a large equipment infrastructure should be built where it will have the smallest adverse ecological impact possible. I can imagine many opportunities for such sites with the advent of south sloping faces and access to high voltage power lines, where very little impact would result from construction and operation of such a facility.

That is definitely not the case with the site on the Cle Elum Ridge that has been chosen by the Teamway Solar Reserve, (the organizers).

I have heard that the organizers plan to provide limited access to the solar panel site for passage or use of wild animals and people. This would not be true if the site is fenced ~~there~~ which we have been told is not their plan. However, one can see the result of a solar energy site on page 35 of the September 2009 issue of National Geographic Magazine which was demolished by vandalism and has ~~now~~ recently been rebuilt. Protection of this type of a facility will definitely require substantial fencing to protect it from people, - vandals.

If the organizers come to that conclusion as I am certain they will, the fenced property will create a huge impact on the ecology and use of their property and, especially on the migration and use of the deer, elk, and their predators. We love our land at PTHR, especially to view wild life and wander in a forested and pastured landscape.

I feel strongly that a complete Environmental Impact Study should be completed before a permit should be issued to construct such a facility. The people ~~in the~~ living and owning property in the vicinity of the proposed solar farm should have sufficient time to study such an EIS and to make comments on the plans and site before it is permitted.

5/5

I would be most grateful if you establish strong requirements that such action, particularly an EIS study be required together with sufficient time for informing ~~and~~ all parties affected.

Yours very truly,

Richard J Robbins
154 Lake Washington Blvd. East
Seattle WA 98112
Ph. 206-323-6019
e-mail - rjr@robbinsusa.com

Partner & owner of the Pine Hills Ranch

Richard Robbins

Attachment 12

September 17, 2009

Mr. Dan Valoff
Kittitas County Community Development Services
411 N Ruby ST, Suite 2
Ellensburg WA 98926

RECEIVED

SEP 18 2009

Kittitas County
CDS

Subject: Proposed Teanaway Solar Reserve Project – CU – O9-00005

Dear Mr. Valoff,

I am a party of interest with regards to the proposed Solar Reserve Project, which has applied for a Conditional Use Permit under the Kittitas County Land Use Code. I am an adjacent land owner (parcel # 694935). I am an environmental consultant with an M.S. in Botany (U.W 1993) and I specialize in vegetation and wildlife analysis and documentation. I have spent many hours enjoying and documenting the plant and animal species on the subject site in an informal capacity since 1999.

I am in favor of increased use of alternative energy, but know that all projects need careful analysis of impacts to lessen impacts to the environment. I appreciate the work done to date by the applicant to document current conditions on the site. However, I have significant concerns with project impact analysis done to date and submitted in support of the project.

Elk Habitat and Elk Movement

The project area is a portion of the range of the Colockum elk herd. Although logged several times in the last 50 years, this area is still dominated by native species of trees, shrubs, and forbs that provide excellent forage for elk. The combination of open-canopy Ponderosa pine forest with seasonal wetlands provides varied forage used by elk throughout the year. Along with neighbors and hunters, we have observed the movement of elk through this area in small groups of cows and calves, or bull elk groups, to large breeding herds with upwards of 60 - 80 individuals. The year-round presence of water, on the subject site and on neighboring properties to the south, provides additional value for elk.

Construction of an extensive solar array as described in project documentation will include clearing most vegetation from the 400-acre site before installation of the solar panels. Although site restoration includes reseeding, no irrigation is provided, and given local site conditions, revegetation success will be limited. If appropriate vegetation is not re-established, this area will be lost to the elk as foraging habitat. **Water trucks could be used to help vegetation become established.**

Information from the Rocky Mountain Elk Foundation (Tom Toman, email communication, Sept. 15, 2009) indicates that elk are unlikely to move underneath the panels, and this opinion was concurred with by Scott McCorquodale (WDFW Elk

Mandy Weed

From: Cathie Conolly [CConolly@esassoc.com]
Sent: Thursday, September 17, 2009 3:22 PM
To: CDS User
Subject: Teanaway Solar Reserve CU 09-00005
Attachments: Teanaway Solar.doc

Follow Up Flag: Follow up
Flag Status: Completed

Dan-

I am an "interested party" for the proposed Teanaway Solar Reserve. I have written a comment letter (attached) and have mailed you a hard copy as well. Please let me know if you are not the correct contact for this application.

Thank you,
Catherine Conolly
Cell: 206 795.3340
WK: 206.789.9658

RECEIVED

SEP 17 2009

**Kittitas County
CDS**

September 17, 2009

Mr. Dan Valoff
Kittitas County Community Development Services
411 N Ruby ST, Suite 2
Ellensburg WA 98926

Subject: Proposed Teanaway Solar Reserve Project – CU – 09-00005

Dear Mr. Valoff,

I am a party of interest with regards to the proposed Solar Reserve Project, which has applied for a Conditional Use Permit under the Kittitas County Land Use Code. I am an adjacent land owner (parcel # 694935). I am an environmental consultant with an M.S. in Botany (U.W 1993) and I specialize in vegetation and wildlife analysis and documentation. I have spent many hours enjoying and documenting the plant and animal species on the subject site in an informal capacity since 1999.

I am in favor of increased use of alternative energy, but know that all projects need careful analysis of impacts to lessen impacts to the environment. I appreciate the work done to date by the applicant to document current conditions on the site. However, I have significant concerns with project impact analysis done to date and submitted in support of the project.

Elk Habitat and Elk Movement

The project area is a portion of the range of the Colockum elk herd. Although logged several times in the last 50 years, this area is still dominated by native species of trees, shrubs, and forbs that provide excellent forage for elk. The combination of open-canopy Ponderosa pine forest with seasonal wetlands provides varied forage used by elk throughout the year. Along with neighbors and hunters, we have observed the movement of elk through this area in small groups of cows and calves, or bull elk groups, to large breeding herds with upwards of 60 - 80 individuals. The year-round presence of water, on the subject site and on neighboring properties to the south, provides additional value for elk.

Construction of an extensive solar array as described in project documentation will include clearing most vegetation from the 400-acre site before installation of the solar panels. Although site restoration includes reseeding, no irrigation is provided, and given local site conditions, revegetation success will be limited. If appropriate vegetation is not re-established, this area will be lost to the elk as foraging habitat. **Water trucks could be used to help vegetation become established.**

Information from the Rocky Mountain Elk Foundation (Tom Toman, email communication, Sept. 15, 2009) indicates that elk are unlikely to move underneath the panels, and this opinion was concurred with by Scott McCorquodale (WDFW Elk

*Teanaway Solar
Conolly Comment Letter
9/23/2009*

Specialist, Region 3) (personal communication, September 17, 2009). Only one corridor is planned between the two main portions areas of solar panels, and it does not connect with properties to the south and east of the site, where elk movement is common. **Incorporation of additional wildlife corridors** that would allow elk to continue to move through this area would facilitate elk access Cle Elum Ridge north and west of the proposed project site and partially mitigate impacts to elk.

Weed Management

In the project vicinity, a number of weeds currently on the Washington State and 2009 Kittitas County Noxious Weed list are present. Notably, spotted and Russian knapweed, Mullein, Ox-eye daisy, kochia, and perennial pepperweed are common on the site. Neighbors have worked hard to decrease the presence of these weeds on their properties, including spot spraying, and introduction of Knapweed root weevil for biological control.

The proposed project includes clearing activities that are likely to increase the presence of noxious weeds on the site, and does not include adequate measures to revegetate the site by native vegetation. **Water trucks could be used to help vegetation become established**, and several maintenance visits during vegetation establishment for weed control would partially mitigate for increase in weed prevalence.

Aesthetics

The project visual impact technical memorandum (CH2M Hill, 2009) did not include any of the properties adjacent to the site, that will be most impacted by the project. The clearing extend to the south property boundary. We request that the project provide a **200-foot buffer of existing trees and vegetation** to partially mitigate the visual impacts, and the corresponding loss of value of our property.

Thank you for considering these comments. Please feel free to contact me with regards to this letter at (206) 789-9658.

Sincerely,



Catherine Conolly
801 Arrowleaf Road
Cle Elum, WA 98922

Mailing address:
2580 Magnolia Blvd. W.
Seattle, WA 98199

Teanaway Solar
Conolly Comment Letter
9/17/2009

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Thank you for considering these comments. Please feel free to contact me with regards to this letter at (206) 789-9658.

Sincerely,



Catherine Conolly
801 Arrowleaf Road
Cle Elum, WA 98922

Mailing address:
2580 Magnolia Blvd. W.
Seattle, WA 98199

Attachment 13

Bonnie B. Robbins
154 Lake Washington Blvd. E.
Seattle, Washington 98112

RECEIVED

SEP 18 2009

Kittitas County
CDS

September 17, 2009

Ms. Anna Nelson
Kittitas County Community Development Services
411N. Ruby Suite 2
Ellensburg, WA 98926

Dear Ms. Nelson,

As one of the partners of Pine Hills Ranch I am very disheartened to learn of the solar facility being proposed in the Cle Elum vicinity. The impact it would have on the diversity of wildlife in the area proposed would be disastrous. It would disrupt or prohibit the natural movements of the elk on the Cle Elum Ridge. It would impact the cougars which are already being crowded out by human development. The hawks would be deprived of small rodents. All wildlife would be impacted negatively. For a project this large a thorough EIS is necessary before a true assessment can be made.

It is also disturbing that you provide a very short comment period. There is not time to inform the community of the major project being proposed. Please give us more time so that we can learn more about the impact the solar facility would make on the whole area.

Sincerely,

Bonnie Robbins



Attachment 14

Seidell, Nichole/PDX

From: Anna Nelson [anelson@GordonDerr.com]
Sent: Tuesday, September 29, 2009 3:01 PM
To: Seidell, Nichole/PDX
Subject: FW: Teanaway Solar Reserve

From: Dan Valoff [mailto:dan.valoff@co.kittitas.wa.us]
Sent: Tuesday, September 29, 2009 3:00 PM
To: Anna Nelson
Subject: FW: Teanaway Solar Reserve

FYI

Dan Valoff
Staff Planner

Kittitas County Community Development Services
411 N Ruby Street Suite 2
Ellensburg, WA 98926
dan.valoff@co.kittitas.wa.us
P: 509.962.7637
F: 509.962.7682



All e-mail sent to this address will be received by the Kittitas County e-mail system and may be subject to Public Disclosure under Chapter 42.56 RCW and is subject to archiving and review by someone other than the recipient.

From: Arriola, Carlos [mailto:Carlos.Arriola@seattle.gov]
Sent: Tuesday, September 29, 2009 2:52 PM
To: Dan Valoff
Subject: Teanaway Solar Reserve

Hello Mr. Valoff. As a property owner and taxpayer in Kittitas County, I STRONGLY SUPPORT the The Teanaway Solar Power Reserve. Regards, Carlos Arriola.

Attachment 15

Seidell, Nichole/PDX

From: Anna Nelson [anelson@GordonDerr.com]
Sent: Tuesday, September 29, 2009 9:07 AM
To: Seidell, Nichole/PDX
Subject: FW: Teanaway Solar Reserve - YES!!!

fyi

From: Dan Valoff [mailto:dan.valoff@co.kittitas.wa.us]
Sent: Tuesday, September 29, 2009 8:01 AM
To: Anna Nelson
Subject: FW: Teanaway Solar Reserve - YES!!!

For your file.

Dan Valoff
Staff Planner

Kittitas County Community Development Services
411 N Ruby Street Suite 2
Ellensburg, WA 98926
dan.valoff@co.kittitas.wa.us
P: 509.962.7637
F: 509.962.7682



All e-mail sent to this address will be received by the Kittitas County e-mail system and may be subject to Public Disclosure under Chapter 42.56 RCW and is subject to archiving and review by someone other than the recipient.

From: Mike Haschak [mailto:MHaschak@ci.kirkland.wa.us]
Sent: Tuesday, September 29, 2009 6:28 AM
To: Dan Valoff
Subject: Teanaway Solar Reserve - YES!!!

Dear Sirs, as a homeowner in Easton, WA. (51 Homestead Lane), I wanted to express my enthusiastic support of the Teanaway Solar Reserve out of Cle Elum. What a great environmental project. This could not only mean lots of jobs for Kittitas County, but possibly be a worldwide example of a way out of our dependence on oil and coal.

Respectfully,
Mike and Tory Haschak
425-442-9976

Attachment 16

Seidell, Nichole/PDX

From: Anna Nelson [anelson@GordonDerr.com]
Sent: Tuesday, September 29, 2009 10:56 AM
To: Joan Neslund
Cc: Holmes, Kirk; Valoff, Dan; Seidell, Nichole/PDX
Subject: RE: Information on the validity of the Teanaway Solar Reserve
Attachments: CU-09-00005 Teanaway Solar Reserve Notice of Application Mailed.pdf

Hello Joan,

Thank you for your email. I am a contract planner working for and on behalf of Kittitas County to review the Conditional Use Permit application and proposed Development Agreement that was submitted by the Teanaway Solar Reserve LLC. Attached is the Notice of Application. The comment period ends October 5th. The application documents are available on the County website. If you have questions about the County review process, please contact me at 206-382-9540.

I have also cc:d the applicant's agent and included her contact information below, so that she can provide you with information that may be helpful to your library patrons.

Regards,
Anna Nelson, AICP
Contract Planner for Kittitas County

Agent for Teanaway Solar Reserve, LLC.:
Nichole M. Seidell
Associate Project Manager
CH2MHILL
2020 SW Fourth Ave, 3rd Flr
Portland, OR 97201-4958
nseidell@ch2m.com

Business (503) 235-5000
Direct Dial (503) 872-4803
Fax (503) 736-2000

From: Joan Neslund [mailto:neslundj@ci.ellensburg.wa.us]
Sent: Tuesday, September 29, 2009 10:43 AM
To: Anna Nelson
Cc: info@teanawaysolarreserve.com
Subject: Information on the validity of the Teanaway Solar Reserve

Hi

I work at the Ellensburg Public library in Kittitas County. Patron are coming in with comments that this project is a scheme and not valid. Can you provide the library information on your project?

Joan Neslund
Ellensburg Public Library - reference
<http://www.ellensburglibrary.org/>

9/29/2009

509.962.7228

Attachment 17



CENTRAL WASHINGTON UNIVERSITY

Your future is Central.

DEPARTMENT OF INDUSTRIAL AND ENGINEERING TECHNOLOGY

September 29, 2009

Ms. Anna Nelson
Kittitas County Community Services Department
411 N. Ruby St. Ste 2
Ellensburg, WA 98926

Anna Nelson,

We would like to add our public support to the Teanaway Solar Reserve. We have met with Howard Trott and looked at their project description; we feel this is a great opportunity with clear benefits for CWU's department of Industrial and Engineering Technology.

The Teanaway Solar Reserve has taken the steps to show its intent to build a much-needed power source while protecting the character and integrity of our natural forest lands. The added benefit of a solar panel manufacturer here in Kittitas County is of even greater importance to this project, because of the jobs and opportunities it provides to our students. The benefits of renewable energy and the jobs this project will bring to Kittitas County in general are immense.

When this project becomes a reality we plan to perform applied research in support of the Teanaway Solar Reserve. We encourage you to weigh these benefits and approve a Conditional Use Permit for the Teanaway Solar Reserve.

Sincerely,

W. J. Bender

W. J. Bender
Industrial and Engineering Technology Department.

Attachment 18



120 South 3rd Street, Suite 299-A
Yakima, WA 98901
ak.wintzer@co.yakima.wa.us
509.574.1950
Cell: 509.388.4361

September 30, 2009

Kittitas County Community Development Services Office
411 N. Ruby Street
Ellensburg, WA 98926

Dan,

I would like to express my support for the Teanaway Solar Reserve that is seeking to be developed in the Cle Elum area. It is my understanding that this private project will consist of 400,000 photovoltaic panels spread across 145 acres on a 900 acre of privately owned timberland. During construction this project will create up to 235 badly needed construction jobs. It will require around 35 full-time family wage jobs after construction is completed. As part of this project, the Reserve will require that their solar panel vender locate a manufacturing plant in Cle Elum.

Please look favorably on this project so it can move forward and contribute to the economic base of Kittitas County.

Sincerely,

A.K. Wintzer
Project Manager
Renewable Energy Workforce Training Needs Study

Attachment 19

Crivella, Ellen/PDX

From: Seidell, Nichole/PDX
Sent: Wednesday, September 30, 2009 9:54 AM
To: Crivella, Ellen/PDX
Subject: FW: Teanaway Solar Reserve
[I think this one is a repeat..can you check?](#)

From: Anna Nelson [mailto:anelson@GordonDerr.com]
Sent: Wednesday, September 30, 2009 9:26 AM
To: Seidell, Nichole/PDX
Subject: FW: Teanaway Solar Reserve

From: Mike Haschak [mailto:MHaschak@ci.kirkland.wa.us]
Sent: Tuesday, September 29, 2009 8:58 PM
To: Anna Nelson
Subject: Teanaway Solar Reserve

I would like to throw my complete support behind this project. As a homeowner in Easton (51 Homestead Lane), I think this would be good for the economy, good for the environment, and possibly have the eyes of the world looking to this project as how things should be done in the 21st century.

What a great opportunity for our area.

Mike Haschak
425-442-9976

Attachment 20



Department of Energy

Bonneville Power Administration
Ellensburg Maintenance District
14001 Wilson Creek Road
Ellensburg, WA 98926

September 30, 2009

In reply refer to: Kittitas County – CU-09-00005 (Teanaway Solar Reserve)

LINE: Rocky Reach – Maple Valley No. 1
LOCATION: BOL 54/5

Kittitas County Building & Planning Department (via e-mail)
411 N. Ruby St, Suite 2
Ellensburg, WA 98926

Subject: CU-09-00005 (Teanaway Solar Reserve)

To Whom It May Concern:

The Bonneville Power Administration (BPA) has reviewed the materials sent with the Notice of Application for the above-referenced project and its relationship to the BPA transmission line easement that may be affected by this project. BPA does not have any objection to this project as long as any planned buildings and facilities remain off the BPA right-of-way. We do request, however, that the following statement be forwarded to the property owner to help ensure public safety and reliable operation of BPA's facilities.

Portions of the property (Kittitas County parcel map number 20-16-27000-0009) located in Section 27, Township 20 North, Range 16 East, W.M., are encumbered by an easement for high-voltage transmission lines owned by the Bonneville Power Administration (BPA). BPA has acquired rights for these easements that limit the landowner's use of this area. BPA has the right of ingress and egress, the right to keep the easement free and clear of all brush, timber, structures and fire hazards, and rights associated with roads within the easement area. **All activities planned within the BPA easement need to be reviewed by BPA prior to their occurrence.** Do not build, dig, install utilities, plant, or burn within the easement area. For further questions or concerns regarding any proposed uses of the easement, you may contact BPA Real Estate Field Services at the address listed above or by calling (877) 417-9454.

Your cooperation in this matter is greatly appreciated. By working together with our agency, your effort will help to minimize later disputes or unnecessary costs associated with the required removal or modification of incompatible or non-permitted activities placed within BPA's easement. If you have any questions regarding this request or need additional information, please feel free to contact me at (509) 925-2088 or toll-free at (877) 417-9454.

Sincerely,

A handwritten signature in blue ink that reads "Lila Black".

Lila Black
Field Realty Specialist

Attachment 21



State of Washington
Department of Fish and Wildlife

1701 South 24th Avenue • Yakima, Washington 98902-5720 • (509) 575-2740 FAX (509) 575-2474

September 28, 2009

Ms. Anna Nelson
Kittitas County
Community Development Services
411 N. Ruby St. Suite 2
Ellensburg, WA 98926

RE: Supplemental Explanation of Attachment to Teanaway Solar Reserve comments submitted on September 16th (CU -09-00005).

Concern has been expressed regarding what is depicted in the map titled “*Cougar locations in vicinity of proposed solar reserve*”, which was attached to and submitted with our comment letter. The data is from “Project CAT”, a research project, involving Washington Department of Fish and Wildlife (WDFW) scientists, a carnivore research institute, and the Cle Elum School District. There were 2116 total cougar locations (shown as red dots) identified from GPS collars in the map. The collars were set to provide location signals at four to six hour intervals. The data has not been analyzed or interpreted yet.

The map included 1693 locations from two females between 2003 and 2008 (Cougar #1, 2003-2007 and Cougar #2, 2005 -2008). Of these, 72 percent of the locations occurred between November and April (winter), and 28 percent of the locations occurred from May through October (summer).

The map also included 423 locations from five male cougars between 2002 and 2008. However, only two of the five males were major contributors to the location data points as the others were on the periphery of the map. Of the male cougar locations, 76 percent occurred between November and April (winter) and 24 percent of the locations occurred between May and October (summer).

Thank you for the opportunity to provide these comments. If you have any questions regarding these comments, please feel free to contact me at (509) 457-9314.

Sincerely,

Perry Harvester
Region 3, Habitat Program Manager

Attachment 22

Crivella, Ellen/PDX

From: Seidell, Nichole/PDX
Sent: Thursday, October 01, 2009 9:08 AM
To: Crivella, Ellen/PDX; Ryan, Patrick W. (Perkins Coie); Jjones@forestllc.com; Howard@sawtoothdg.com; Matt Steuerwalt
Subject: FW: Teanaway Solar Reserve - Conditional Use Endorsement

From: Anna Nelson [mailto:anelson@GordonDerr.com]
Sent: Thursday, October 01, 2009 6:15 AM
To: Seidell, Nichole/PDX
Subject: FW: Teanaway Solar Reserve - Conditional Use Endorsement

From: Terry Walker [mailto:walkerarchitects@gmail.com]
Sent: Thursday, October 01, 2009 1:08 AM
To: Anna Nelson
Subject: Teanaway Solar Reserve - Conditional Use Endorsement

To Kittitas County, Washington,

I am writing to endorse the Teanaway Solar Reserve project. As an architect I am concerned with the built environment and the expanding carbon footprint, the pollution from coal power plants and the associated waste and health issues. I endorse clean renewable solar power as an imperative step into the most desirable future state. I endorse the expanding green economy. I am in good company in endorsing this project, joined by Senator Murray, Senator Cantwell and U.S Rep. Jay Inslee. The project is rare in its bold vision and serves as a shining example of the promise embodied in the emergent green economy, to create clean energy jobs, renewable power, to lead the way for future projects, to strengthen the local community and to summon from the people of a small community the inspiration to lead a nation. To be among the pioneers who forge a new world is a rare opportunity.

In a speech delivered September 22, 2009, President Obama said "No nation, however large or small, wealthy or poor, can escape the impact of climate change." The president of the United States has committed the United States to support renewable energy as a component of an international effort to address our shared global problems. In closing he called upon the people of this nation to take action saying:

" So let us begin. For if we are flexible and pragmatic; if we can resolve to work tirelessly in common effort, then we will achieve our common purpose: a world that is safer, cleaner, and healthier than the one we found; and a

future that is worthy of our children."

I urge the people of Kittitas Co to rise to the moment and approve the Teanaway Solar Reserve Conditional Use Permit Application. To carry the torch and light the way for other communities in the State of Washington, to a clean and sustainable future.

Thank you,

Terry L. Walker, AIA

Attachment 23

Crivella, Ellen/PDX

From: Dan Valoff [dan.valoff@co.kittitas.wa.us]
Sent: Wednesday, September 30, 2009 2:00 PM
To: Knapp, Anne (ORA)
Subject: FW: Teanaway Solar Reserve application
Follow Up Flag: Follow up
Flag Status: Flagged

Dan Valoff
Staff Planner

Kittitas County Community Development Services
 411 N Ruby Street Suite 2
 Ellensburg, WA 98926
dan.valoff@co.kittitas.wa.us
 P: 509.962.7637
 F: 509.962.7682



All e-mail sent to this address will be received by the Kittitas County e-mail system and may be subject to Public Disclosure under Chapter 42.56 RCW and is subject to archiving and review by someone other than the recipient.

From: Anna Nelson [mailto:anelson@GordonDerr.com]
Sent: Thursday, August 27, 2009 4:33 PM
To: CFAdams2@aol.com
Cc: Dan Valoff
Subject: RE: Teanaway Solar Reserve application

Hi Chuck,

The application has been determined complete. Notice will be mailed and published in the paper sometime next week. There is a 15 day comment period on the Conditional Use Permit and a 30 day comment period on the Development Agreement.

The notice will be sent to various agencies, including WDFW. The WDFW contact who will receive the notice is:

Travis Nelson
 Washington Department of Fish and Wildlife
 1111 Washington Street SE
 Olympia, WA 98501

I have not had the opportunity to look at all the application materials yet, so can not respond to your question on noise issues. You may want to contact the applicant's consultant to see if she can point you to information in the application more quickly. Her name is Nichole Seidel and her number is 503-872-4803.

Regards, Anna

From: CFAdams2@aol.com [mailto:CFAdams2@aol.com]
Sent: Thursday, August 27, 2009 4:05 PM
To: Anna Nelson
Subject: Re: Teanaway Solar Reserve application

10/1/2009

Thanks, Anna. I got the application info on the Solar reserve from Box.net as you arranged. What is the next step and the timing of comments in the application procedure? Also, either you or someone else at the Grange said something about concerns of the Fish and Wildlife folks about fencing and the elk herd. Do you know who the contact person at Wildlife is on this issue? As adjoining neighbors, we see a lot of the elk herd, and some of the company environmental statements about the herd seem erroneous to us. Also, I saw nothing about the motor noise generated by 400,000 solar panels rotating. Am I missing something? Thanks for your assistance.

Chuck Adams

Attachment 24

Letter to the Editor Daily Record

In a Sept. 18 opinion piece in the Wall Street Journal, Senator Lamar Alexander, former governor of Tennessee and a member of the Senate Environment and Public Works Committee, stated “ I fear we’re about to destroy the environment in the name of saving it.” This comment perfectly describes the Teanaway Solar Reserve’s proposed development on Cle Elum Ridge, which is being rushed through the county’s approval process with very little opportunity for public comment on an **industrial** use of land which is zoned “Forest and Range”.

The conditional use permit application and related documents were published September 3 with limited notice and the public was given 15 days to read over 600 pages of material and submit comments. To further discourage comment, the county stated that, unless strong opposition was encountered, they intended to issue a Determination of Non-significance. Given the fact that all the newspaper articles on the project have made it sound as though there would be no environmental or visual impact on the community, significant opposition is unlikely. These articles were based on information provided by the developer, some of which are not accurate.

Public statements indicate that the land in question has been logged and has no useful purpose. In fact, the land has been selectively logged and still has many remaining trees. It is open pine forest and meadows that have been used through the years by many valley residents for hiking, orienteering, hunting, and horseback riding, all of which will be eliminated by restricted access.

The document states that there is no wildlife of note on the property. In fact, a large elk herd is present in the area from mid- October to May, and we have seen significant birdlife, deer, cougar, coyotes, and an occasional bear and turkey. None of this wildlife is likely to wander through a maze of concrete pillars topped with solar panels spaced about six yards apart. No fences are proposed at this time but given the value of the panels, one can not be sure that fences won’t be required in the future.

The public has been led to believe that no one can see the solar area except by plane. Based on the conceptual placement of the panels outlined in the document, this is not true. There are seven or eight houses on adjoining property which will look directly onto a hillside of panels with minimal setbacks and screening. The proposed area that would include solar panels and infrastructure is over 500 acres. It’s a HUGE piece of property. In addition to the visual impact on neighboring properties, it is obvious that some of this solar paneled area will be seen from the valley, I90, and from the hills across the valley.

The developers appear to be counting on substantial tax subsidies to support the project and generate profit. If this fails to materialize in the future, the neighborhood could be left with overgrown industrial blight in a once beautiful environment and it would be impossible to restore the land.

There are other issues that have not been addressed. Much of the run off that inundated Red Bridge and Wiehl Road during the “Pineapple Express” in January of 2009 came from the hillside where the panels will be placed. The proposed construction will further destabilize the hill. Depletion of soil, noise generated by stiff winds blowing through the panels, and the impact of construction on the access roads are other concerns.

We have owned adjoining property for over 30 years. Like other neighboring owners, we value the beautiful pastoral nature of this land. We recognize the value of developing alternative energy resources, but there must be much more suitable locations for this kind of industrial installation that doesn’t “destroy the environment in the name of saving it.”

Barbara M. Hodgson
425-455-0455
bmhodgson@comcast.net

Box 68, Medina, WA 98039

Attachment 25

To Anyone Who is Concerned about the Teanaway Solar Reserve

We are long term owners of 500 acres adjacent to the proposed Teanaway Solar Reserve and are deeply disturbed by the misinformation presented to the public in the media. We assume that most of this misinformation was generated by the developer and was reported by the media before it could be verified. Unfortunately, this picture then becomes the public's perception of the project since few people will have taken the time to read the 600+ pages contained in the official documents.

What was reported in the press at the outset:

The project could not be seen by anyone.

The property had been logged.

The property is zoned "Resource" and no zoning change would be required to place 400,000 panels on 400 acres.

Later: The property is zoned "Commercial Forest" and there could be a conditional use variance granted.

Information which is set forth in the Developer's formal application:

The project could be seen from homes in the area. Unfortunately, the figure depicting the number and location of these homes is virtually illegible.

The property has been selectively logged.

The property is zoned "Forest and Range", which is entirely different than "Commercial Forest".

Comments re the above:

This is a vast tract. Using the developer's number for a four hundred acre site, there will be 40% coverage of the tract with 400,000 panels in groups of eight before making any allowance for roads or associated structures and equipment. To put this in perspective, this is the same coverage you would have if you put 95,000 Volkswagens on the hillside! The amount of acreage which will be needed for the panels is in flux and seems to be growing but my point is still valid. The math is attached as Exhibit 1.

Not only are there homes abutting the proposed site some of which are new and substantial, you can stand on the property and look across the valley and see many other homes and I90. What you can see can see you.

There has been some selective logging but numerous existing trees would have to be cut to make room for the installation of the panels. The developer's representation of the panel site shows a clear cut hillside. Removal of these trees will cause very serious runoff problems.

Upon review of the zoning ordinances, I find no zoning called "Resource". It would be a stretch to say that this project would qualify as a conditional use if it were zoned "Commercial Forest". There are no conditional uses listed for "Forest and Range" which come close to resembling the proposal.

This is an industrial use which is totally incompatible with the existing neighborhood. Let me be absolutely clear. I am not suggesting mitigation. I am recommending relocation and think there are many better and more suitable locations.

Concerning the announced intention to not require an Environmental Impact Statement:

There are a number of serious environmental and ecological concerns which others will raise. Permit me to comment on just two: The need to keep the panels clean in order for them to function and access.

The developer recognizes the need and likelihood that there may not be enough water on the property to do this. So, for purposes of the application, they assume water will be trucked to the site and the panels cleaned once a month. With eight panels per section, the 50,000 mounts (according to my math) will be 6-7 yards apart. This density would need to be diminished dramatically to get the necessary wiggle room for large trucks. How many truck loads and how many days does it take to rinse down 400,000 panels?

Forget about summer, think about the winter months. The ground is frozen or muddy depending on the time of day and the temperature. Even with paving all of the roadways, how do trucks navigate the hillside? Snow must be plowed. Where does the snow get piled? Can the panels be sprayed in freezing conditions without being harmed? What percentage of the time in winter is the temperature such that the water will evaporate rather than freeze? Where does this much water go?

There is an estimate for the cost of the panels at \$300,000,000 and a statement that access must be restricted but the area would not be fenced so the elk can move through. But how can all of this equipment be secured from man without a fence or full time guard force of considerable numbers? We are dealing with a minimum perimeter of 2.5 miles. I can't imagine elk walking through this maze of concrete and metal with or without a fence. This is not just a migratory route for elk. It is their home for most of the year excluding the summer months.

Postscripts: Has anyone verified the benefit claims? What does 75 mw really mean. They claim power for 45,000 homes. The Wall Street Journal last week sited a project which produced 1,000,000 mw per year and powers 90,000 homes. These numbers could well be apples and oranges. I don't know. Do you?

In summary, we need alternative power sources but there are many more suitable locations than this one.

Jack N. Hodgson
PO Box 68, Medina, WA 98039

tel: 425 455-0455
email: JNHodgson@comcast.net

Attachment 26

Crivella, Ellen/PDX

From: Seidell, Nichole/PDX
Sent: Monday, October 05, 2009 5:18 PM
To: Crivella, Ellen/PDX
Subject: FW: Teanaway Solar Reserve CUP and Development Agreement

From: Anna Nelson [mailto:anelson@GordonDerr.com]
Sent: Monday, October 05, 2009 5:10 PM
To: Seidell, Nichole/PDX
Subject: FW: Teanaway Solar Reserve CUP and Development Agreement

From: reagan.dunn@comcast.net [mailto:reagan.dunn@comcast.net]
Sent: Monday, October 05, 2009 5:06 PM
To: Anna Nelson
Cc: Reagan Dunn
Subject: Teanaway Solar Reserve CUP and Development Agreement

Ms. Nelson,

Please find the attached public comment regarding the Teanaway Solar Reserve CUP and Development Agreement. Nothing in these comments is in any way intended to waive my right of appeal or litigation on any issue relating to this proposed CUP or Development Agreement.

While I am a big fan of solar power, I have serious concerns about the appropriateness of this project in its proposed location. I think the letters From the Washington State Department of Fish and Wildlife and from Chuck Adams in the public file are both very accurate and I incorporate their content herein by this reference.

But I don't want to stand in the way of "clean energy", so if the County is serious about placing this project on the Cle Elum Ridge as proposed I hope they consider, and make the CUP conditioned on, the following mitigation efforts at a minimum. (I am the closest landowner to the site and the road will run right THROUGH my property, across a road easement. Those trucks and construction workers will pass about 150 feet from the future home site (where I have spent a ton of money trenching power and phone etc nearly a quarter mile in hopes of a pristine retirement home). So here they are:

1) ROAD and CULVERTS: The access road to the site is poor. Even in the spring I have required four wheel chains on full-size 4 wheel drive truck simply to get through the mud roads without snow. With snow I have been stuck no less than six times and required towing. The proposed access road to the site is wholly inadequate for the scale of the site and will need to be improved. Because of drainage problems, discussed later, the road should be a high quality gravel road with steps taken to keep the level of dust down. Culverts must be improved to handle the considerable drainage

that runs off in many stream beds. If they are serious about getting vehicles up there from October until late April, the road improvements must be made by the applicant from Red Bridge Road all the way to the American Forrest Property Gate which sits on my property. The CUP should be conditioned on this improvement.

2) GATE: I built and own the gate at the bottom of lot 1, this will need to be automated to allow construction and also homeowners access. The road easement is NOT a public one. I do not allow trespassing without written permission. The gate must be closed at all times when not actually letting vehicles in. If a passing area is required for trucks, construct it on Lot 2 under the power lines and try not to disturb the gate since it has a Ranch look to it and it was expensive. I don't believe a guard shack is necessary but if one is needed, I would place it by the lower gate (the one I built) just inside of lot two. I would prefer not to have a guard shack just behind my house and in view of it. Not only would he be a very lonely guy in the middle of the night, but it wouldn't make any sense if visitors couldn't get through the lower gate. I request to have a meaningful input as the applicant designs the gate and the policy for entry into the site.

3) POWER LINES: They should be buried, regardless of the cost. If not buried, they should be as low to the ground as possible with the fewest trees cut as possible. Also, they should be required to use the brown/rusty single power polls that look like tree trunks. A 300 foot wide clear cut with huge power polls would really kill the rural feel up there and it doesn't need to be properly designed.

4) 10 ACRE SUBSTATION: This feature should be placed WELL back into the applicants property out of site from all landowners at least 1000 feet. I could handle some power lines, but a substation that is fenced in in sight of the home site is unnecessary. Applicant should bear the cost of adding a few more feet of power lines and place it well back on the American Forrest property and nowhere near lots 1, 2 and 3. Not on lot 2, where the access road exists. An appropriate fence should be as small as possible should be used to hide the station and minimize its appearance to neighboring properties.

5) DRAINAGE: Proper draining for the road and culvert system must be added. The whole hillside along loping lane is unstable. I think something like 2 million dollars in FEMA money was used to rehab the site this spring. Even during normal winter snow runoff the creeks are all full and drain into the Teanaway River in a muddy mess. In January, the floods took out HWY 970 along with Red Bridge Road in a few spots. The applicant wants to put up numerous solar panels on the site. As I read the application, there will be a bunch of access roads and lots of trenching for power lines which will require all of the trees to be cut because the roots will be compromised or the trees are simply in the way. In addition, a buffer will be created. The first problem is that the solar panels don't allow water to pass through them and will act just like a big tarp. Second, clearing this huge amount of trees and other biomass will further reduce the ability of the land to absorb this runoff. Believe me, this area already floods EVERY spring. Unless extraordinary measures are taken to mitigate, the flooding will be far worse. (Again, I don't want to stand in the way of this project but it might be wise for the County to consider a full Environment Impact Study for this project--especially with all this drainage running into the Teanaway River.)

6) CLEAR CUTTING AND SETBACKS: Clear cutting to the property line with 100 foot setbacks for the solar panels is really cutting it close, not to make a pun. Setbacks should be at least 500 feet from the property lines and 1000 feet from existing structures or developed

home sites like mine. I could accept less if they would work with me on site lines for the solar panels and other structures.

7) ACCESS: If all of the above is granted, my family will require written permission to access the site.

Sincerely,

Reagan Dunn
1370 Loping Lane
Cle Elum, Washington

Mail to:

Reagan Dunn
24488 SE 179th Street
Maple Valley, WA 98038

Attachment 27

Anna Nelson

From: Lori Hinton [Lori@hintoncreative.com]
Sent: Monday, October 05, 2009 1:43 PM
To: Anna Nelson
Subject: RE: Teanaway Solar Reserve: inappropriate location

Thanks, Anna.
Lori

From: Anna Nelson [mailto:anelson@GordonDerr.com]
Sent: Monday, October 05, 2009 1:39 PM
To: lori@hintoncreative.com
Cc: Valoff, Dan
Subject: RE: Teanaway Solar Reserve: inappropriate location

Hi Lori,
Thank you for your comments. They have been added to the County file. Your contact information has also been added to the County's "parties-of-record" list for notice on future County actions.
Regards, Anna

From: Lori Hinton [mailto:Lori@hintoncreative.com]
Sent: Monday, October 05, 2009 1:29 PM
To: Anna Nelson
Subject: Teanaway Solar Reserve: inappropriate location

Hi Anna~
My name is Lori Hinton and I recently purchased property in Kittitas County in 2007 because I love the rural atmosphere and wildlife. I am in the process of building my retirement home there on this property as this is where I am choosing to live because of these things. I spent yesterday in the Teanaway Valley hiking Ingall's Way and enjoying the gorgeous drive up the valley. Then, my entire outlook came crashing to the ground as I heard word of a proposed solar project which would be sited in these very pristine areas I hold so sacred. I am 100% behind solar energy and all kinds of alternative energies, but I strongly believe the Teanaway is not the location to conduct such a project. It will forever negatively change this pristine area whether it fails or succeeds, and there are far more suitable locations further east along I-90 that are not so treasured for wildlife and views yet have less snow and great sun exposure. Please consider this a vote against the TSR by a very concerned citizen, yet a push for solar energy in a more suitable Kittitas environment.
Thank you and let me know if I can help further at saving our beloved valley.
Lori
206.854.1685
Mailing address:
4000 SW Donovan St
Seattle, WA 98136

Attachment 28

Anna Nelson

From: Anna Nelson
Sent: Monday, October 05, 2009 9:08 AM
To: 'Robert Hill'
Cc: Valoff, Dan
Subject: RE: CUP Application for Teanaway Solar Reserve

Thank you for your comments. They have been added to the County file for consideration.

From: Robert Hill [mailto:hillshill@wavecable.com]
Sent: Sunday, October 04, 2009 7:41 PM
To: Anna Nelson
Subject: Fw: CUP Application for Teanaway Solar Reserve

----- Original Message -----

From: Robert Hill
To: anelson@GordenDerr.com
Sent: Sunday, October 04, 2009 8:54 AM
Subject: CUP Application for Teanaway Solar Reserve

Anna, I wanted to let you know that my Wife Diane and I do appose the process being followed to get Conditional Use approval for the Teanaway Solar Reserve. Such a major project will have very long lasting impact on the area and the approach to shorten the process from a full EIS to the DNS just offers major opportunity for error and needed broad scale evaluation. We own three Properties that Loping Lane, the project access road goes through Parcels 17792,21129 and 314136) Please clearly understand we do not support the direction being followed and asks for your consideration and voice in requesting a full Environmental Impact Statement plan.

So, clearly we feel the CUP and DNS treatment is not the proper and honest approach to follow in such a large scale project.

Thank You for your consideration,

Robert and Diane Hill
2548 S. Camano Drive
Camano Island, Wash. 98282
360 387 0393

Attachment 29

Anna Nelson

From: Anna Nelson
Sent: Thursday, October 01, 2009 3:35 PM
To: 'Barb King'
Subject: RE: Oppose TSR

Thank you for your comments. They will be added to the County's file. If you would like to receive future notices regarding County actions on this application, please respond with your mailing address.

Regards,

Anna Nelson, AICP

Contract Planner for Kittitas County

From: Barb King [mailto:dragonwood1@hotmail.com]
Sent: Thursday, October 01, 2009 3:28 PM
To: Anna Nelson
Subject: Oppose TSR

I strongly oppose the misuse of our land use policies. I would support a project that was properly cited, but this site is absolutely absurd for many reasons. I fully agree with the following:

To My Neighbors in the Lower Teanaway Watershed:

(Including Weihl Road, Red Bridge Road, Lookout Mountain, and Teanaway Road)

I write this email to bring your attention to a potential gross-misuse of the land in the lower Teanaway watershed. Please take a moment to read this e-mail and submit your comments on this issue to Kittitas County planners before the deadline for public comment expires on October 5th.

The Teanaway Solar Reserve (TSR) is corporation recently formed by Seattle-area businessmen. TSR is a spin-off business of the American Forest Land Company (AFLC), a Wyoming corporation, with offices in Bellingham. AFLC is also trying to create a large development cluster in the upper Teanaway while TSR is simultaneously trying to place the largest solar array in the United States right in our scenic valley.

400,000 solar panels will be perched on top of Cle Elum Ridge directly above SR 970. The site will consist of shiny solar arrays nearly TWO MILES across. These arrays will be visible in ALL directions for up to 8 miles, including from I-90, SR 970, and even parts of Cle Elum!

The property is zoned for use as a Commercial Forrest. This means that if Kittitas County followed its own zoning practices, not more than 1 house could be built on 88 acres of land. However, the County is seriously considering approval of a conditional Use Permit (CUP) that would allow this use in direct contradiction of the County's current zoning. Most of us purchased our land and built our homes in this area to enjoy a rural lifestyle. We relied on the County's practice of zoning to cluster development in the cities and towns and keep the rural areas rural. Each solar panel is nearly the size of a car and the ridge will look like a parking lot for 400,000 of them. The County must not grant the CUP and this gross-misuse of our land-use policies must be stopped.

You can help be letting your voice be heard.

I believe in Solar Power and think we should invest in this important resource for our future. But the proper place for real solar power is NOT in the beautiful pine and fir forests of the Teanaway. Along with the Methow Valley, the Teanaway is one of this state's two most scenic watersheds. This Valley and watershed should be protected. The proper place for a solar array of this magnitude should be in the sage brush country toward vantage, near the wind farm or by Hanford. It's OK to be a fan of solar power but against the siting of this project. That makes sense and is not somehow "anti-environment." Don't be afraid to protest. I would be the first to support a project that was properly cited.

TSR's site location on the top of the Cle Elum Ridge is at approximately 2,500 feet is a poor choice for a solar array of this size. The site averages 25-30 inches of snow in mid-winter and frequently has more than 3 feet of snow. In their application materials, TSR has no serious plan to keep the panels clear of snow. With a snow load on them, the panels PV cells will generate very little energy.

As many of you know, the Teanaway is not a desert. The area receives 23 inches of rain per year. This is more than the San Juan Islands and twice as much as Hanford. The clouds that frequently hang over the Cascades make for a fair amount of cloudy days also make this site far less effective for PV cells than sunnier climates. To be sure, winter months with short cloudy days will hurt the ability of the PV cells to generate power.

So why do we care if they can't make a profit? Because if they cannot, the business will go under and we could be left with 400,000 ugly solar panels, clear cuts and ugly road systems in perpetuity on Cle Elum ridge. The CUP application has no plan for how to deconstruct this site should this occur.

AFLC and TSR are pushing this project for two reasons. The first is that they can no longer get much value for their land because the large trees have already been logged. (Many small trees exist with 12-15 inch trunks however). In short, one house per 88 acres doesn't fetch much profit for them if they were to sell it. TSR is trying to use a CUP and the promise of a renewable energy to convince the County planners to let them have a second "bite at the apple" and use their land for a quasi-industrial purpose. (That's really what it is--an industrial purpose. If this were any other business enterprise--other than "green" energy--it wouldn't even pass the laugh test. But somehow because it is Solar it seems to be nearly sacred. In the end, it's still just an industrial use and a forest area).

The second reason TSR is pushing this is that the state recently created some pretty big tax incentives for renewable energy. So the promise of cheap land and tax breaks makes it easy for TSR to make their proposal. They hope they can get the CUP from the county and then go shopping for investors world-wide to fund their project. They don't have the hundreds of millions now to pay the tab. Remember, this is essentially a timber company trying to run a solar business. If it doesn't work, the bones of their failure will remain long after they are gone for the rest of us to enjoy.

The County seems to be biting this hook, line and sinker. TSR has "promised" to establish a solar manufacturing plant in Cle Elum and the promise of hundreds of new jobs. However, as of the date of this e-mail no application for the actual plant in Cle Elum has been submitted. A source with the City Cle Elum believes that they don't ever really intend to build a plant at all and will truck PV cells and the towers from Moses Lake, a city in a different county.

So what will Kittitas County really get? Not much. At best we will get an out of town company, using the state's forests for a quick profit, creating a two mile eye sore with very little economic benefit. All of our land values will be diminished and the Teanaway will join the ranks of those many great places in the state that used to be pristine.

For those of you who live on Red Bridge Road and Wehl Road you will really suffer. You will have to endure at least three years of construction. TSR expects to bring up to 450 workers up your road system daily at the peak, with no proposals to fix the roads other than to "work with the Neighbors." They will construct a 10 acre substation and 175 foot high power lines through the area to access the BPA lines. They will add some 100 plus transformer sheds the size of large vans and a hundred miles of buried cable with an extensive network of dirt road systems also visible from all directions in the valley. Since they can't use well water they will truck in water and will set out dozens of honey bucket bathrooms all across the two mile site for their 450 employees to use. If you border the AFLC, they plan on clear-cutting a 100 foot wide fire line right to the edge of your property line and only set the solar panels back 100 feet.

Imagine what this will do to the elk, deer, cougar, bear, bobcat and other animal population? Imagine what 400,000 shiny solar panels will look like 100 feet behind your fence with a clear cut between you and them. Imagine how you will feel when your access gets cut off to the AFLC property as early as next year. They say they won't but they will need to protect their construction and solar equipment. Imagine the drainage problems that nearly 1/2 square mile of impervious solar panels will create in Wehl Road and Loping Lane. That slope is highly unstable and it failed in no less than four paces earlier this January. What will all these transformers and the 10 acre substation sound like?

Friends, tough questions need to be asked. Both of TSR and the County. The problem is the County has already issued a preliminary Designation of Non-Significance (DNS). In short this means that they don't think this will do much to the environment?? However, the Washington Department of Fish and Wildlife has directly disagreed with this ruling and has objected asking for a full Environmental Impact Study (EIS). Good for them. Of course this needs to be studied, at the very least. Why not study it? TSR doesn't want it studied, because of all of the game migration, wetland, steep slope, drainage, and ESA listed species (Steelhead and Bull Trout) issues it will trigger.

The answer is TSR doesn't want you to know until its too late and they want to start building in early Spring. That is Right away! TSR has requested a 15 day notice and comment period. This is the shortest period allowed in county code. They have done this to try and "pull a fast one" on all of us by not providing time for us to comment--and trying to get their permits before anybody of consequence really noticed. A sign was nailed to the base of a pine tree (nice touch) by TSR on September 3rd off of Red Bridge Road. The same date notices were allegedly sent out to property to a handful of property owners (less than 20). What about those of us who look right across SR 970 at the site, or those that live below it? Aren't we entitled to know about something that so directly effects us? To be sure, a good neighbor would have allowed a much longer comment period an followed good process. A good neighbor would have spoken to the community before it rammed this down our throats. Is this an indication of how TSR will treat this community once it gets it permits?

So, what can you do? First, let your voice be heard. Provide written comments on what you think about the CUP and the Development Agreement application by no later than October 5, 2009. Comments can be made to Anna Nelson, Contract Planner at (206) 382-9540. Her e-mail is anelson@GordenDerr.com. Be kind, she works on contract for the County and doesn't work for TSR. She can be helpful if you point out obvious problems with the application. I would first recommend you read the CUP Application and the Development Agreement which can be found online at CDS@CO.KITTITAS.WA.US

When you look over the application, pay attention to the section entitled Attachment F, Zone of Visual Influence Technical Memorandum. Sit down as you look at the scale of this project and how visible it will be to everyone on the Cle Elum-Teannaway area. Then go to the TSR official Website where they say that "not even the closest land owners will be able to see the solar panels." Somebody isn't telling the truth here. You can't submit an application with four CH2MHILL graphs showing everyone within 8 miles will see this and then have your website says it can't be seen. Again, this is further evidence of why TSR will not be the neighbor they say they will be.

After you make comments, I suggest you let all three county commissioners know how you feel. Call or e-mail. Urge them to require additional time for public input and comment. Public pressure will induce them to back of and maybe even run from the project.

Finally, make your voice heard before the Kittitas County Board of Adjustment. This is tentatively scheduled for Wednesday, November 18, 2009 at 7:00 pm. This time and date may change and I will attempt to update you on this meeting. And remember it is the Board of Adjustment and not the Commissioners who will grant or Deny the CUP. So for those of you who appose this project, THAT is where our energies should be focused. Denial of the CUP will effectively kill the project...at least for now. Also, if a full EIS is required, this will also delay the project allowing us to get our ducks in a row. A full EIS is also something you should ask for in your public comment.

I appreciate your willingness to listen. I hope you will look at the application and make comments. Together we an ensure that the Teanaway remains one of the most beautiful areas in the State of Washington.

Please act to save this important resource!

Respectfully submitted,

James Smith,
Resident of Kittitas County
e-mail: friendsoftheteanaway@gmail.com

PS. Please forward this e-mail to your contact lists in the area. Urge them to act as well!

Barb King
Dragonwood
dragonwood1@hotmail.com
www.dragonwoodbreeding.com
Barb King
Dragonwood
dragonwood1@hotmail.com
www.dragonwoodbreeding.com

Attachment 30

Anna Nelson

From: Anna Nelson
Sent: Monday, October 05, 2009 9:30 AM
To: 'Janet Brose'
Subject: RE: Teanaway Solar Reserve

Thank you for your comments. They have been added to the County file. Your contact information has also been added to the County's "parties-of-record" list for notice on future County actions.

Regards, Anna

From: Janet Brose [mailto:jl.brose@comcast.net]
Sent: Friday, October 02, 2009 5:17 PM
To: Anna Nelson
Subject: Teanaway Solar Reserve

October 2, 2009

Ms. Anna Nelson
Kittitas County Community Development Services
411 N. Ruby, Suite 2
Ellensburg, WA 98926

RE: Teanaway Solar Reserve

We are writing to respond to the short notice afforded us regarding the proposed Solar Reserve on some of the most beautiful forested countryside in Eastern Washington. Our understanding all along has been that we bordered land zoned forest and range, not lands designed for commercial use. From all appearances this would clearly impact home and property values. We are very concerned about the location selected for a number of reasons, but at the same time support the concept of developing alternative sources of energy. **JUST NOT IN OUR BACKYARD!!** Nor would you want it in **YOURS!** A solar reserve should be located in a flat open non forested and not residential area.

Just last spring county engineers roamed the surrounding properties because of severe water runoff and damage along Loping Lane to Red Bridge Rd. after the January 09 flood. The county engineers uncovered little to point to the reason for the flood damage. We personally incurred the loss of over half of our driveway which required fourteen trucks to replace the base that washed away. We can only image the greater threats if the natural vegetation is removed and replaced with panels causing even more erosion from the snow and rain run off.

The proposed clearing and location of the ten acres for the substation is of particular concern.

We also question how easily the impact to the natural wildlife has been dismissed in the presentations of these plans for the solar reserve. We have the good fortune to enjoy much of the animal population, yet the removal of their natural habitat will certainly change our lives and theirs especially. To reestablish the lost vegetation as a result of the construction will take years.

Directly behind our home is a southern facing hillside which appears slated to be populated with hundreds of these panels? The articles we have read have repeatedly suggested the panels would not be visible to anyone except from the air. Yet, if the program proceeds why must it be located directly out our door? Why isn't the proposed installation located further from the residential areas and closer to the interior of the forested area if it has to be developed here at all! The idea of a fence in the area further limiting food for the wildlife and significantly changing the rural appeal just boggles our minds. What are these commissioners thinking?

Vandalism of our home and property damage are also of great concern. Also, without water access in the proposed reserve, we are extremely apprehensive about the fire danger. What assurances will we have that these panels and electrical components will not ignite a fire?

The biggest issue we do have is the way this has been rushed through with little input from the community. Sure there would be some road improvement, but we moved here to enjoy a less hectic lifestyle and rural setting. A paved road will only encourage more traffic. The construction phase would ruin entire seasons of the spring and summer months, which is unacceptable to us. The notices have allowed us little time to respond or comment because of the clandestine way the county has promoted this program to the detriment of those who live in the community. No, we are not up on all the EIS requirements or even understand why a Conditional Use Permit would be granted when the area is clearly zoned. We need time to understand what rationale the Commissioners are following. We would like the process to involve us, not skip us. We look forward to the opportunity to be heard.

Jim and Janet Brose
951 Loping Lane
Cle Elum, WA

Attachment 31

Anna Nelson

From: Anna Nelson
Sent: Monday, October 05, 2009 9:29 AM
To: 'Bill'
Subject: RE: Tragedy in the Teanaway--say NO to the 1000 acre solar site in the middle of the Teanaway Watershed!

Thank you for your comments. They have been added to the County file. Your contact information has also been added to the County's "parties-of-record" list for notice on future County actions.

Regards, Anna

From: Bill [mailto:kingbros@cse-net.com]
Sent: Friday, October 02, 2009 5:20 PM
To: Anna Nelson
Subject: FW: Tragedy in the Teanaway--say NO to the 1000 acre solar site in the middle of the Teanaway Watershed!

From: Bill [mailto:kingbros@cse-net.com]
Sent: Thursday, October 01, 2009 1:41 PM
To: 'anelson@GordenDerr.com'
Subject: FW: Tragedy in the Teanaway--say NO to the 1000 acre solar site in the middle of the Teanaway Watershed!

Dear Anna, Following is a letter I just received (which you probably have already seen). My wife and I have a home straight across 970 and, if this is built, it will be ruining one of the most beautiful views of the Stewart Mountains in the area. (Although all of our neighbors would probably say theirs is the best). It would surprise me that you haven't heard from them.

You would be more than welcome to come to our place and sit with us in the front yard and try to picture the change to our view. This will certainly have a negative effect on the value of our home.

I have enclosed the letter because I don't think I could say it any better.

I guess I must have my head in the sand, to have this CUP get as far as it has without me getting involved. There has been a problem in the area that there doesn't seem to be much thought put into the overall effects of the different planning decisions.

All of the previous development of this projected area has been residential (and pretty high end residential for the most part). It seems way off the track to put what is obviously a pretty high density commercial project into the middle of the area. It's hard for me to believe that there has not been a bunch of negative response from these neighbors.

I can't help but think the reason for this development is because of the downturn in the real estate market that put a wrench in the original plan of the American Forest Land Co. which was to log and then develop this property by breaking it up into smaller residential pieces. I hate to say I envision them pulling in their 100 million dollars worth of investors, taking their share (which is probably a lot more than what they would have gotten with the original residential idea)and walking away either immediatly or at the first winter when this sight proves unfeasable. I certainly know that I won't be one of the investors.

Please read the following letter, it addresses a bunch of issues that should have stopped this project already and said much better than I could have presented them.

(I'm not very computer savy and have not a clue how I printed this in different fonts.... and certainly didn't want the dark printing above to come across like I was yelling, I just would appreciate some help to stop this CUP or at least slow it down with the requested EIS.

Sincerely, Bill King

From: Barb King [mailto:dragonwood1@hotmail.com]
Sent: Thursday, October 01, 2009 11:44 AM
To: kingbros
Subject: Fw: Tragedy in the Teanaway--say NO to the 1000 acre solar site in the middle of the Teanaway Watershed!

From: Ellen Porter - W
Sent: Thursday, October 01, 2009 9:37 AM
To: dragonwood1@hotmail.com
Subject: FW: Tragedy in the Teanaway--say NO to the 1000 acre solar site in the middle of the Teanaway Watershed!

Barbara,

Reagan asked me to forward this to you.

Ellen Porter

From: reagan.dunn@comcast.net [mailto:reagan.dunn@comcast.net]
Sent: Wednesday, September 30, 2009 4:08 PM
To: Ellen Porter
Subject: Fwd: Tragedy in the Teanaway--say NO to the 1000 acre solar site in the middle of the Teanaway Watershed!

Ellen,

Can you forward this e-mail to Barbara at Draganwood. She is our Horseback ridding instructor and I don't have her e-mail. I gave you her card a few days back. Thanks,

-Reagan

----- Forwarded Message -----

From: "James Smith" <friendsoftheteanaway@gmail.com>
To: friendsoftheteanaway@gmail.com
Sent: Wednesday, September 30, 2009 3:40:11 PM GMT -08:00 US/Canada Pacific
Subject: Tragedy in the Teanaway--say NO to the 1000 acre solar site in the middle of the Teanaway Watershed!

To My Neighbors in the Lower Teanaway Watershed:

(Including Wehl Road, Red Bridge Road, Lookout Mountain, and Teanaway Road)

I write this email to bring your attention to a potential gross-misuse of the land in the lower Teanaway watershed. Please take a moment to read this e-mail and submit your comments on this issue to Kittitas County planners before the deadline for public comment expires on October 5th.

The Teanaway Solar Reserve (TSR) is corporation recently formed by Seattle-area businessmen. TSR is a spin-off business of the American Forest Land Company (AFLC), a Wyoming corporation, with offices in Bellingham. AFLC is also trying to create a large development cluster in the upper Teanaway while TSR is simultaneously trying to place the largest solar array in the United States right in our scenic valley.

400,000 solar panels will be perched on top of Cle Elum Ridge directly above SR 970. The site will consist of shiny solar arrays nearly TWO MILES across. These arrays will be visible in ALL directions for up to 8 miles, including from I-90, SR 970, and even parts of Cle Elum!

The property is zoned for use as a Commercial Forrest. This means that if Kittitas County followed its own zoning practices, not more than 1 house could be built on 88 acres of land. However, the County is seriously considering approval of a conditional Use Permit (CUP) that would allow this use in direct contradiction of the County's current zoning. Most of us purchased our land and built our homes in this area to enjoy a rural lifestyle. We relied on the County's practice of zoning to cluster development in the cities and towns and keep the rural areas rural. Each solar panel is nearly the size of a car and the ridge will look like a parking lot for 400,000 of them. The County must not grant the CUP and this gross-misuse of our land-use policies must be stopped.

You can help be letting your voice be heard.

I believe in Solar Power and think we should invest in this important resource for our future. But the proper place for real solar power is NOT in the beautiful pine and fir forests of the Teanaway. Along with the Methow Valley, the Teanaway is one of this state's two most scenic watersheds. This Valley and watershed should be protected. The proper place for a solar array of this magnitude should be in the sage brush country toward vantage, near the wind farm or by Hanford. It's OK to be a fan of solar power but against the siting of this project. That makes sense and is not somehow "anti-environment." Don't be afraid to protest. I would be the first to support a project that was properly cited.

TSR's site location on the top of the Cle Elum Ridge is at approximately 2,500 feet is a poor choice for a solar array of this size. The site averages 25-30 inches of snow in mid-winter and frequently has more than 3 feet of snow. In their application materials, TSR has no serious plan to keep the panels clear of snow. With a snow load on them, the panels PV cells will generate very little energy.

As many of you know, the Teanaway is not a desert. The area receives 23 inches of rain per year. This is more than the San Juan Islands and twice as much as Hanford. The clouds that frequently hang over the Cascades make for a fair amount of cloudy days also make this site far less effective for PV cells than sunnier climates. To be sure, winter months with short cloudy days will hurt the ability of the PV cells to generate power.

So why do we care if they can't make a profit? Because if they cannot, the business will go under and we could be left with 400,000 ugly solar panels, clear cuts and ugly road systems in perpetuity on Cle Elum ridge. The CUP application has no plan for how to deconstruct this site should this occur.

AFLC and TSR are pushing this project for two reasons. The first is that they can no longer get much value for their land because the large trees have already been logged. (Many small trees exist with 12-15 inch trunks however). In short, one house per 88 acres doesn't fetch much profit for them if they were to sell it. TSR is trying to use a CUP and the promise of a renewable energy to convince the County planners to let them have a second "bite at the apple" and use their land for a quasi-industrial purpose. (That's really what it is--an industrial purpose. If this were any other business enterprise--other than "green" energy--it wouldn't even pass the laugh test. But somehow because it is Solar it seems to be nearly sacred. In the end, its stil just an industrial use and a forest area).

The second reason TSR is pushing this is that the state recently created some pretty big tax incentives for renewable energy. So the promise of cheap land and tax breaks makes it easy for TSR to make their proposal. They hope they can get the CUP from the county and then go shopping for investors world-wide to fund their project. They don't have the hundreds of millions now to pay the tab. Remember, this is essentially a timber company trying to run a solar business. If it doesn't work, the bones of their failure will remain long after they are gone for the rest of us to enjoy.

The County seems to be biting this hook, line and sinker. TSR has "promised" to establish a solar manufacturing plant in Cle Elum and the promise of hundreds of new jobs. However, as of the date of this e-mail no application for the actual plant in Cle Elum has been submitted. A source with the City of Cle Elum believes that they don't ever really intend to build a plant at all and will truck PV cells and the towers from Moses Lake, a city in a different county.

So what will Kittitas County really get? Not much. At best we will get an out of town company, using the state's forests for a quick profit, creating a two mile eye sore with very little economic benefit. All of our land values will be diminished and the Teanaway will join the ranks of those many great places in the state that used to be pristine.

For those of you who live on Red Bridge Road and Wehl Road you will really suffer. You will have to endure at least three years of construction. TSR expects to bring up to 450 workers up your road system daily at the peak, with no proposals to fix the roads other than to "work with the Neighbors." They will construct a 10 acre substation and 175 foot high power lines through the area to access the BPA lines. They will add some 100 plus transformer sheds the size of large vans and a hundred miles of buried cable with an extensive network of dirt road systems also visible from all directions in the valley. Since they can't use well water they will truck in water and will set out dozens of honey bucket bathrooms all across the two mile site for their 450 employees to use. If you border the AFLC, they plan on clear-cutting a 100 foot wide fire line right to the edge of your property line and only set the solar panels back 100 feet.

Imagine what this will do to the elk, deer, cougar, bear, bobcat and other animal population? Imagine what 400,000 shiny solar panels will look like 100 feet behind your fence with a clear cut between you and them. Imagine how you will feel when your access gets cut off to the AFLC property as early as next year. They say they won't but they will need to protect their construction and solar equipment. Imagine the drainage problems that nearly 1/2 square mile of impervious solar panels will create in Wehl Road and Loping Lane. That slope is highly unstable and it failed in no less than four paces earlier this January. What will all these transformers and the 10 acre substation sound like?

Friends, tough questions need to be asked. Both of TSR and the County. The problem is the County has already issued a preliminary Designation of Non-Significance (DNS). In short this means that they don't think this will do much to the environment?? However, the Washington Department of Fish and Wildlife has directly disagreed with this ruling and has objected asking for a full Environmental Impact Study (EIS). Good for them. Of course this needs to be studied, at the very least. Why not study it? TSR doesn't want it studied, because of all of the game migration, wetland, steep slope, drainage, and ESA listed species (Steelhead and Bull Trout) issues it will trigger.

The answer is TSR doesn't want you to know until it's too late and they want to start building in early Spring. That is Right away! TSR has requested a 15 day notice and comment period. This is the shortest period allowed in county code. They have done this to try and "pull a fast one" on all of us by not providing time for us to comment--and trying to get their permits before anybody of consequence really noticed. A sign was nailed to the base of a pine tree (nice touch) by TSR on September 3rd off of Red Bridge Road. The same date notices were allegedly sent out to property owners (less than 20). What about those of us who look right across SR 970 at the site, or those that live below it? Aren't we entitled to know about something that so directly affects us? To be sure, a good neighbor would have allowed a much longer comment period and followed good process. A good neighbor would have spoken to the community before it rammed this down our throats. Is this an indication of how TSR will treat this community once it gets its permits?

So, what can you do? First, let your voice be heard. Provide written comments on what you think about the CUP and the Development Agreement application by no later than October 5, 2009.

Comments can be made to Anna Nelson, Contract Planner at (206) 382-9540. Her e-mail is anelson@GordenDerr.com. Be kind, she works on contract for the County and doesn't work for TSR. She can be helpful if you point out obvious problems with the application. I would first recommend you read the CUP Application and the Development Agreement which can be found online at CDS@CO.KITTITAS.WA.US

When you look over the application, pay attention to the section entitled Attachment F, Zone of Visual Influence Technical Memorandum. Sit down as you look at the scale of this project and how visible it will be to everyone on the Cle Elum-Teannaway area. Then go to the TSR official Website where they say that "not even the closest land owners will be able to see the solar panels." Somebody isn't telling the truth here. You can't submit an application with four CH2MHILL graphs showing everyone within 8 miles will see this and then have your website says it can't be seen. Again, this is further evidence of why TSR will not be the neighbor they say they will be.

After you make comments, I suggest you let all three county commissioners know how you feel. Call or e-mail. Urge them to require additional time for public input and comment. Public pressure will induce them to back off and maybe even run from the project.

Finally, make your voice heard before the Kittitas County Board of Adjustment. This is tentatively scheduled for Wednesday, November 18, 2009 at 7:00 pm. This time and date may change and I will attempt to update you on this meeting. And remember it is the Board of Adjustment and not the Commissioners who will grant or Deny the CUP. So for those of you who appose this project, THAT is where our energies should be focused. Denial of the CUP will effectively kill the project...at least for now. Also, if a full EIS is required, this will also delay the project allowing us to get our ducks in a row. A full EIS is also something you should ask for in your public comment.

I appreciate your willingness to listen. I hope you will look at the application and make comments. Together we can ensure that the Teanaway remains one of the most beautiful areas in the State of Washington.

Please act to save this important resource!

Respectfully submitted,

James Smith,
Resident of Kittitas County
e-mail: friendsoftheteanaway@gmail.com

PS. Please forward this e-mail to your contact lists in the area. Urge them to act as well!

No virus found in this incoming message.

Checked by AVG - www.avg.com

Version: 8.5.409 / Virus Database: 270.13.113/2400 - Release Date: 10/01/09 06:34:00

Attachment 32

Anna Nelson

From: Anna Nelson
Sent: Monday, October 05, 2009 9:27 AM
To: 'Bill Sparks'
Subject: RE: Teanaway Solar Preserve

Thank you for your comments. They have been added to the County file. Your contact information has also been added to the County's "parties-of-record" list for notice on future County actions.

Regards, Anna

From: Bill Sparks [mailto:wssparks@gmail.com]
Sent: Saturday, October 03, 2009 10:18 AM
To: Anna Nelson
Subject: Fwd: Teanaway Solar Preserve

----- Forwarded message -----

From: Bill Sparks <wssparks@gmail.com>
Date: Sat, Oct 3, 2009 at 9:57 AM
Subject: Teanaway Solar Preserve
To: Anna Nelson <anelson@gordenderr.com>

I would like to record my opposition to the proposed solar installation in the Teanaway Valley. I live on 40 acres of land in the Teanaway Rifer valley directly below the proposed solar installation. When I first read the article in the paper I was incredulous that the largest solar installation in the world - according to the newspaper, would be sited on a ridge in the foothills of the Cascade Mountain range. My first thought was that something other than common sense was driving this proposal. Somehow money, through tax incentives, or energy incentives, must be at the root of this misguided venture. I am all for energy production, whether by drilling for oil, natural gas, bio-fuel generators, wind, hydro, solar, etc., but to place the largest solar installation in the world in the Teanaway Valley does not compute. The only justifying reason is that there is a major power transmission line adjacent or on the property. Forty miles to the east of this location, where the present Wild Horse Wind Farm is located, the weather is dramatically different. We receive about 20-25 inches of precipitation a year, most of which is in the form of snow. I cannot imagine placing the largest solar location in the world in a location such as the Teanaway where we experience a considerable amount of inclement days as it relates to solar production. Arizona, New Mexico, Nevada, California, Texas, - I can understand siting the solar preserve in such places located where the basic necessities are present for maximum solar production, i.e. clear, sunny days. The only reason I can come up with for the siting of the solar preserve in the Teanaway is artificial financial inducement. I have seen many tax favored investments ultimately go bust and be a liability to tax payers when the basic tenet for the investment is strictly the tax incentives and not sound economic decision making. This is the wrong project in the wrong location and should not be approved. I would certainly require an EIS at the very least.

Thanks for your consideration.

Bill Sparks
P.O. Box 490
691 Quail Drive

Cle Elum. Wa. 98922
509-674-8159

Attachment 33

Anna Nelson

From: Anna Nelson
Sent: Monday, October 05, 2009 9:25 AM
To: 'JaneMcc'
Cc: Valoff, Dan
Subject: RE: Teanaway Project

Thank you for your comments. They have been added to the County file. Your contact information has also been added to the County's "parties-of-record" list for notice on future County actions.

Regards, Anna

From: JaneMcc [mailto:janeMcc@fairpoint.net]
Sent: Saturday, October 03, 2009 8:32 PM
To: Anna Nelson
Subject: Teanaway Project

**RICHARD LUCHSINGER
JANE McCLENNEY
9300 Brick Mill Rd.
Ellensburg, WA 98926
509-968-3714**

We need to keep our forest lands AS forest land. These private timber companies have received big tax breaks to keep these lands in forest. They are always telling us on TV how they protect fish and wildlife. When are they going to do so? The Fish and Wildlife Department disagreed with the County and says that there would be a big impact if this development was allowed.

Have you ever studied forest or soils? Hard surface runoff is 100% and immediate. Grasslands, much slower, with only about a 90% total runoff. And forest land is even longer yet, with only 75-80% runoff to the rivers. This is why so many rivers on the west side of the mountains flood even with only heavy rain. It is overdeveloped with a lot of hard surface runoff area.

Deer, elk, and other wildlife would be totally displaced. Look at what's even happening with Suncadia. They are having trouble with deer and elk there, which would force even more wildlife onto I-90. We also have to remember tree, shrubs and other plants is the only true air conditioning this earth has. Their development would destroy all this. We would have to cut down even more trees as more houses were built and power lines go in. If you want to really be "green" pass laws that make all new building and remodels have solar and some type of wind power. Other countries are already doing so, and eventually we will have to get there as well.

If you are looking for jobs, enhance hunting and fishing. Last fall, Daily Record had an article that sportsmen support more jobs than Boeing and Washington State University together. And if you would like a copy of this, we will be happy to send you one.

Why not put a solar project of this magnitude in sagebrush area – where no trees need be destroyed, where sun is plentiful, snowfall is lighter? Where this is planned is in higher elevation with heavy

snowfall. The panels will be virtually useless for 3 months of the year, where in sagebrush, they would not. The lots and development are in higher elevation which also means snowfall would need to be removed for these lots. And who would pay for this?

And finally, this would be a blight on the landscape for visual reasons.

This application should be denied.

Richard Luchsinger
Jane McClenney

Attachment 34

Anna Nelson

From: Anna Nelson
Sent: Monday, October 05, 2009 10:28 AM
To: 'barbarafaulkner@comcast.net'
Cc: Valoff, Dan
Subject: FW: Inquiry through County web site
Attachments: CU-09-00005 Teanaway Solar Reserve Notice of Application Mailed.pdf

Hello Ms. Faulkner,

Thank you for your email. I am a contract planner working for and on behalf of Kittitas County to review the Conditional Use Permit application and proposed Development Agreement that was submitted by the Teanaway Solar Reserve LLC. Attached is the Notice of Application.

Do you have a phone number I can contact you at to discuss where this application is in the review process? The comment period ends today (October 5th), but the County will continue to accept comments through out the entire review. If you prefer to call me, please contact me at 206-382-9540.

Regards,

Anna Nelson

From: Mandy Weed [mailto:mandy.weed@co.kittitas.wa.us] **On Behalf Of** CDS User
Sent: Friday, October 02, 2009 8:48 AM
To: Anna Nelson
Subject: FW: Inquiry through County web site

Please see below.

Thanks,

Mandy Weed

From: Barbara Faulkner [mailto:barbarafaulkner@comcast.net]
Sent: Thursday, October 01, 2009 5:30 PM
To: CDS User
Subject: Inquiry through County web site

As you can see Mark Mclain has suggested that there will be plenty to comment time and I should contact you for more information on how, when and where to offer comment. Any information/direction you can provide would be greatly appreciated.

Thank you: Barbara Faulkner, Property owner

There will be plenty to comment time. Feel free to contact Community Development Services for more information about how to do that.

You should know that this is not something the Board is involved in.

From: Barbara Faulkner

To: Mark D. McClain

Sent: Thu Oct 01 17:12:36 2009

Subject: TSR 1000 acre solar site

Commissioner McClain, I was alarmed today to hear of the proposed TSR 1000 acre solar site project. I am a landowner off of Wehl Road and respectfully request and urge the county require additional time for public input and comment. I believe The size and scope of this proposed project would have a long lasting negative impact on The Cle Elum ridge, property owners, property values, wildlife and the natural beauty of the area for years to come. I would also like to see a full EIS required for this project.

Respectfully submitted

Barbara Faulkner

Property owner

Attachment 35



September 29, 2009

Ms. Anna Nelson
Kittitas County Community Services Department
411 N. Ruby St. Ste 2
Ellensburg, WA 98926

Anna Nelson,

We would like to add our public support to the Teanaway Solar Reserve. Having spoken with Howard Trott and looked at their project description, we feel this is a great opportunity with clear benefits for the Upper County.

The Teanaway Solar Reserve has taken the steps to show its intent to build a much-needed power source while protecting the character and integrity of our natural forest lands. The studies on plants and animals show minimal impact to these important resources.

Additionally, the working families of our community need a new industry to replace the loss of the timber and mining jobs and slow-down in construction. The added benefit of a solar panel manufacturer here in Cle Elum is of even greater importance to this project.

The benefits of renewable energy and the jobs this project will bring to the Cle Elum area and Kittitas County in general are immense. This project has the potential to keep a strong work-force here in the community and draw more projects of this type to the county. We encourage you to weigh these benefits and approve a Conditional Use Permit for the Teanaway Solar Reserve.

Sincerely,

Rob Marusa
Cheri Marusa

Rob and Cheri Marusa

Box 433
So Cle Elum, WA
98943

Attachment 36

City of Cle Elum
119 West First Street
Cle Elum, WA 98922



Telephone: (509) 674-2262
Fax: (509) 674-4097
www.cityofcleelum.com

September 18, 2009

Anna Nelson, Contract Planner
Kittitas County Community Development
411 N Ruby St., Suite 2
Ellensburg, WA 98926

RECEIVED
SEP 18 2009
Kittitas County
CDS

Re: Teanaway Solar Reserve (CU-09-00005)

Dear Ms. Nelson,

As Mayor of the City of Cle Elum I am writing to offer my unqualified support for the Teanaway Solar Reserve Project and respectfully request that the Board of Adjustment approve the Conditional Use Permit for this project. There is significant local interest in seeing this project realized, in terms of the economic and employment benefits to Kittitas County and the Cle Elum area specifically.

This project will not only provide a local source of clean energy but will also provide new jobs in Kittitas County. The 200 plus construction jobs created by this project are very much needed in the Upper County and once Teanaway Solar receives permit approval from the County they will work to locate a manufacturing plant in the Cle Elum area which will translate into potentially hundreds of permanent jobs. In addition to the new jobs, there will be an increased demand in goods and services and increased tax revenues for Cle Elum and the County.

Again, thank you for the opportunity to comment on this proposed conditional use permit and I urge the Board of Adjustment to approve this application.

Respectfully Submitted,


Charles J. Glondo
Mayor

Attachment 37

To : Anna Nelson, Contract Planner, (206) 382-9540, anelson@GordenDerr.com

From: John C Talley and Sarah C Talley

Subj: Teanaway Solar Reserve (TSR) application for Conditional Use Permit

Date: Oct 5, 2009

Hello Ms Nelson,

I have a vacation home (intended retirement home in just a couple years) (parcel H) on the ridge just south of the TSR location bought in the year 2000 I believe. Our home and parcel are contiguous and south of Mike Hanson's 20 acre parcel which borders the TSR property. And my mother owns 2 parcels adjacent to our home in this nice pasture slope with views to the ridge very close by:

- Parcel # 14935 13 acres 100 Nordic Lane Cle Elum, WA 98922
Legal Desc. PTN.NW1/4 WEST OF CO.RD. (PARCEL H, SURV. B24/P98)
- Parcel # 14731 6 acres 14731 Wiehl Road, Cle Elem, WA 98922
Legal Desc. PTN.NW1/4 WEST OF CO.RD. (PARCEL F, SURV. B27/P97)
- Parcel # 14732 11.75 acres 00182 Arrowleaf Lane, Cle Elem, WA 98922
Legal Desc. PTN.NW1/4 WEST OF CO.RD. (PARCEL G, SURV. B27/P97)

In general I'm a supporter of solar and wind power and am excited that there could be some serious jobs potential for the Cle Elum area. Specifically, I could be proud of a big solar electric plant nearby, and so would my kids.

I think the company is rushing this through in order to skip a lot of environmental impact issues. Given the political climate, the economic climate, and the very high level support I see this passing inevitably. I do think the county and the state can however push back successfully in mitigating some of this rush and serious detrimental neighborhood impact and I implore you politely to consider a reasonable set of requirements on this developer. I do have some serious concerns about this particular project that I would like to see mitigated by any conditional use permit:

Visual impact: the TSR marketing pronouncements and public statements are not matching up with the details in the permit application. I specifically recall them saying that

- a. the area was already logged
- b. there were trees all around the perimeter
- c. nearby homeowners would not even see the panels

The early PR work (quoted on the company's website) gives the distinct impression that the project will be non-invasive and hardly noticeable - *"It was logged for so there's a row of trees left around it so we have a great natural buffer," said Trott. (Aug 9, 2009). Also.... "The site has been heavily logged in the past, but is surrounded by Ponderosa pine forest that will screen the array from view, Trott said."*

But the application that I and others read on-line show that the company plans to clear-cut a 100 foot fire protection rim around the border and then install panels right up to that point. That will produce a starkly visible industrial plant footprint that will be glaringly visible. Speaking of glare, the permit application contains language denying that these photovoltaic panels will produce glare. That is much less than hard to believe.

My neighbors and I would greatly prefer that IF the conditional use permit is granted that some conditions be imposed on the TSR LLC – keeping a negotiated healthy size border of trees around the panels (as implied by the company originally) and somehow visually softening up any clearcutting of a 100’ fire boundary. Naturally my neighbors and I are concerned about the southern border directly above the Goodwins, Hansen, and Milt Kuolt property up to the Pine Hill Ranch eastern border.

Construction impact: I’m concerned about Wiehl Road from Red Bridge Road up to Loping Lane (assuming ALL construction traffic turns left at that point). The permit application has no compelling language detailing the extent to which Wiehl Road ought to be rebuilt in order to sustain the pounding of all the heavy trucks over all the seasons. There are a few in my neighborhood who take up collections of dollars, equipment, and many labor hours to patch together and snow plow Wiehl Road simply to keep the road together under a minimal amount of traffic. We know what is needed:

- Designate Wiehl Road from Red Bridge Road to Loping Lane as officially a “county maintained road”
- Negotiate a shared cost approach between the appropriate governmental agency and TSR, LLC and rebuild Wiehl Road to meet the true standard of what is needed to withstand multiple years of very heavy construction traffic, increased employee traffic and the heavy impact of snow and snow melt on this poorly built dirt road

Thank you for your consideration,

John C Talley
And
Sarah C Talley

Talley.jack@gmail.com
Cell 425-233-2110
Mailing address:
3008 43rd Street NE
Tacoma, WA 98422

Attachment 38

STATE REPRESENTATIVE
13th DISTRICT
BILL HINKLE
MINORITY WHIP

State of
Washington
House of
Representatives



GENERAL GOVERNMENT
APPROPRIATIONS
ASSISTANT RANKING MEMBER
HEALTH CARE & WELLNESS
LOCAL GOVERNMENT
& HOUSING
WAYS & MEANS
RULES

October 2, 2009

Ms. Anna Nelson
Kittitas County Community Services Department
411 N. Ruby Street, Suite 2
Ellensburg, WA 98926

Dear Ms. Nelson,

I would like to add my public support to the Teanaway Solar Reserve and their request for approval of a Conditional Use Permit for the Teanaway Solar Reserve. I have been briefed on the project and I feel this is a great opportunity with clear benefits for the Upper Kittitas County, and all of Kittitas County and Washington State.

The Teanaway Solar Reserve will develop a high-quality renewable energy resource while providing needed economic development and jobs to the area. At the same time, the project will maintain the nature of the Teanaway Valley, which is important to local residents. I see this project as having the potential to develop related jobs and bring other renewable energy industries to our area.

I encourage you to weigh these benefits while determining appropriate conditions. I hope you will ultimately approve a Conditional Use Permit in a timely manner.

Sincerely,

Rep. Bill Hinkle

Attachment 39



PO Box 1212
Puyallup WA 98371
Telephone: 253.841.9710
Fax: 253.841.0264
www.encoec.com



December 10, 2009

Mr. James Brose
Citizens Alliance for a Rural Teanaway (CART)
P.O. Box 177
Cle Elum WA 98922

**RE: Professional Opinion Statement
Proposed Teanaway Solar Reserve Project (CUP-09-00005)
Northeast of the City of Cle Elum off of Highway 970
Cle Elum, Unincorporated Kittitas County WA**

Dear Mr. Brose:

EnCo Environmental Corporation (**EnCo**) appreciates the opportunity to provide a professional opinion to the Citizens Alliance for a Rural Teanaway (CART) regarding the proposed Teanaway Solar Reserve project within the Teanaway River Watershed. The purpose of this letter is to make a professional opinion pertaining to the support documents for the proposed project and its' potential, as planned, for impacts to the environment.

Teanaway Solar Reserve, LLC has recently submitted a Conditional Use Permit (CUP) application and Development Agreement to develop a solar farm generating up to 75 megawatts of photovoltaic for distribution to utilities and communities through a substation interconnection point on the Pacific Northwest power grid. The project site is located in unincorporated Kittitas County and consists of 982 acres and the solar farm will use approximately 580 acres of the project site. The reported surface area of the solar panels would cover about 160 acres and other development disturbances would include clearing and grading, access and maintenance roadways, staging areas, utility ditches, transmission towers and poles, substation, building and panel footings, solar modules, and other infrastructure.

The site is currently zoned as Forest and Range land. Land use history included forestry, cattle grazing, ranch, open space, and recreation. Historical recreational activities have occurred on the project site, which included hiking, bird watching, native plant walks, biking, horseback riding, hunting, cross-country skiing, and orienteering.

The property consists of an open canopy Ponderosa/Douglas fir forest with intermittent meadows, seasonally flooded wetlands, a small, artificially created pond, seasonal streams, and natural drainage corridors through undulating hills and dales with outcrops of widely-scattered boulders. Several logging roads, access roads, and mammal trails

traverse the site. Much of the land appears to have been logged and thinned within the last 20 to 25 years and some thinning has reportedly occurred as recently as 2001.

The information presented in this letter was made after reviewing several readily available documents submitted with the County CUP application and Development Agreement; specifically the SEPA Environmental Checklist with supplemental environmental studies performed by an environmental engineering firm. In addition, I obtained information from local sources and interviewed several nearby and adjacent landowners who are very familiar with the natural wildlife and habitat within the project site boundary. I have personally visited the proposed project site three times since the summer of 2008, and am quite familiar with the general lay of the land, its surroundings, vegetation patterns, and wildlife habitat. **EnCo's** field work included performing a reconnaissance-level assessment.

PRIORITY HABITAT, PRIORITY AREAS, AND SPECIAL OR SENSITIVE AREAS

The priority habitat, priority areas, and special or sensitive areas that were observed or indicated on the project site are listed below.

Freshwater Wetlands: Transitional lands between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water were observed as evidenced by dominant hydrophytic plants and wetland hydrology indicators such as water stained leaves, surface soil cracks, sparsely vegetated concave surfaces, algae mats, and drainage patterns.

Riparian: Areas adjacent to seasonal or perennial aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other were observed contiguous to the ordinary high water mark of several on-site streams.

Aspen Stands: Mixed stands of aspen were observed contiguous to a small pond and this stand of aspen extended within the drainage corridor to the pond at a distance of several hundred feet.

Migration Corridors: Areas regularly used by animals as travel routes between seasonal ranges were observed throughout the site, especially along several mammal trails and old logging roads. The property provides excellent habitat for large mammals to meander freely while providing good shelter and a variable food source. Evidence of large mammals which frequent the site include elk, deer, cougar, coyote, and black bear (scat). It has been reported that large herds of elk and deer move onto and through the project site in early October and many stay in the area until June.

Elk Herd Winter Range: Features observed on the project site include elk footprints, droppings, bones, fur, and pathways. One remnant female elk was observed just east of the project site in September 2009.

Foraging Areas: Feeding areas that may be regularly used by individuals or groups of animals were observed near several mammal pathways located adjacent to open grass covered areas scattered with pockets of shrubs.

Breeding Areas: Features associated with producing and rearing young (i.e., nest trees, burrows, den) have been reportedly observed on the project site. A coyote den was reportedly observed on the eastern portion of the project site by a local neighbor.

Regularly Used Perches: Habitat features (dead and broken-topped trees) are regularly used by birds (i.e. eagles, hawks) for perching.

Snags and Downed Logs: Logs greater than or equal to 12 inches in diameter at the largest end and greater than or equal to 20 feet long and snags with excavated holes were observed at several locations on the project site.

Waters of the State, Natural Waters, and Adjacent Riparian-Shorelines: Shorelines of the State were not identified on the project site. Waters of the State were observed. The intermittent seasonal and/or ephemeral streams observed on the project site eventually flow into the Teanaway River and into the Yakima River.

Priority Fish in Natural Waters, and/or Adjacent Riparian-Shorelines: Fish-bearing streams were not identified on the project site. The Teanaway River (about 1 mile east) is a fish-bearing stream for bull trout and likely presence of steelhead and other resident fish. The Yakima River (several miles south) is a fish-bearing stream for bull trout and other resident fish.

Instream: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for seasonal or perennial instream fish or wildlife resources. The streams have natural features (water, food, protection, escape, residence) that provide a good resource for wildlife.

Western Bluebird Non-Artificial Nesting Sites: Several groups of these birds were observed on the project site in September 2009.

Biodiversity Areas and Corridors: Biodiversity areas and corridors that have habitat that are relatively important to various species of native wildlife were observed throughout the project site. Corridors to other open and undisturbed lands are greater than 250 feet wide at several boundaries.

Thin-Stemmed Persistent Vegetation with Seasonally Inundation: Habitat suitable for egg-laying by amphibians may be present in several of the seasonal wetlands, pond, and in some of the natural drainage corridors. Drainage corridors and streams on the project site more than likely provide pathways for several amphibians to move freely up onto the project site from the Teanaway River and associated wetland system.

Occurrence: It has been reported that lizards (unknown species) are commonly observed on the site during the summer months. Owl hoots (unknown species) are

also commonly heard during the summer months, especially in the denser stands of evergreen trees with open understories near the eastern part of the site. Other important birds observed by others on the site include quail and wild turkey.

PREVIOUS STUDIES BY THE APPLICANT

The field studies for this planned project were performed on June 16th through June 19th and on July 9, 2009, for a total of five (5) days. The field work did not include performing seasonal assessments and inventories for wildlife, birds, and plants. This brief survey does not adequately address the seasonal variation and numbers of a given species that can occur in any given season. Additional Baseline studies need to be performed to incorporate seasonal variances. This work effort should include gathering information from local naturalists as well.

It is the opinion of this writer that the environmental-related items, surveys, and/or studies listed below were not adequately addressed in the proposed project support documents and are in need of further study and evaluation.

1. Perform a more detailed assessment of the elk populations on the project site during the months when they would be expected to be present.
2. Intuitive and complete native plant floristic surveys were not performed in the springtime when many of the wild flowering plants can be adequately observed and keyed. A more detailed sensitive/priority plant survey needs to be undertaken at the appropriate time(s) of the year. Also local plant enthusiasts, naturalists, and botanists should be consulted.
3. Perform a more detailed bird study on the project site to include the identification and mapping of owl, quail, turkey, blue bird, heron, eagle, hawks, songbirds, woodpeckers, or other sensitive birds.
4. A detailed insect survey should be undertaken and the results presented.
5. A bat habitat assessment should be undertaken and results presented.
6. The aspen stand needs to be characterized, measured, and protected or mitigated if it is determined to be a priority area. The entire drainage corridor containing the aspen stand needs to be studied in more detail to determine if it meets the criteria for being a wetland.
7. Specific details on mitigating measures were not clearly identified from the effects of the planned clearing and de-vegetation to the priority and/or sensitive native vegetation and wildlife habitat.
8. Possible negative impacts to the functions and values of the wetlands and streams from the effects of the proposed development within and extending beyond the standard buffers were incomplete and not clearly discussed.
9. Stormwater runoff **quantity** flowing off of the impervious solar modules and other constructed impervious surfaces to the Teanaway River; a Section 303(d) river and to the Yakima River needs further investigation and assessment.
10. Surface water hydrology patterns to maintain a drinking water source for animal use and to prevent documented and reported down slope flooding during the wet weather months needs further study and protection measures.

11. Stormwater runoff **quality** from washing/rinsing solar modules and the use and application of weed control measures (pesticide and herbicide use) needs further assessment and management.
12. The effects of the near surface groundwater table and quality due to increased stormwater runoff and infiltration rates needs to be addressed.
13. Determine the status of local groundwater withdrawal moratoriums and if present, prohibit the installation of any groundwater well on the project site. Determine the status of any recorded water wells on the project site using the Washington State Well Log Database. Water storage may be needed on or near the project site to contain or extinguish potential grass or forest fires. This needs to be studied further.
14. A vegetation management plan needs to be prepared to protect natural areas from over growth and spreading of nuisance, exotic, or non-indigenous native vegetation from standard seed mixtures to be planted for erosion and sediment control and beneath the solar panels. In addition, non-native vegetation growing in any fence line will need to be controlled to prevent spreading to natural areas.
15. Wildlife corridors will need protection from lighting features by installing or incorporating mitigation measures such as: installing blinds, fences, or by positioning and aligning lights so not to be directed into natural areas.
16. The effects of noise during construction, operation, and maintenance needs to be further studied and mitigating measures undertaken. Study needs to include possible noise generated from the solar panels during operation, precipitation event, re-alignment, and wind movements over and under the panels.
17. Prohibit fencing in areas frequented by migrating wildlife such as elk.
18. Estimate the extent of and mitigating measures for sediment and dust control.
19. Provide further study to determine what the setbacks will be for the project. Setbacks need to be determined by combining fire protection, preservation of habitat and wildlife, security, preserving or enhancing functions and values or critical areas, and minimizing the loss of natural views to the adjacent landowners.
20. The possible effects of burning cleared and grubbed vegetation to surrounding wildlife and humans needs to be studied and controlled in a safe manner.
21. The boundary flags associated with the twelve (12) wetland edges and the 6 stream ordinary high water marks, and the associated riparian zones to these streams were missing for field verification purposes. Boundary flags need to be placed on all critical areas and riparian zones, including those within about 300 feet from the project edge so that others can observe and verify these edges.
22. Wetland/stream/riparian/upland test plot locations were not marked in the field for verification. These need to be depicted with flags or stakes in the field.
23. Five of the six identified streams were classified by the applicant's consultant as "ephemeral" and one of the six being "intermittent". Five of these 6 streams were classified as "seasonal" by WDNR. These streams need to be further characterized (i.e. how long does water flow in the streams after precipitation events and how long do they flow in the early growing season after snow melt and spring rains) to see if they may or may not afford wider buffer protection based on their type.

24. The environmental engineering firm's Cultural Resource Report, labeled as Attachment C, was "*privileged and confidential for restricted distribution*" therefore this document was not available for review at this time. This document needs to be made available to the general public.
25. It has been reported that an adjacent landowner found a possible Native Indian artifact (arrowhead) in an area very close to the project site boundary. Due to the reported artifact that was found to be very close to the project site a detailed cultural/heritage study should be performed on the project site to determine if any archeological sites of significant importance need to be protected or mitigated.

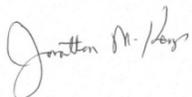
The SEPA Environmental Checklist provides a conceptual and limited representation of the property and in my opinion did not provide adequate study to present actual site conditions over four seasons. This made it difficult if not impossible to analyze the true environmental impacts for the proposed project. The Purpose and Need statement that the project will "*avoid environmentally sensitive areas*" was not adequately demonstrated.

The magnitude of this project, loss of priority habitat, priority areas, and special or sensitive areas for wintering deer, coyote, cougar, and elk, alteration of hydrology, changes in storm water quantity and quality, and other items presented in this letter appear to be cumulatively significant. The project as proposed will more than likely significantly impact resident and migratory priority, special, and/or sensitive species and will permanently damage the Ponderosa forest and meadow communities and winter range habitat for large mammals.

It is therefore the opinion of this writer that the project, as proposed, should be subject to further and extensive environmental analysis including but not limited to a complete Environmental Impact Statement (EIS) with an alternative site analysis and economic feasibility study under the State Environmental Policy Act (SEPA) review process. This process must allow ample opportunity for public review and comment before any determination on the CUP is made. It is also my opinion that Kittitas County issue a Determination of Significance for this proposed project until these issues can be further studied.

If you have any questions concerning my opinion you can contact me by telephone (243.841.9710) or by e-mail at jkemp@encoec.com.

Sincerely,



Jonathan M. Kemp
Wildlife & Fisheries Biologist
Principal, EnCo Environmental Corporation

Permit Application

**Teanaway Solar Reserve
Conditional Use Permit
Application Supplement**

Submitted to

Kittitas County, Washington

by

Teanaway Solar Reserve, LLC

February 2010



**Printed on
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- B Photos
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- E Development Agreement

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SECTION 1

Request

Teaway Solar Reserve, LLC (TSR) proposes to construct and operate the Teaway Solar Reserve (project), a solar farm capable of generating up to 75 direct current megawatts (MWdc) of photovoltaic (PV) solar energy. The proposed project area consists of 982 acres within the County's Forest and Range (F&R) zoning district. Based on site surveys, the project will utilize approximately 477 acres within the proposed project area. This includes 399 acres of solar panels and 78 acres of supporting facilities. The remaining 505 acres are currently undeveloped open space, a portion of which will be preserved as part of the wildlife mitigation plan (see Expanded SEPA Checklist Supplement, Attachment H, *Wildlife Mitigation Plan*).

TSR worked with staff from Kittitas County to determine the applicable land use approvals and permits in addition to the relevant provisions from the *Kittitas County Code* (KCC). This narrative is a supplement to the application submitted to Kittitas County for a Conditional Use Permit (CUP) necessary to construct and operate the proposed project. TSR understands that the following approvals and permits are also required from Kittitas County:

- TSR must demonstrate project compliance with the State Environmental Policy Act (SEPA) through a decision rendered by Kittitas County. This application notebook also includes TSR's Expanded SEPA Checklist Supplement to demonstrate compliance with SEPA.
- The project is subject to compliance with the County's Critical Areas Ordinance (CAO). The CAO is introduced in this narrative (see Section 3), but a thorough demonstration of compliance is included in the Land Use section of the Expanded SEPA Checklist Supplement.
- Kittitas County has indicated that the size and complexity of the project generates the need for a Development Agreement (DA) between TSR and the County. To ensure mitigation consistency and jurisdictional efficiency, the requirement for the DA is expected to be a condition for approval of this CUP, and will condition and govern this CUP. As set forth in the DA, any inconsistencies between the CUP and the DA will be resolved in favor of the DA. A revised draft DA is included as Attachment E to this CUP application and will also be submitted concurrent with the other application materials described above. The Supplement to the SEPA Expanded Checklist is intended to apply to all of TSR's County proposals triggering SEPA, including this CUP and the DA.

Subsequent sections of this narrative are organized as follows:

- **Section 2, Project Description:** This section provides information about the project in general, including the purpose and need (Section 2.1), proposed project schedule (Section 2.2) site setting (Section 2.3), key components (Section 2.4), permits and authorizations (Section 2.5), summary of construction activities and features (Section 2.6), summary of operations and maintenance activities and features (Section 2.7), and decommissioning and site restoration (Section 2.8).

- **Section 3, Compliance with Kittitas County Land Use Regulations:** This section provides specific detail on how the project is consistent with the applicable provisions from the KCC. The section is organized numerically by applicable code.
- **Attachment A:** Contains figures referenced in the text of this narrative.
- **Attachment B:** Contains photographs showing examples of proposed project components.
- **Attachment C:** Contains a table identifying landowners of real property within 500 feet of the proposed project.
- **Attachment D:** Contains a legal description of the proposed project.
- **Attachment E:** Contains the Draft Development Agreement, which will be submitted to the Board of County Commissioners of Kittitas County.

SECTION 2

Project Description

This section provides an overview of the project. Topics addressed include the project description, the project purpose and need, the proposed schedule, site setting, key components, permits and authorizations, summary of construction activities and components, and a summary of operations and maintenance activities and components.

TSR proposes to construct and operate the project on approximately 982 acres of private land within the F&R zoning district in an unincorporated area of Kittitas County, Washington. The project will generate up to 75 MWdc of PV solar energy utilizing approximately 477 acres of land within the proposed project area.

2.1 Purpose and Need

The purpose of the proposed project is to generate up to 75 MWdc of PV solar energy for distribution to utilities seeking to optimize their renewable and sustainable energy sources. The project was conceived in response to the growing importance of and need for sustainable energy sources. In 2001, Kittitas County recognized the importance of facilitating new alternative energy facilities, proclaiming that:

Kittitas County recognizes the value of facilitating the construction and operation of both alternative and conventional energy producing facilities in reducing the disruption of commerce and governmental services caused by potential energy shortages, all of which adversely affect the economy, public health, safety and welfare. (Kittitas County Ordinance No. 2001-12)

In recognition of the importance alternative energy could play in the future of Kittitas County, the County amended its land use code to, among other things, allow alternative energy facilities as conditional uses in a number of zones. See Kittitas County Code (KCC) Chapter 17.61.

The State of Washington also recognizes the importance of locally produced renewable energy. For example, the State of Washington's Renewable Electricity Standard, Revised Code of Washington (RCW) Title 19, mandates that by the year 2020, the state's largest electric utilities meet 15 percent of their retail electric load with renewable electricity (for example, wind and solar energy). The standard first takes effect in 2012 with a requirement of 3 percent through 2015, then 9 percent from 2016 through 2019, and 15 percent thereafter. Oregon and California have adopted similar standards. Depending on the commercial terms available for the power sales, the utilities that may buy power from the project could change over time.

The Governor of Washington has also proclaimed that renewable energy production, including the project, is integral to the economic health of Washington: "If we seize on the

economic opportunities presented by the clean energy revolution...then we can achieve our other important goals: a healthier environment and more energy independence” (Speech to the Seattle Chamber of Commerce by Gov. Chris Gregoire, October 22, 2009, found at: <http://www.tvw.org/media/mediaplayer.cfm?evid=2009100047C&TYPE=V&CFID=1701129&CFTOKEN=11324713&bhcp=1>).

2.2 Project Schedule

The proposed project schedule is outlined in Table 2-1.

TABLE 2-1
Proposed Project Schedule

Task/Milestone	Start	Finish
Obtain Necessary Permits	June 2009	June 1, 2010
Engineering	June 2009	October 2010
Construction	April 1, 2010	As early as October 2011 or as late as December 2012
Initial Operation	Fall 2010	Not applicable

Note: Two to three 7- to 9-month construction seasons are anticipated.

2.3 Site Setting

The proposed project site is located approximately 4 miles northeast of Cle Elum, Washington, in Township 20N, Range 16E, within Sections 22, 23, and 27 (see Attachment A, Figure 1 for site location). The site is located on the eastern slopes of the Cascade Mountains on Cle Elum Ridge, which runs generally from east to west at elevations ranging from approximately 2,200 to 2,600 feet (see Attachment A, Figure 2). The Teanaway River is approximately 1 mile to the northeast of Cle Elum Ridge. The site is accessed from Highway 970 by way of County roads such as Red Bridge Road (see Attachment A, Figure 3), and private roads such as Loping Lane. The site is also accessed via Wiehl Road, which is a dedicated public road but is not maintained by the County; it is maintained privately.

The proposed project area consists of 982 acres. This site was chosen for the project by TSR for a variety of reasons.

First, the property is not occupied by any threatened or endangered species, such as the northern spotted owl, nor does it contain any high quality habitats, such as shrub steppe grasslands. TSR was thus able to initially consider the entire 982 acres for potential solar placement. TSR then conducted numerous site surveys, as explained in the technical reports attached to the Expanded SEPA Checklist Supplement, including those for wetlands, plants and wildlife, cultural resources, and critical areas. Based on the site surveys and topography, the project will utilize approximately 477 acres within the proposed project area. Solar arrays will be placed on approximately 399 acres. The remaining 505 acres are currently undeveloped open space, a portion of which will be preserved as part of the wildlife mitigation plan (Expanded SEPA Checklist Supplement, Attachment H, *Wildlife*

Mitigation Plan). An open corridor will be maintained to allow for potential wildlife migration through the site.

Second, the site has been managed for timber harvesting and has been frequently disturbed. Currently zoned F&R (see Attachment A, Figure 6), the project area has been repeatedly selectively logged since the early 1900s. Harvests have occurred in the 1920s, 1950s, 1980s, and 2000s. Pre-commercial thinning occurred in the decades between logging. Prior to 1900, the site had a fire frequency of 9 to 12 years, indicating that a healthy understory and small trees did not exist, creating a park-like stand of larger trees that were fire resistant to low-intensity periodic fires (Wright, 1996; Agee and Wright, 1997). The site was most recently selectively logged in 2001, and existing site vegetation consists of low grasses, shrubs, and plants with scattered 50- to 60-foot, 6- to 18-inch-diameter ponderosa pine (*Pinus ponderosa*) trees. Shrub and riparian plant communities are predominantly snowberry (*Symphoricarpos albus*) and Rose (*Rosa* spp.) bushes. Herbaceous plant communities are predominantly Lupine (*Lupinus seiceus*), yarrow (*Achillea millefolium*), arrowleaf balsamroot (*Balsamorhiza sagittata*), and various grass species. Wetland plant communities are dominated by rushes (*Juncus* spp.), sedges (*Carex* spp.), wild onion (*Allium douglasii*), and various grass species. Some structural and residential developments have taken place on the site's southern boundary. Figure 5 in Attachment A shows the identified structures within the vicinity of the site boundary.

Third, the Bonneville Power Administration's (BPA) 345-kilovolt (kV) Rocky Reach-Maple Valley transmission line is in close proximity to the site, running east to west along the southern site boundary (see Attachment A, Figure 2). The proposed project is expected to interconnect to the regional transmission grid using this line (see Attachment A, Figure 4). An interconnection substation with an approximate footprint of 6 acres will be located on the project site. Siting the project close to the existing BPA transmission line significantly minimizes the environmental impacts that could arise from using other sites further away from the line. Construction of transmission lines is costly; therefore, siting a project in close proximity to a transmission is economically beneficial to the project.

Finally, TSR proposes to develop the site described below to maximize its solar energy potential, based on its commitment to providing renewable energy and becoming the leading (in terms of energy production and environmentally sensitive development and management of its solar production site) sustainable energy production location in North America. The following factors have been analyzed to determine optimal location within the site defined below:

- Significant solar radiation (insolation)
- Site accessibility
- Avoidance of and minimization of impacts to environmentally sensitive areas
- Limited visibility from offsite locations

2.4 Key Components

The proposed project will consist of the following key components:

- Solar modules
- Field inverters
- Field transformers
- Electrical conductors
- Electrical substation and switchyard
- Operations and maintenance (O&M) building and supervisory control and data acquisition (SCADA) system
- Overhead interconnection transmission line
- Access and maintenance roads

Key components are described in the following subsections.

2.4.1 Solar Modules

Solar modules in a metal frame on supporting mounting structures will be used for the proposed project. Approximately 399 acres of modules will be installed within the 982-acre proposed project area. The solar modules are manufactured offsite and will be delivered to the site by truck in wooden crates or cardboard boxes. TSR seeks flexibility in choosing a solar array system that best suits the site conditions. A representative module is shown in Attachment B, Photo 1. Each module measures 65 inches by 38 inches (5.4 feet by 3.2 feet) and is rated at 216 watts (Sharp Electronics, 2009) and will be mounted so that they are at least 4 feet above the ground surface. The solar modules are mounted in a fashion that orients the modules toward the sun.

Several module mounting types will be considered to best address the slope of land and soil stability at the project site. For example, large land areas with a slope toward the south are excellent for single-axis tracking systems. Land areas that are sloped to the east, southeast, west, or southwest will not as easily accommodate single-axis tracking systems, and are better suited to a fixed-tilt mounting structure.

The mounting system foundations could consist of embedded posts, poles, or structural steel angle. For one type of single-axis support approach, 1,936 posts are needed for every megawatt of energy. If the entire 75 MWdc were to be installed with this mounting system, then approximately 145,200 posts would need to be set. If a fixed-tilt approach is used, up to 8,000 steel angles would be needed. The impervious surface associated with these structures is presented in more detail in the Expanded SEPA Checklist Supplement, Attachment F, *Hydraulic Analysis*.

The posts will not be anchored unless a patch of bedrock is encountered during installation. The embedment could be completed via a vibratory drill or similar installation method to depths of approximately 8 feet. After the posts are installed, they are held in place by friction from the surrounding soil, without the use of concrete. Driven piles develop their strength by utilizing a definable skin friction between the pile and the soil. As the pile is forced into the ground, the displaced material compresses and that, in turn, creates the friction at the pile/soil interface. Piles are typically driven to a depth that prevents seasonal

and temporary changes from affecting their strength. A geotechnical engineer will determine the parameters to be used in the structural design.

The modules will be arranged in 1-MW fields and up to 75 fields will be installed at the project site. A representative single-axis tracking system is presented in Attachment B, Photo 2. Fixed-tilt systems typically have a galvanized or corrosion-resistant metal frame to hold the solar modules at a 20 to 30 degree tilt, as shown in Attachment B, Photo 3.

2.4.2 Field Inverters

Up to 80 field inverters will be needed for the project. The inverters will be placed outdoors in enclosures to attenuate noise and protect the equipment from the elements. An example inverter is shown in Attachment B, Photo 4.

2.4.3 Field Transformers

Up to 80 field transformers will be required for the solar field arrays. The field transformers are approximately 8 feet by 6 feet and 8 feet in height. They may be contained within prefabricated cabinets that will rest on concrete pads. A typical transformer cabinet is presented in Attachment B, Photo 5.

2.4.4 Electrical Conductors

Underground 34.5-kV electrical conductors will connect the solar array field transformers and the proposed BPA substation transformers. These will be installed in trenches along improved maintenance roads onsite at depths of 36 inches or greater (KCC, Chapter 12.24.040). Conductors will be direct burial or in a polyvinyl chloride (PVC) conduit. A photo of typical trenching for underground cables is included in Attachment B, Photos 6 and 7.

Electrical conductors from the array field to the field inverters will be supported aboveground within the solar module framework and installed per National Electrical Code (NEC) standards.

2.4.5 Electrical Substation and Switchyard

A new electric primary transmission line dedicated to the project will be constructed to connect the proposed project substation to the existing BPA line. It has yet to be determined if certain elements of the line and substation will be owned and constructed by BPA, but for purpose of environmental review and this permit application, all elements of the line and the substation (up to the point of interconnection with BPA's existing transmission line) are proposed as part of the project. The substation will be located in the southern part of the project site, to minimize the size of the associated transmission line. The substation will require a level, fenced area of approximately 6 acres. The 6-acre area will be graveled with no vegetation. The substation will contain a small control house, transformer(s), circuit breakers and switches, steel support structures, a dead-end tower structure, and overhead electrical bus work. The control house will be up to 16 feet high, 60 feet long, and 30 feet wide. The dead-end tower structure will be up to 120 feet high. Transformers and oil-filled equipment will be underlain with appropriate containment structures. The appearance of

the substation will be similar to that of many other substations throughout the Pacific Northwest.

2.4.6 Operations and Maintenance (O&M) Building and SCADA System

A storage and O&M building will store spare parts (e.g., modules and fuses), testing equipment, and cleaning equipment. The building will be of cinderblock construction or pre-engineered with an overall footprint of approximately 1,000 square feet and will be located within the 6-acre fenced substation area.

A SCADA system will be installed within the substation boundary to collect operating and performance data from the TSR facilities, and provide remote operation of the solar panels. The SCADA system will be associated with the BPA-owned facilities (substation and transmission line). The fiber-optic cable system needed for the SCADA components will be determined by BPA and will be installed per BPA standards.

2.4.7 Overhead Interconnection Transmission Line

A new 345-kV transmission line is required to connect the new substation to the existing BPA line and up to 200 feet of clearance will be needed for the proposed overhead line. Similar to the substation, it has yet to be determined if certain elements of the transmission line will be owned and constructed by BPA, but for purpose of environmental review and this permit application, all elements of the line and the substation (up to the point of interconnection with BPA's existing transmission line) are proposed as part of the project. As illustrated on Attachment A, Figure 4, TSR has delineated a 300-foot area within which the BPA transmission line could be sited. Of this 300-foot area, a maximum of 200 feet will be cleared for the transmission line. In April 2006, the North American Electric Reliability Corporation (NERC) issued mandatory standards that govern the height of vegetation growing near certain high-voltage power lines. NERC is in charge of improving the reliability and management standards for electric transmission lines. NERC has authority over eight regional entities in North America, known as regional reliability organizations, which include all segments of the electric industry: investor-owned utilities; federal power agencies; rural electric cooperatives; state, municipal and provincial utilities; independent power producers; power marketers; and end-use customers. The regional entity that has jurisdiction over Washington State is the Western Electric Coordinating Council (WECC)(Puget Sound Energy Fact Sheet, 2007).

Along with the regional reliability organizations, NERC has the legal authority to enforce compliance with NERC reliability standards. NERC achieves compliance through a rigorous program of monitoring, audits and investigations, and the imposition of financial penalties and other enforcement actions for non-compliance (Puget Sound Energy Fact Sheet, 2007).

New NERC vegetation standards, effective June 2007, require utilities to actively manage vegetation in all transmission line corridors that operate at more than 200 kV. Vegetation that matures at a height of more than 15 feet must be removed from the areas underneath and beside transmission rights of way (ROW). These areas are known as the wire and border zones (Puget Sound Energy Fact Sheet, 2007). Per the BPA Business Plan Environmental Impact Statement (BPEIS, 1995), typical ROW widths for 230-kV transmission lines are 105 to 115 feet on either side of the line, for a total of 210 to 230 feet.

Typical ROW widths for 500-kV transmission lines are 120 to 170 feet on either side of the line, for a total of 240 to 340 feet (BPEIS, 1995). Typical ROW widths for 345-kV lines are not outlined in the BPEIS.

A new BPA structure will be required to replace the existing lattice tower located within the BPA easement (see Attachment A, Figure 4). The BPA replacement tower would reroute the three existing 345-kV power lines via an existing 200-foot-wide ROW within the leasehold through the substation and back to the replacement BPA tower. Two additional grounding lines may be required by BPA to bring the total number of power lines between the replacement tower and substation to eight. A visual simulation of the replacement tower is shown in Expanded SEPA Checklist Supplement, Attachment L, *Potential Visual Impact Assessment*) In addition to the replacement structure, two new transmission structures will be required to support the new transmission lines between the replacement BPA tower and the substation. New transmission structures are indicated on the site plan (see Attachment A, Figure 4) and will be steel monopole structures.

2.4.8 Access and Maintenance Roads

The site will be accessed via Kittitas County and private roads that interconnect with Highway 970. The major County access road is Red Bridge Road. Only the southern portion of this road will be used and no construction access or delivery vehicles will cross the Red Bridge. TSR has easement rights over Wiehl Road, a dedicated public road maintained privately and not by the County, and Loping Lane, a private road. Loping Lane is subject to several road use and cost-sharing agreements, and TSR will comply with any such applicable agreement. Additionally, TSR will work with neighbors who use Loping Lane to identify measures that will minimize disruption to their use during construction and to the roadway itself. TSR will videotape the conditions of the roads prior to construction to ensure the roads are returned to the same or better than conditions once the project is decommissioned. The project will be served internally by a network of existing and new maintenance roads. The existing maintenance roads will be widened and graveled, where necessary. The roads will be improved pursuant to County requirements and turnarounds adequate for fire protection service vehicles will be established.

Per the Kittitas County Code and roadway standards (KCC, Chapter 12.01.090), Wiehl Road and Loping Lane would likely be improved to 24-foot wide roads to allow vehicles in both directions to pass safely at the same time. These roads could be paved, with culverts or drainage ditches constructed along the shoulders to prevent water from collecting on the roadway surface. Water could be channelized into a detention pond or catchment area, where it would be slowly released back into the ground. The County road standards suggest asphalt concrete pavement for roads with grades exceeding 10 percent. Because Wiehl Road (between Red Bridge and Loping Lane) is fairly steep, paving would likely be recommended. An alternative to paving is using layers of crushed stone or gravel to level and stabilize the roadway. The gravel layer would likely need to be between 8 and 21 inches deep, depending on the topography of the existing road. The size of the gravel and the density of the layers would need to be determined during engineering. Although gravel roads would allow some drainage to occur on the roadway surface, drainage ditches or culverts would likely still be necessary to prevent water from collecting.

As set forth in the Draft DA, TSR will coordinate any improvements to these roads with the Kittitas County Public Works Department. Attachment A, Figure 3 shows the location of the access and maintenance roads in relation to the project site.

2.5 Permits and Authorizations

Table 2-2 outlines the permits and authorizations required to construct the proposed project.

TABLE 2-2
 Required Permits and Authorizations

Act/Law	Permit/Authorization	Permit Trigger	Agency/Contact
Federal Permits			
Section 404 Clean Water Act Compliance	Section 404— Nationwide Permit	May be required if road improvements impact wetlands along Loping Lane	U.S. Army Corps of Engineers
State Permits			
Historic Preservation Act Compliance	Section 106 Review	TSRs receiving a section 404 permit from the U.S. Army Corps must undergo a Section 106 review	WA Authority Delegated to State Department of Archaeology and Historic Preservation (DAHP)
State Environmental Policy Act	Chapter 197-11 Washington Administrative Code	Conditional use permit per Kittitas County	Authority Delegated to Kittitas County
Clean Water Act— Section 401 Compliance	Water Quality Certification	TSRs receiving a section 404 permit from the U.S. Army Corps are required to obtain a section 401 water quality certification	Washington Department of Ecology
National Pollutant Discharge Elimination System (NPDES)	General Construction Permit	Required for land disturbances greater than 1 acre	Washington Department of Ecology
Forest Practices Act (76.09 RCW)	Forest Practices Permit	Harvesting trees from onsite	Washington Department of Natural Resources (WDNR)
County Permits			
Land Use Review	Conditional Use Permit	Development occurring within Kittitas County	Kittitas County
Land Use Review	Development Agreement	Development occurring within Kittitas County	Kittitas County
Land Use Review	Cultural Resources	Development occurring within Kittitas County	Kittitas County
Land Use Review	Stormwater	Development occurring within Kittitas County	Kittitas County
Land Use Review	Critical Areas Ordinance	Development occurring within Kittitas County	Kittitas County
Land Use Review	Construction Permit	Development occurring within Kittitas County	Kittitas County

2.6 Summary of Construction Activities and Components

Site preparation will consist of clearing the existing vegetation only in those areas where construction, grading, and road improvements will occur. Site preparation will be limited to maintenance roads, the O&M facility, the substation, and the solar facility. Once the site is prepared, and the materials are delivered to the staging areas within the cleared portion of the site, the installation of module foundations, field inverter pads and enclosures, field transformer pads, electrical conductors, substation switchyard foundation, overhead interconnection transmission line, and access and maintenance roads will begin. Materials and equipment used for the installation of the facilities are described in Section 2.6.3, “Construction Materials and Equipment”.

2.6.1 Site Preparation

The project site will require clearing to address the potential for damage to the project from blown down trees, decreased power efficiency of the solar modules from shading, the risk of fire from fuel buildup within the project area, and the need to create a 100-foot firebreak along the project's perimeters as described below. To clear the site for installing the project, trees will be harvested within the project area on an as-needed basis for facilitating each construction phase of the project (Table 2-1). Trees will generally be harvested to a stump level of 6 to 12 inches above ground level. TSR will obtain a permit from the Washington Department of Natural Resources (WDNR) and contract with a professional forester to harvest these trees in accordance with the Forest Practices Act (FPA). Because the bottoms of the solar modules will be approximately 3 feet above grade, any vegetation taller than 3 feet or expected to exceed 3 feet in height will be removed. Shrubs, grass, and groundcover will, to the maximum extent practicable, remain between rows and under the solar modules.

Trees within the 100-foot firebreak will be limbed up to 12 feet, as negotiated with Kittitas County Fire District 7. This minimizes the need to remove the entire tree, thus potentially decreasing the visual impact to nearby landowners. In addition, existing trees with a diameter base of 3 inches or greater will be replanted at a 3:1 ratio. Although there is no legal requirement for this mitigation, TSR is committed to undertaking efforts that will further the long-term sustainability of the land. These two measures will provide greater carbon sequestration, wildlife habitat, and soil stabilization opportunities than are currently available onsite. A more detailed discussion on vegetation management is included in Expanded SEPA Checklist Supplement, Attachment G, *Vegetation Management Plan*.

Construction equipment such as tractors, backhoes, loaders, dozers, and graders will be needed to clear brush and vegetation from the site as needed, and to grade roads and foundation locations. If the slope of the land is excessive, terracing, or retaining walls may be required.

2.6.2 Staging Areas

Staging areas for parts and materials such as solar modules, electric cable, and structural supports will be needed. These staging areas will be located in areas where solar arrays will eventually be constructed and will change location throughout the duration of the project.

These will not add additional impact acreage to the project area and will not be permanent components of the project site. Staging will also occur near the O&M Building. Mobilization will last approximately 1 month during each phase of construction.

2.6.3 Construction Materials and Equipment

A concrete batch plant will not be located on site. Gravel and concrete for the project will be sourced in the Cle Elum area to the extent possible. Construction equipment such as backhoes, loaders, concrete trucks, and graders will likely be used. A crane may be necessary, but is typically not required.

2.6.3.1 Module Foundation Installation

Several module mounting types will be considered to best address the slope of land and soil stability at the project site. For example, large land areas with a slope toward the south are excellent for single-axis tracking systems (see Expanded SEPA Checklist Supplement Attachment J, Figure 4b). Land areas that are sloped to the east, southeast, west, or southwest will not as easily accommodate single-axis tracking systems, and are better suited to a fixed-tilt mounting structure (see Expanded SEPA Checklist Supplement Attachment J, Figure 4c).

The foundations securing the solar modules will be designed to withstand high winds and snow loads. The site may have multiple foundation types to match the ground conditions and type of mounting structures used. The mounting-system support structures could consist of embedded posts, poles, or structural steel angle. The embedment could be completed via a vibratory drill or similar installation method to depths of approximately 8 feet. Pending final design, the solar module foundations will require site work and potential boring.

The posts will not be anchored unless a patch of bedrock is encountered during installation. The embedment could be completed via a vibratory drill or similar installation method to depths of approximately 8 feet. After the posts are installed, they are held in place by friction from the surrounding soil, without the use of concrete. Driven piles develop their strength by utilizing a definable skin friction between the pile and the soil. As the pile is forced into the ground, the displaced material compresses and that, in turn, creates the friction at the pile/soil interface. Piles are typically driven to a depth that prevents seasonal and temporary changes from affecting their strength. A geotechnical engineer will determine the parameters to be used in the structural design. Expanded SEPA Checklist Supplement Attachment J, Figure 4d illustrates the footing installation methods for both the fixed tilt and single axis panels.

No concrete will be used when installing the foundations for the modules.

For one type of single-axis support approach, 1,936 posts are needed for every megawatt of energy. If the entire 75 MWdc were to be installed with this mounting system, then approximately 145,200 posts would need to be set. If a fixed-tilt approach is used, up to 8,000 steel angles would be needed. The impervious surface associated with these structures is presented in more detail in Expanded SEPA Checklist Supplement, Attachment F, *Hydrological Analysis*.

Fixed-tilt systems typically have a galvanized or corrosion-resistant metal frame to hold the solar modules at a 20 to 30 degree tilt, as shown in Attachment B, Photo 3.

Dependent upon weather conditions at the site, installation of foundations, trackers, and modules will occur over a period of approximately 7 to 9 months during two or three construction seasons.

2.6.3.2 Field Inverter Pad and Enclosure Installation

Concrete use will be limited to the foundations for field inverters and field transformers, as well as the foundations for the substation buildings. Up to 80 field inverters will be needed for the project. A total of approximately 250 cubic yards of concrete, or 25 truck loads, will be needed for the 80 field inverter concrete pads.

Dependent upon weather conditions at the site, installation of field inverter pads and enclosures will occur over a period of approximately 5 to 6 months.

2.6.3.3 Field Transformer Pad Installation

Concrete use will be limited to the foundations for field inverters and field transformers, as well as the foundations for the substation buildings. A total of approximately 150 cubic yards of concrete, or 15 truck loads, will be needed for the 80 field transformer concrete pads. Dependent upon weather conditions at the site, installation of field transformer pads will occur over a period of approximately 5 to 6 months.

2.6.3.4 Electrical Conductor Installation

Underground 34.5-kV electrical conductors will connect the solar array field transformers and the proposed BPA substation transformers. These will be installed in trenches along improved maintenance roads onsite at depths of 36 inches or greater (KCC, Chapter 12.24.040). Conductors will be direct burial or in a polyvinyl chloride (PVC) conduit.

Electrical conductors from the array field to the field inverters will be supported aboveground within the solar module framework and installed per NEC standards. Photos of typical trenching for underground cables are included in Attachment B, Photos 6 and 7.

2.6.3.5 Substation and Switchyard Foundation Installation

The substation will require an area of approximately 6 acres. The substation consists of a steel support structure that is 15 to 20 feet tall. The substation will be surrounded by a cyclone fence that is approximately 10 feet tall. The substation will include a small, enclosed, air conditioned control building, approximately 1,000 square feet in area.

Approximately 135 truckloads of concrete will be necessary for the substation foundations and associated facilities. The concrete necessary for the substation includes 70 yards for the BPA control building (7 trucks), 40 yards for the switchgear buildings (4 trucks), 50 yards for the operations and maintenance building (5 trucks), 660 yards for the dead-end towers and overhead transmission line support structures (66 trucks), and 530 yards for the substation electrical equipment, including transformer, breakers, switches, and overhead bus foundations (53 trucks).

2.6.3.6 Overhead Interconnection Transmission Line Installation

Pending location of the substation, overhead electrical distribution lines may be required to connect the substation with BPA's transmission line. Two new structures supporting the overhead lines will be required from the facility to the substation and will be approximately spaced as indicated in the site plan. Spans between structures can range from 1,000 to 1,200 feet.

2.6.3.7 Access and Maintenance Road Installation

A network of existing and new maintenance roads will serve the project internally. The existing maintenance roads will be widened and graveled, where necessary. Approximately 751,000 square feet of roadway may require gravel surfacing improvements. These improved roadways will be approximately 8 inches deep, and will require up to 1,900 truckloads of gravel.

Paths for new maintenance roadways will be cut from existing grades. At least half of the cut material will be spread out on site. The remaining amount of cut earthwork will be hauled off-site in approximately 950 truckloads. The roads will be improved pursuant to County requirements and turnarounds adequate for fire protection service vehicles will be established.

2.6.4 Transportation and Traffic

Materials for the project (e.g., solar modules, supporting racks, foundation materials, electrical gear) will be brought to the site by truck. The trucks will travel on Interstate 90 (I-90) and access Highway 970 by way of County roads such as Red Bridge Road (see Attachment A, Figure 3), private roads such as Loping Lane, and public roads that are privately maintained such as Wiehl Road. An existing network of maintenance roads will provide Road service within the project area, although new maintenance roads or segments may be necessary. Road improvements will be conducted as needed, and are anticipated to include upgrades to local gravel and dirt roads as discussed above in Section 2.6.1. Road improvements are further addressed in the DA with Kittitas County (Attachment E). For further discussion of traffic impacts, see the Expanded SEPA Checklist Supplement, Attachment I, *Transportation Road Plan*.

2.6.5 Employment

A typical construction workforce for a multiple-megawatt solar facility consists of between 200 and 450 full-time workers during the construction period. Typically, 100 to 150 workers are involved in the site prep, and 100 to 150 are involved in installing the module footings. When the solar installation begins, the workload will peak, and will likely remain at between 300 and 450 workers for a period of up to 27 months (two to three 7- to 9-month construction seasons). Workers could be brought in by vanpool or bus. Workers will stay at local hotels and motels, as described in the Housing section of the Expanded SEPA Checklist Supplement. Security crews will likely consist of up to eight workers. In addition, access control in the form of an electric gate with an associated keypad security code for entry will be installed.

2.6.6 Safety and Fire Protection

The fire protection needs of the site are currently served by WDNR. After the project is constructed, the site will likely be served by the Kittitas County Fire District 7, under a contractual agreement with TSR (see Expanded SEPA Checklist Supplement, Attachment M, *Fire Protection Agreement*). Further, the project will be bordered by a firebreak no less than 100 feet wide. Should the construction of the project require supplemental fire protection services, TSR will work with Kittitas County Fire District 7 to ensure that suitable fire suppression services are in place during the construction and ongoing operations of the project. Separate safety or fire protection systems will not be required at the site. Basic safety and fire protection equipment such as fire extinguishers, personal protective equipment, and other equipment as determined by the site's safety and emergency response plan can be stored in the O&M equipment storage building.

Police protection of the proposed project area is provided by the County's Sheriff's Office. The construction contractor will notify the fire protection and police services of staging and active construction locations so these services can respond efficiently to emergencies, should any arise.

2.6.7 Water Use

Water will be needed for activities such as dust control and module cleaning. TSR proposes to truck in water from the Cle Elum area or elsewhere. Subject to any restrictions imposed by the County or Washington Department of Ecology (Ecology), an alternative approach would be to establish a groundwater well onsite. For initial project permitting, it is assumed that water will be trucked to the site.

2.6.8 Sewer and Solid Waste

Sewer services are not anticipated. Portable toilets will be placed onsite during construction. The onsite toilets will require regular service visits.

2.7 Summary of O&M Activities and Components

Photovoltaic power plants typically have low O&M requirements. During the life of the plant, there will be regular O&M site activity. The actual O&M requirements will be determined by the specific plant components.

2.7.1 Materials and Equipment

A storage and O&M building will store spare parts (e.g., modules and fuses), equipment testing equipment, and cleaning equipment. The building will be constructed on site or pre-engineered in accordance with local and state building codes and it will have an overall footprint of approximately 1,000 square feet.

2.7.2 Transportation and Traffic

Routine vehicular traffic will occur along the site access roads and any maintenance roads within the PV array. One to two small to medium-duty pickup trucks will be required. Larger delivery trucks occasionally may be required if major equipment is in need of

replacement such as structural elements, inverters, or large quantities of PV modules (not likely).

2.7.3 Employment

Personnel for system monitoring, maintenance, and troubleshooting will likely be needed on site. The staff will work out of the O&M building and make frequent trips to the facility by way of passenger pickup truck or off-road vehicle. If issues regarding plant performance are detected, additional troubleshooting or maintenance may be required through special visits from vendors or specialty technicians.

2.7.4 Maintenance Activities

Routine onsite activities will consist of maintaining vegetation so that it does not interfere with operation of the plant (as often as weekly during periods of high rain and growth), and cleaning the solar modules of dirt and debris. Routine weed control will be required to ensure vegetation growth does not interfere with the operation of any equipment. For more details on noxious weed control, see Expanded SEPA Checklist Supplement Attachment G, *Vegetation Mitigation Plan*. The frequency of visits will be determined by the growth rate and density of the vegetation left on the site once construction is complete. In a heavily vegetated area such as the proposed site, it is not anticipated that cleaning will be required on a weekly basis (as it would be in a desert environment). The firebreak will require periodic monitoring and clearing to remove vegetation buildup. It is anticipated that additional personnel may be required to monitor and secure the site.

In addition to maintaining the vegetation on site during project operations, TSR has committed to maintenance and operation of Wiehl and Loping during all seasons. That includes winter plowing of these roads.

2.7.5 Safety and Fire Protection

As previously discussed, separate safety or fire protection systems will not be required at the site. TSR will create and maintain a firebreak of no less than 100 feet between all outer edges of the project site and adjacent property lines. Basic safety and fire protection equipment such as fire extinguishers, personal protective equipment, and other equipment as determined by the site's safety and emergency response plan can be stored in the O&M equipment storage building.

A copy of the contractual agreement between TSR and Kittitas County Fire District 7 is included as Attachment M to the Expanded SEPA Checklist Supplement.

Police protection of the proposed project area is provided by the County's Sheriff's Office. During the operational phase, TSR will contact fire protection and police services in the event of an emergency.

2.7.6 Water Use

The solar modules must be kept clear from dirt and debris, the presence of which can affect the performance of the PV plant. Because the proposed site is heavily vegetated and has sufficient rainfall, it is not anticipated that monthly washing will be required. Annual cleaning may be recommended based on soiling conditions. It may be possible to use special

brushes in lieu of water to remove any dirt that accumulates on the solar modules. However, if it is determined that water is required for cleaning the solar modules or other purposes, a water tanker truck could be brought onsite to fill portable canisters with water to be used throughout the PV array.

2.7.7 Sewer and Solid Waste

Sewer services are not anticipated. If necessary, portable toilets can be placed onsite. Onsite toilets would require regular service visits.

2.8 Decommissioning and Site Restoration

In the event TSR decides to terminate operation of the project, the project will be decommissioned and the site will be restored.

At least 30 days prior to construction of the project, TSR will provide to the County for its approval an Initial Project Decommissioning and Site Restoration Plan (the “Initial Plan”), prepared in sufficient detail to identify, evaluate, and resolve all major environmental impacts, costs, and public health and safety issues reasonably anticipated by TSR at that time associated with decommissioning and restoring the project site. The Initial Plan will describe the measures that will be taken to decommission the project and restore the project site, including any measures necessary to protect the public against risks or danger resulting from decommissioning the project and restoring the project site.

Ninety days prior to decommissioning the project site, TSR shall submit a Final Project Decommissioning and Site Restoration Plan (“Final Plan”) to the County for its approval. The Final Plan may contain measures to decommission the project and restore the project site different than the Initial Plan, provided that TSR explains in sufficient detail the reasons for any new or substantially different measures.

Subject to the Initial and Final Plans, decommissioning the project shall involve removal of the project’s components, including the solar panels, panel trackers, anchors, supports and mounts, inverter buildings, electrical conductors, substation, the O&M building, and any foundations or permanently fixed anchors to a depth of 3 feet below grade; the re-grading of any areas significantly impacted by the removal of any components; and removal of project maintenance roads and overhead cables (except for any roads, buildings, and/or power cables that project area landowners wish to retain) (all of which shall comprise “Decommissioning”). The Initial and Final Plans shall contain the measures necessary to fulfill TSR’s Decommissioning obligations.

Restoration of the project site shall be to a reasonable approximation of its original condition prior to construction allowing for any permanent improvements chosen by the underlying landowners to be left on site. Restoration procedures would be based on site-specific requirements and forest management techniques commonly employed at the time the area is to be reclaimed, and would include regrading, adding topsoil, and replanting of all disturbed areas with an approved seed mixture (all of which shall comprise “Restoration”). Decommissioned roads would be reclaimed or left in place. The Initial and Final Plans shall contain the measures necessary to fulfill TSR’s Restoration obligations.

Decommissioning the project and restoring the project site will occur within 12 months following the earlier of either terminating the Agreement or when the project is no longer in substantive operation. However, if the project stops generating electricity due to *force majeure*, mechanical breakdown, or malfunction, TSR may repair rather than decommission the affected project component(s).

Prior to commencing construction, TSR will post a bond or letter of credit in favor of the County to cover decommissioning costs. The initial amount of the bond or letter of credit will be set forth in the Initial Plan. If the project were terminated, the necessary authorization from any appropriate regulatory agencies would be obtained to decommission the project and restore the project site in accordance with the approved Final Plan.

As set forth in the Initial and Final Plans, aboveground facilities would be removed from the site, and unsalvageable material would be disposed of at authorized sites.

Decommissioning would consist of removing aboveground equipment, such as inverters, substations, and their associated foundations, to a depth of 3 feet below grade. Any foundations below 3 feet would remain. The ground surface would be regraded to natural contours and revegetated to a natural condition. For several years after decommissioning, site disturbance would likely be visible upon close examination and the visual impacts of those aboveground elements that are not removed would remain. During the decommissioning process, similar impacts to those experienced during construction would occur but to a lesser extent because less construction material would likely be removed than was delivered to the project site. To avoid environmental damage and unnecessary land disturbance, underground collector cables likely would be retired in place, and any building or structural foundations would be removed to a depth of approximately 3 feet below grade, with the remainder likely retired in place. Decommissioned roads would be reclaimed or left in place. The soil surface would be restored as close as reasonably possible to its original condition. The Initial and Final Plans shall be prepared in sufficient detail to identify, evaluate, and resolve all major environmental impacts, costs, and public health and safety issues associated with decommissioning and restoring the project site. Accordingly, no significant unavoidable adverse environmental impacts, including those to rare or sensitive plants or animals from construction, operation, decommissioning, or restoration of the proposed project are expected.

SECTION 3

Compliance with Kittitas County Land Use Regulations

This section demonstrates compliance with the relevant provisions from the KCC. The project is proposed entirely within the Kittitas County F-R zoning district and the applicable review procedure includes approval of a CUP. The relevant provisions from the KCC are reviewed below in numerical order by title and then chapter. The KCC provisions are included in *italics* followed by TSR's response (i.e., finding of fact, or "**Finding**").

3.1 Title 17—Zoning

3.1.1 Chapter 17.56—Forest and Range Zone

17.56.020 Uses permitted.

17.56.030 Conditional uses.

Finding: The project is a "*Major alternative energy facility*" as defined in Section 17.61.010(9) and is an authorized use in the Forest and Range Zone subject to approval of a CUP per Section 17.61.020(4) & (6). Sections 17.61.010(9) and 17.61.020(4) & (6) are reviewed further later in this narrative.

17.56.040 Lot - Minimum size.

The minimum lot size in the Forest and Range Zone shall be:

- 1. Twenty acres;*
- 2. One-half acre minimum for any lot with an approved platted cluster subdivision, served by public water and sewer;*
- 3. Six thousand square feet for lots on existing municipal sewer and water systems.*

Response: The project is proposed on several existing tax parcels that all exceed the 20-acre minimum. The project does not include a request for approval of a subdivision or municipal sewer and water, and criteria 2 and 3 are not applicable. Therefore, the project complies with these criteria.

17.56.050 Lot - width.

- 1. No parcel created after the adoption of the ordinance codified in this chapter shall have a length-width dimension less than five hundred feet unless the parcel is approved under provisions established in Section 17.56.040 (2) and (3).*
- 2. No platted parcel shall have dimensions in excess of a 4:1 length by width ratio.*

Finding: The proposed project does not include the creation of any new parcels nor does it modify the boundaries of existing lots. Therefore, the project complies with these criteria.

17.56.060 Yard –requirements.

1. *Front Yard.* There shall be a minimum front yard of twenty-five feet.
2. *Side Yard.* Side yard shall be ten feet, except on corner lots which shall have a fifteen-foot side yard.
3. *Rear Yard.* There shall be a rear yard with a minimum depth of ten feet to the main building.

Finding: The proposed project will not include any buildings or improvements within 25 feet of a property boundary. TSR will create and maintain a firebreak of no less than 100 feet between all outer edges of the project site and adjacent property lines. Therefore, the project complies with these criteria.

17.56.065 Yard requirements – Zones Adjacent to Commercial Forrest Zone

Properties bordering or adjacent to the Commercial Forest zone are subject to a 200' setback from the Commercial Forest Zone. (KCC 17.57.050(1)). For properties where such setback isn't feasible, development shall comply with Kittitas County Code 17.57.050(2).

Finding: The northernmost extent of the proposed project boundary is directly adjacent to an area encompassed by the Commercial Forest (CF) zone. To achieve 75 dcMW of generating capacity, use of the entire area within the project boundary may be required, including the area within 200 feet of the adjacent CF zone. The closest structure is a PV array, which is located 100 feet from the adjacent CF property boundary. Assuming the 200-foot setback applies to the project, the TSR will seek a modification to this dimensional standard as set forth in Section 5.3 of the DA, which Attachment E to this CUP.

17.56.070 Structure height

No structure shall exceed two and one-half stories or thirty-five feet in height, whichever is greater. This limit does not apply to agricultural buildings.

Finding: The solar modules and associated structures currently proposed for the project will be less than 2-1/2 stories or 35 feet in height. The solar modules will be approximately 14 feet in height, inverter buildings 12 feet, switchgear structures 10 feet, substation 14 feet, and storage/O&M building 24 feet.

A new electric primary transmission line dedicated to the project will be constructed to connect the proposed project substation to the existing BPA line. It has yet to be determined if certain elements of the line and substation will be owned and constructed by BPA, but for purpose of environmental review and this permit application, all elements of the line and the substation (up to the point of interconnection with BPA's existing transmission line) are proposed as part of the project. Support structures for the line would be steel mono-poles, and each structure will be approximately 120 feet tall. Two structures would be needed for the 3,000-foot-long line, and one 120-foot termination structure will be constructed as part of the substation. The line would be constructed at the lowest elevation on the site to minimize its visibility, and the line route, right-of-way width, structure locations, conductor type, and span lengths were selected for compatibility with other land uses. A modification to 17.56.070 may be needed to address the height of the transmission line towers. More detailed information regarding this modification can be found in the DA (Attachment E).

17.56.080 Setbacks

The following setbacks shall be enforced for residential and accessory buildings constructed or placed on shorelines or floodplains under the jurisdiction of the Washington State Shoreline Management Act:

1. *One hundred feet (measured horizontally) from the ordinary high water mark or line of vegetation for lots abutting such waterways;*
2. *One hundred feet (measured horizontally) from the ordinary high water mark of line of vegetation for lots fronting on reservoirs including Keechelus, Cle Elum, Kachess, and Easton Lakes and Wanapum reservoir.*

Finding: The proposed project site and adjacent areas do not include shorelines or floodplains under the jurisdiction of the Washington State Shoreline Management Act. The proposed buildings for operation and maintenance activities will not be located in or near a regulated shoreline or floodplain. Therefore, the project complies with these criteria.

3.1.2 Chapter 17.60A—Conditional Uses

17.60A.010 Review Criteria

The Board of Adjustment, upon receiving a properly filed application or petition, may permit and authorize a conditional use when the following requirements have been met:

1. *The Board of Adjustment shall determine that the proposed use is essential or desirable to the public convenience and not detrimental or injurious to the public health, peace, or safety or to the character of the surrounding neighborhood.*

Finding: The proposed project is desirable to the public convenience. TSR proposes to develop the project site so that solar energy potential is maximized, in accordance with the commitment to establishing a leading sustainable energy production location in North America. TSR is committed to energy production and environmentally sensitive development and management of its solar production site.

The project is desirable as it will have the capacity to generate up to 75 MWdc of PV solar energy for distribution to utilities seeking to optimize their renewable and sustainable energy sources. The project was conceived in response to the growing interest in and need for sustainable energy sources and the State of Washington's Renewable Electricity Standard, RCW Title 19, mandate that by the year 2020, the state's largest electric utilities meet 15 percent of their retail electric load with renewable electricity (for example, wind and solar energy). The standard first takes effect in 2012 with a requirement of 3 percent through 2015, then 9 percent from 2016 through 2019 and 15 percent thereafter. Therefore, the project will provide a clean energy source and assist utilities in achieving the Renewable Electricity Standard.

Construction and operation of the project is desirable as it will benefit the local and regional economies. When the solar installation begins, the workload will peak at 450 workers for a period of up to 27 months (two to three 7- to 9-month construction seasons). The project, along with the construction workers, will further stimulate the economy through local purchases of goods and materials. The total value of goods and services that will be purchased locally (within Kittitas County) during the three construction seasons is

estimated to be \$97.5 million. Project construction could also attract other related businesses to the local and regional area, resulting in longer-term economic benefits. Operation of the project will employ up to eight O&M and security staff. For a more detailed analysis of the economic benefits provided by the construction and operation of the proposed project, please see the *Economic Impact Analysis for the Teanaway Solar Reserve Kittitas County, Washington* (see Expanded SEPA Checklist Supplement, Attachment N), which has been prepared at the County's request.

The project will not be injurious to the public health, peace, or safety or to the character of the surrounding neighborhood. The proposal involves a clean energy source without emissions to air or water for the life of the project.

The solar modules do not present a health or safety hazard. Contact with the modules will not lead to electrocution or contamination (see Expanded SEPA Checklist Supplement Attachment H, *Wildlife Mitigation Plan*, Appendix G). No combustible materials will be used except for fuel and oil used in construction equipment. The project will be constructed in accordance with applicable federal, state, and county regulations that pertain to fire prevention and suppression. In addition, standard construction safety measures would be implemented to reduce the risk of hazards and accidents. The project is proposed in a rural area with a limited existing neighborhood character and a limited number of surrounding residences. In addition, it is being designed and sited to minimize its visibility from all surrounding areas and will result in a minimal increase in noise and odors.

For the reasons stated above, the project complies with this criterion.

- The Board of Adjustment shall determine that the proposed use at the proposed location will not be unreasonably detrimental to the economic welfare of the county and that it will not create excessive public cost for facilities and services by finding that (1) it will be adequately serviced by existing facilities such as highways, roads, police and fire protection, irrigation and drainage structures, refuse disposal, water and sewers, and schools; or (2) that the applicant shall provide such facilities or (3) demonstrate that the proposed use will be of sufficient economic benefit to offset additional public costs or economic detriment.*

Finding: The proposed project will not be unreasonably detrimental to the economic welfare of the county and will not create excessive public cost for facilities and services for the following reasons:

- Construction and operation of the project is desirable as it will benefit the local and regional economies. Construction will employ approximately 450 workers at peak levels. The project, along with the construction workers, will further stimulate the economy through local purchases of goods and materials. The total value of goods and services that will be purchased locally (within Kittitas County) during the three construction seasons is estimated to be \$97.5 million.
- Project construction could also attract other related businesses to the local and regional area, resulting in longer-term economic benefits.
- Operation of the project will employ up to eight O&M and security staff. Fifty (50) percent of the onsite peak construction workforce of 450 is assumed to be from the local labor market (within Kittitas County) while the remaining 50 percent, or 225 peak period

workers could come from outside the County and are assumed to relocate to Kittitas County for the duration of the construction period or phase.

- The project will be adequately served by existing facilities, as discussed below, and the economic benefits summarized above and in the *Economic Impact Analysis for the Teanaway Solar Reserve Kittitas County, Washington* (Expanded SEPA Checklist Supplement, Attachment N) will exceed any minor public costs..

The project's use of existing facilities is summarized as follows:

Highways and Roads. The site will be accessible via Kittitas County and private roads that interconnect with Highway 970 (see Figure 3). The major County access road is Red Bridge Road. Loping Lane is a private road and Wiehl Road is a public road over which TSR has easement rights. Loping Lane is subject to several road use and cost sharing agreements, and TSR will be subject to those agreements. TSR will additionally work with neighbors who use Loping Lane to identify improvements that will minimize disruption to their use during construction and to the roadway itself. The project will be internally served by a network of existing and/or new maintenance roads. These maintenance roads, along with Wiehl Road and Loping Lane, consist of gravel and dirt and may need improvements pursuant to County requirements. As set forth in attached Draft DA, TSR will coordinate any improvements to these roads with the Kittitas County Public Works Department. Figure 3 shows the location of the maintenance and access roads in relation to the project site.

Police Protection. Police protection of the project area is provided by the County's Sheriff's Office. The project will include security staff on site around the clock. As a result of proposed project security measures and personnel, it is not anticipated that the project will generate any new demand for police services. The construction contractor will notify the police services of staging and active construction locations so these services can respond efficiently to emergencies, should any arise. During the operational phase, TSR will contact police services in the event of an emergency.

Fire Protection. The project area is currently subject to the fire suppression services of the Washington Department of Natural Services. After the project is constructed, it will be served by the Kittitas County Fire District 7 (see Expanded SEPA Checklist Supplement, Attachment M). Further, the project will be bordered by a firebreak no less than 100 feet wide.

The project will be constructed in accordance with applicable federal, state, and county regulations that pertain to fire prevention and suppression. In addition, standard construction safety measures will be implemented to reduce the risk of hazards and accidents. Separate safety or fire protection systems will not be required at the site. Basic safety and fire protection equipment such as fire extinguishers, personal protective equipment, and other equipment as determined by the site's safety and emergency response plan can be stored in the O&M equipment storage building.

Irrigation and Drainage. The project will be adequately served by existing drainage and will not need to utilize Kittitas County irrigation and drainage services. The project will maximize existing pervious surface on the site by maintaining natural ground cover wherever possible including areas under solar modules. In addition, TSR will maintain

existing contours whenever possible during grading and site preparation. Therefore, site runoff and drainage will remain largely unchanged. During construction, TSR will implement Best Management Practices (BMPs) to minimize erosion and sediment release.

Refuse. Construction workers will be directed to dispose of all refuse in defined containers. Following construction, the only refuse generated by the project will be from the O&M staff. This limited refuse will be disposed of as required by the County.

Water and Sewers. The project does not need any water rights. TSR proposes to truck in water from the surrounding area or elsewhere, if and as needed, for dust control during construction and module cleaning for operation.

The need for sewer services is not anticipated. Portable toilets will be placed onsite during construction and as necessary during operation. Service visits to the onsite toilets will occur on a regular basis.

Schools. The project will not be detrimental to or cause an increased burden on local school resources.

17.60A.020 Conditions

1. *In permitting such uses the board of adjustments may impose in addition to the regulations specified herein, such conditions as it deems necessary to protect the best interests of the surrounding property or neighborhood or the county as a whole.*
2. *Uses subject to conditions which exist in an R or S zone on the effective date of the ordinance codified herein shall not be changed, expanded nor structures used in connection therewith altered without first applying to the board of adjustment for review and under provisions of this chapter.*
3. *Any change, enlargement or alternation in such use shall require a review by the board of adjustment and new conditions may be imposed where finding requires.*

Finding: TSR further intends this CUP to be conditioned and governed at a minimum by the attached Draft DA once it is approved by the County (per KCC Chapter 15A.11).

3.1.3 Chapter 17.61—Utilities

17.61.010 Definitions.

2. *“Special utility” or “special utilities” shall mean the following:*
 - b. *Electrical transmission lines exceeding 115,000 volts*
 - c. *Electrical substations*

Finding: A new electric primary transmission line dedicated to the project will be constructed to connect the proposed project substation to the existing BPA line. It has yet to be determined if certain elements of the line and substation will be owned and constructed by BPA, but for purpose of environmental review and this permit application, all elements of the line and the substation (up to the point of interconnection with BPA’s existing transmission line) are proposed as part of the project. The support structures for the line would be steel mono-poles, and each structure will be approximately 120 feet tall. A maximum of two structures would be needed for the 3,000-foot-long line, and a 120-foot termination structure will be constructed as part of the substation. The line would be

constructed at the lowest elevation on the site to minimize its visibility, and the line route, right-of-way width, structure locations, conductor type, and span lengths were selected for compatibility with other land uses. TSR has delineated a 300-foot area within which the BPA transmission line could be sited. Of this 300-foot area, a maximum of 200 feet will be cleared for the placement of the BPA transmission line. Final design and placement of the transmission line will be determined by BPA.

The substation will require an area of approximately 6 acres. The substation consists of a steel support structure that is 15 to 20 feet tall. The substation will be surrounded by a cyclone fence that is approximately 10 feet tall. The substation will include a small, enclosed, air-conditioned control building, approximately 1,000 square feet in area.

9. *“Major alternative energy facility” means a hydroelectric plant, solar farm, or wind farm that is not a minor alternative energy facility.*
11. *“Minor alternative energy facility” or “minor alternative energy system” means a fuel cell or a facility for the production of electrical energy that:*
 - a.
 - i. *Uses as its fuel either solar, wind, or hydropower;*
 - ii. *Is located on the power beneficiary’s premises;*
 - iii. *Is intended primarily to offset part or all of the beneficiary’s requirements for electricity;*
and
 - iv. *Is secondary to the beneficiary’s use of the premises for other lawful purpose(s)*

Finding: The proposed project is a major alternative energy facility. It does not qualify as a minor alternative energy facility because the production of electrical energy is not intended to primarily offset part of all of the beneficiary’s requirements for electricity per KCC Section 17.61.010(11)(a)(iii). Instead, the solar energy will be distributed to the existing electrical grid.

17.61.020 Permitted and conditional uses.

4. *Major alternative energy facilities may be authorized in the Agriculture-20, forest and range, commercial agriculture, and commercial forest zone as follows:*
 - b. *All other major alternative energy facilities may be authorized by the board of adjustments as a conditional use.*

Finding: TSR understands this provision and requests approval of a CUP for the proposed project from the board of adjustments.

17.61.030 Review criteria – Special utilities and associated facilities.

1. *The board of adjustment shall determine that adequate measures have been undertaken by the proponent of the special utility and/or associated facility to reduce the risk of accidents caused by hazardous materials.*

The proposed project includes a primary transmission line and substation, both of which are required to connect the project with the existing BPA transmission network. These are dedicated facilities, serving no other electrical purpose. The risk of exposure to hazardous materials will be minimal. The transmission line will contain no hazardous materials. The substation will contain oil-filled equipment; however, it will be designed to provide

containment for any spills or leaks in accordance with a Spill Prevention Control and Countermeasures (SPCC) Plan Basic safety and fire protection equipment such as fire extinguishers, personal protective equipment, and other equipment as determined by the site's safety and emergency response plan can be stored in the O&M equipment storage building.

2. The board of adjustment, as required by existing statutes, shall determine that the proposed special utility and/or associated facilities are essential and desirable to the public convenience and/or not detrimental or injurious to the public health or safety, or to the character of the surrounding neighborhood.

The proposed project is both essential and desirable to the public convenience. Renewable resources, such as the project, are essential to efforts to reduce greenhouse gases and to fulfill the legislative mandate of State of Washington's Renewable Electricity Standard, RCW Title 19. The project will provide a clean energy source and assist utilities in serving retail electric load with renewable electricity. TSR proposes to develop the project site so that solar energy potential is maximized, in accordance with the commitment to establishing a leading sustainable energy production location in North America. TSR is committed to energy production and environmentally sensitive development and management of its solar production site.

The project will have the capacity to generate up to 75 MWdc of PV solar energy for distribution to utilities in need of renewable and sustainable energy sources.

Construction and operation of the project will also benefit the local and regional economies. Construction will employ 150 to 250 workers at peak levels. The project, along with the construction workers, will further stimulate the economy through local purchases of goods and materials. The total value of goods and services that will be purchased locally (within Kittitas County) during the three construction seasons is estimated to be \$97.5 million. Project construction could also attract other related businesses to the local and regional area, resulting in longer-term economic benefits. Operation of the project will employ a minimum of two to four O&M staff and potentially more for security and other functions. For a more detailed analysis of the economic benefits provided by the construction and operation of the proposed project, please see the *Economic Impact Analysis for the Teanaway Solar Reserve Kittitas County, Washington* (see Expanded SEPA Checklist Supplement, Attachment N), which has been prepared at the County's request.

The project will not be injurious to the public health, peace, or safety or to the character of the surrounding neighborhood. The proposal involves a clean energy source without emissions to air or water for the life of the project.

The solar modules do not present a health or safety hazard. Contact with the modules will not lead to electrocution or contamination. No combustible materials will be used except for fuel and oil used in construction equipment. The project will be constructed in accordance with applicable federal, state and county regulations that pertain to fire prevention and suppression. In addition, standard construction safety measures would be implemented to reduce the risk of hazards and accidents. The project is proposed in a rural area with a limited existing neighborhood character and a limited number of surrounding residences. In addition, it is being designed and sited to minimize its visibility from all surrounding areas and will not result in any noise or odors.

For the reasons stated above, the project complies with this criterion.

3. *The board of adjustment shall determine that the proposed special utility and/or associated facilities will not be unreasonably detrimental to the economic welfare of the county and /or it will not create excessive public cost for the public services by finding that:*

a. It will be adequately serviced by existing services such as highways, roads, police and fire protection, emergency response, and drainage structures, refuse disposal, water and sewers, and schools; or

b. The applicant shall provide such services or facilities.

Finding: The proposed project will not be unreasonably detrimental to the economic welfare of the county and will not create excessive public cost for facilities and services for the following reasons:

- Construction and operation of the project is desirable as it will benefit the local and regional economies. Construction will employ 150 to 250 workers at peak levels. The project, along with the construction workers, will further stimulate the economy through local purchases of goods and materials. The total value of goods and services that will be purchased locally (within Kittitas County) during the three construction seasons is estimated to be \$97.5 million.
- Project construction could also attract other related businesses to the local and regional area, resulting in longer-term economic benefits.
- Operation of the project will employ a minimum of two to four O&M staff and potentially more for security and other functions. Fifty (50) percent of the onsite peak construction workforce of 450 is assumed to be from the local labor market (within Kittitas County) while the remaining 50 percent, or 225 peak period workers could come from outside the County and are assumed to relocate to Kittitas County for the duration of the construction period or phase.
- The project will be adequately served by existing facilities, as discussed below, and the economic benefits summarized above and in the *Economic Impact Analysis for the Teanaway Solar Reserve Kittitas County, Washington* (see Expanded SEPA Checklist Supplement, Attachment N) well exceed any minor public costs.

The project's use of existing facilities is summarized as follows:

Highways and Roads. The site will be accessible via Kittitas County and private roads that interconnect with Highway 970 (see Figure 3). The major County access road is Red Bridge Road. Loping Lane is a private road and Wiehl Road is a public road over which TSR has easement rights. Loping Lane is subject to several road use and cost sharing agreements, and TSR will be subject to those agreements. TSR will additionally work with neighbors who use Loping Lane to identify improvements that will minimize disruption to their use during construction and to the roadway itself. The project will be internally served by a network of existing and/or new maintenance roads. These maintenance roads, along with Wiehl Road and Loping Lane, consist of gravel and dirt and may need improvements pursuant to County requirements. As set forth in attached Draft DA, TSR will coordinate any improvements to these roads with the Kittitas County Public Works Department.

Figure 3 shows the location of the maintenance and access roads in relation to the project site.

Police Protection. The project will include periodic visits by security staff. As a result of proposed project security measures and personnel, it is not anticipated that the project will generate any new demand for police services.

Fire Protection. The fire protection needs of the site are currently served by WDNR. After the project is constructed, it will be served by the Kittitas County Fire Protection District #7 (see Expanded SEPA Checklist Supplement, Attachment M). Further, the project will be bordered by a firebreak no less than 100 feet wide.

The project will be constructed in accordance with applicable federal, state, and county regulations that pertain to fire prevention and suppression. In addition, standard construction safety measures will be implemented to reduce the risk of hazards and accidents. Separate safety or fire protection systems will not be required at the site. Basic safety and fire protection equipment such as fire extinguishers, personal protective equipment, and other equipment as determined by the site's safety and emergency response plan can be stored in the O&M equipment storage building.

Irrigation and Drainage. The project will be adequately served by existing drainage. The project will maximize existing pervious surface on the site by maintaining natural ground cover wherever possible including areas under solar modules. In addition, TSR will maintain existing contours whenever possible during grading and site preparation. Therefore, site runoff and drainage will remain largely unchanged. During construction, TSR will implement Best Management Practices (BMPs) to minimize erosion and sediment release.

Refuse. Construction workers will be directed to dispose of all refuse in defined containers. Following construction, the only refuse generated by the project will be from the two to four O&M staff. This limited refuse will be disposed of as required by the County.

Water and Sewers. The project does not need any water rights. TSR proposes to truck in water from the Cle Elum area or elsewhere as needed for activities such as fugitive dust control during construction and module cleaning for operation.

The need for sewer services is not anticipated. Portable toilets will be placed onsite during construction and as necessary during operation. Service visits to the onsite toilets will occur on a regular basis.

Schools. The project will not be detrimental or cause an increased burden on local school resources.

4. Special utilities and/or associated facilities as defined by this chapter shall use public rights-of-way or established utility corridors when reasonable. Although Kittitas County may map utility corridors, it is recognized and reaffirmed that the use of such corridors is subject to conditional use and approval and just compensation to the landowner for the use of such corridor. While a utility corridor may be used for more than one utility or purpose, each utility or use should be negotiated with the landowner as a separate easement, right-of-way, or other agreement, or other arrangement between the landowner and all owners of interests in the property. Any county map which shows utility corridors shall designate such corridors as "private land closed to trespass and public use" where

such corridors are on private land. Nothing in this paragraph is intended to conflict with the right of eminent domain.

Finding: The project is sited near an existing utility corridor (BPA 345-kV line) and no new transmission lines are needed to provide transmission services to the project. A 3,000-foot tap line (or primary transmission line dedicated to the project) will be constructed to connect the project to the grid. Support structures for this line will be steel mono-poles, and each structure will be approximately 120 feet tall. A maximum of three structures would be needed for the 3,000-foot-long line, and a 120-foot termination structure will be constructed as part of the substation. The line will be constructed at the lowest elevation on the site to minimize its visibility, and the line route, right-of-way width, structure locations, conductor type, and span lengths were selected for compatibility with other land uses. The real property required for the line has been acquired from the underlying property owner. However, because this line can and will serve no electrical purpose other than connecting the project to the grid, there is no intention to develop the right-of-way as a utility corridor that could be used for more than one utility or purpose. This limited purpose, and the structure types, span lengths, and other physical characteristics of the line also keep it in character with surrounding existing and future land uses.

5. The board of adjustment shall consider industry standards, available technology, and proposed design technology for special utilities and associated facilities in promulgating conditions of approval.

Finding: The line and substation will be built and operated in accordance with current industry standards. As noted above, the design of the line employs locational criteria and physical characteristics that minimize its visibility and ensure compatibility with other land uses. The line and the substation are envisioned to utilize the most recent readily available technology for these type of structures.

6. The construction and installation of utilities and special utilities may necessitate the importation of fill material which may result in the displacement of native material. The incidental generation of earthen spoils resulting from the construction and/or installment of a utility or special utility, and the removal said material from the development site shall not require a separate zoning conditional use permit.

Finding: TSR understands the criteria listed under KCC 17.61.030(6) and intends to comply with this provision. Native fill will be used for the structure foundations and the substation. To the extent that any additional fill material is required for these facilities, TSR expects to obtain this material from local sources.

7. The operation of some utilities and special utilities identified within this chapter may necessitate unusual parcel configurations and/or parcel sizes.

Finding: TSR is not proposing to reconfigure or resize any parcels.

3.2 Title 17A—Critical Areas

3.2.1 Chapter 17A.02—Critical Areas Ordinance Definitions

17A.02.060 Critical areas.

“Critical areas” are (1) wetlands; (2) areas with a critical recharging effect on aquifers used for potable water; (3) fish and wildlife habitat conservation areas; (4) frequently flooded area; and (5) geologically hazardous areas.

Finding: All five critical areas are discussed in the Land Use section of the Expanded SEPA Checklist. In addition, the following technical reports have been prepared and are attached to the Expanded SEPA Checklist Supplement:

Attachment A: *Sensitive Species Report*

Attachment B: *Wetland Delineation Report*

Attachment D: *Geology and Soils Hazards Evaluation*

Attachment H: *Wildlife Mitigation Plan*

Chapter 17.A.03 – Critical Areas Administration

17A.03.015 Land use activities to which this chapter applies.

1. *The following land use activities shall be subject to and coordinated with the requirements of this chapter:*
 - a. *Any activity which is not exempt from a threshold determination under the State Environmental Policy Act, as subject to the threshold exemptions established by the county SEPA ordinance;*
 - b. *Any activity which requires approval through a public hearing process under the county ordinance;*
 - k. *Conversion of forest land to nonforest land uses.*

Finding: The Critical Areas Ordinance applies as part of the proposed project review and approval.

17A.03035 Critical area checklist and required information.

An applicant is required to submit a checklist of critical area information before commencement of all land use activities which are subject to this chapter. This information shall be used in processing all other site related development permits and approvals. Development may be required to be modified or may be conditioned to meet the requirements of this chapter. The checklist shall contain the following information:

1. *Legal description of the land, and assessor’s parcel number.*

Finding: The legal description of the land is located in Attachment D to this CUP application. The assessor’s parcel numbers are as follows: 20-16-22000-0001, 20-16-23000-0002, 20-16-22000-0002, 20-16-27000-00025, and 20-16-27000-0009.

2. *As defined herein, the location of the following, if applicable:*
 - a. *Wetlands;*
 - b. *Erosion hazard areas;*
 - c. *Floodplains and floodways;*
 - d. *Riparian habitat;*
 - e. *Geologically hazardous areas;*
 - f. *Landslide hazard areas;*
 - g. *Mine hazard areas;*
 - h. *Seismic hazard areas;*
 - i. *Streams and rivers*

Finding: The proposed project site does not include any of the critical areas defined in KCC Section 17A.02.060 except for wetlands. Impacts to wetlands will be avoided through project design. Minimal impacts to wetlands will occur. See the Land Use section of the Expanded SEPA Checklist Supplement for additional discussion.

3. *Any voluntary methods or activities anticipated by the applicant pertaining to critical areas, including incentives being offered by local or state government.*

Finding: TSR has coordinated with all applicable local and state agencies. TSR will comply with all associated regulations and apply for all applicable licenses and permits.

4. *Duplicate plans drawn to scale showing the nature, location, dimensions and elevations of the area in question, including existing or proposed structures, estimated amounts of fill material, drainage facilities, significant natural features, and the location of the above items, if applicable. Survey quality documents will not normally be required.*

Finding: Plans showing the nature, location, dimensions, and elevations of the area in question are contained in Attachment A to this CUP application. Additional figures are included in the Expanded SEPA Checklist Supplement, Attachment J, *Figures*.

5. *The requirement for delineating the location of possible critical areas will be waived if field investigation by county staff indicates the following:*
 - a. *Sufficient information exists for staff to estimate the boundaries of any critical areas without a delineation by the applicant; or*
 - b. *No structures and uses, except for exempt activities, are proposed to be located within the possible critical areas.*
6. *Subject to field investigation by county staff, or other reliable and relevant information, the information submitted by the applicant shall be presumed valid for all purposes under this chapter.*

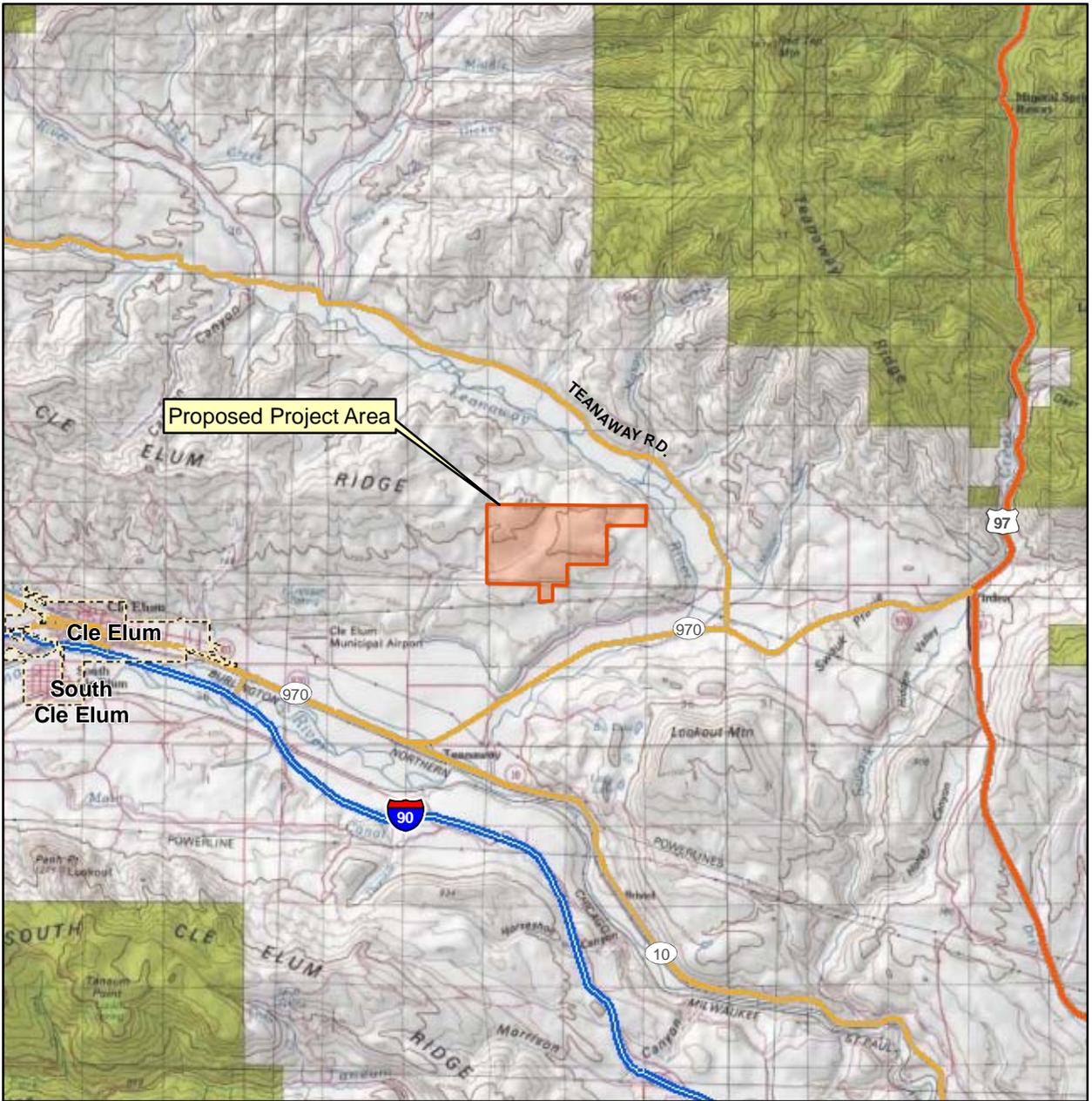
Finding: TSR conducted significant research and field surveys for critical areas located within or directly adjacent to the project site (Attachment A, Figure 5). The Land Use section of the Expanded SEPA Checklist provides additional discussion of critical areas and the various technical reports attached to the Expanded SEPA Checklist Supplement demonstrate the research and field surveys. The wetlands located within the proposed project area have been delineated by professional wetland scientists. A full description of the wetland boundaries is included in Expanded SEPA Checklist Supplement Attachment B, *Wetland Delineation Report*.

17A.03.045 Coordination with the State Environmental Policy Act and other concurrent permitting.

The director shall coordinate application of the critical areas ordinance with any required SEPA review and the processing of any other associated permits. Any required critical areas mitigation shall be separate from SEPA conditions imposed as part of a threshold determination. The objective is to provide a concurrent, coordinated, and consistent review of development activities within critical areas, without creating another regulatory review or appeal process.

Finding: TSR understands this criterion. A detailed discussion of critical areas is provided in the Land Use section of the Expanded SEPA Checklist Supplement.

ATTACHMENT A
Figures



VICINITY MAP

LEGEND

-  Proposed Project Area
-  City Boundary
-  Interstate
-  Highway
-  Major Road

Note:

1. USGS 100K Quadrangle: Wenatchee.

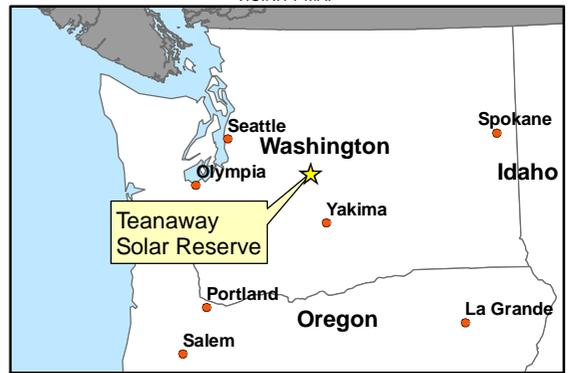
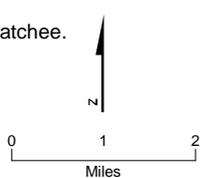
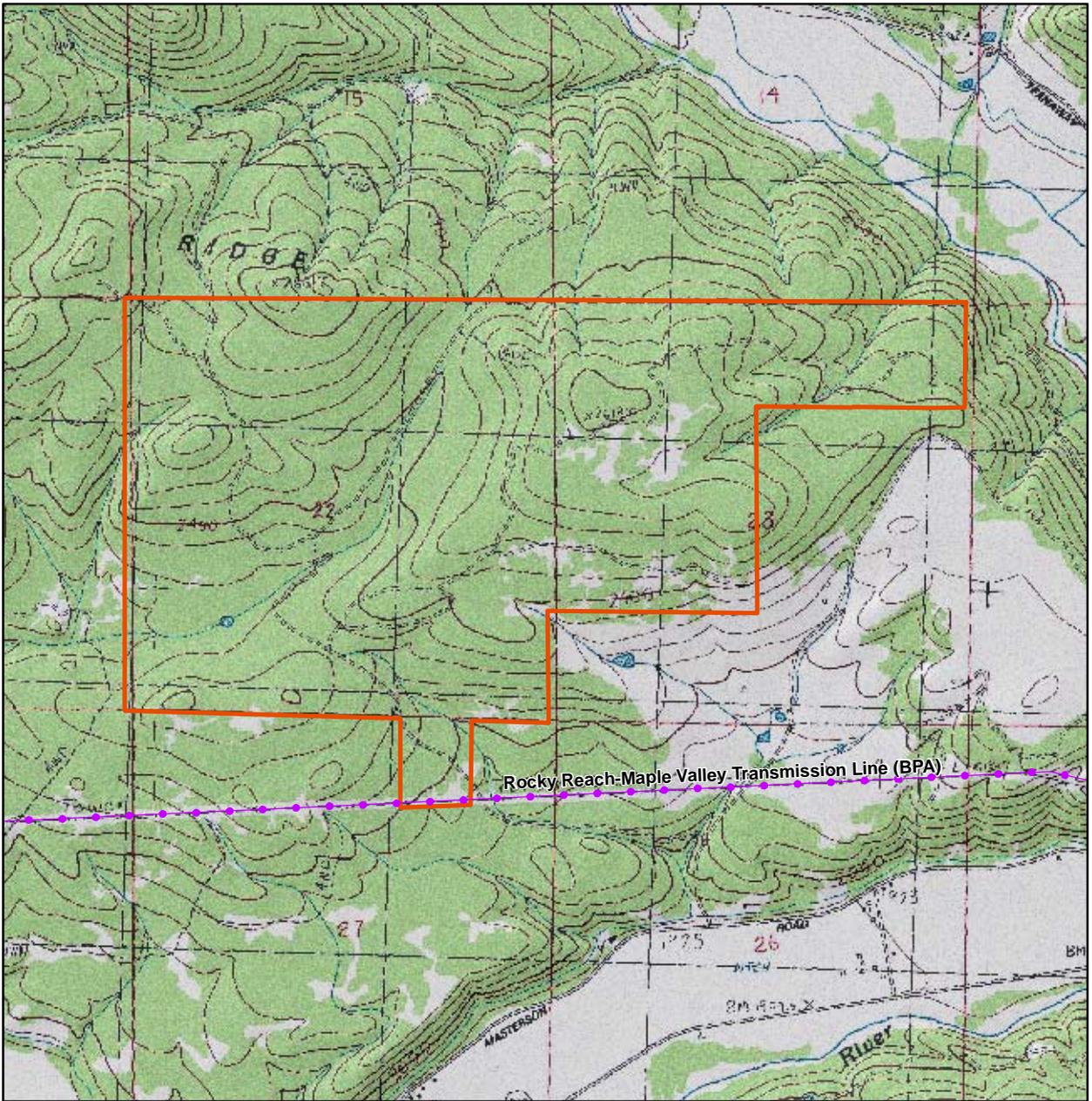


FIGURE 1
Vicinity Map

Teanaway Solar Reserve
Kittitas County, Washington



LEGEND

-  Existing BPA Transmission Line
-  Proposed Project Area

Note:

1. USGS 24K Quadrangle: Teanaway.

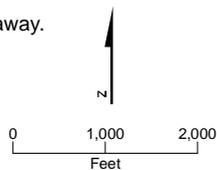
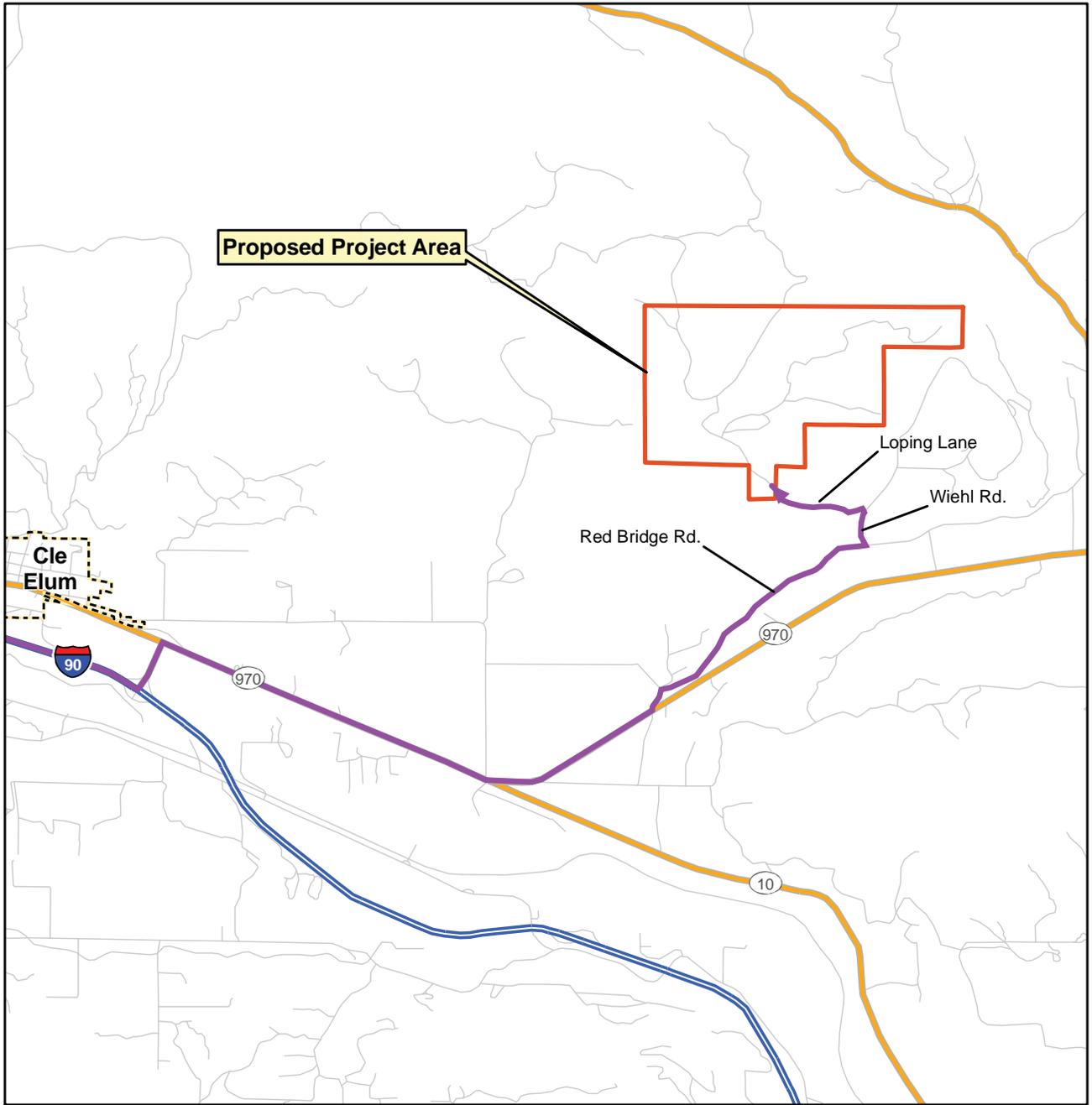


FIGURE 2
U.S. Geological Survey Topographic Map
 Teanaway Solar Reserve
 Kittitas County, Washington



VICINITY MAP

LEGEND

-  Proposed Project Area
-  Site Access Route
-  City Boundary
-  Interstate
-  Highway
-  Major Road
-  Minor Road

Note:

1. Street Data: 2002 ESRI StreetMap USA.

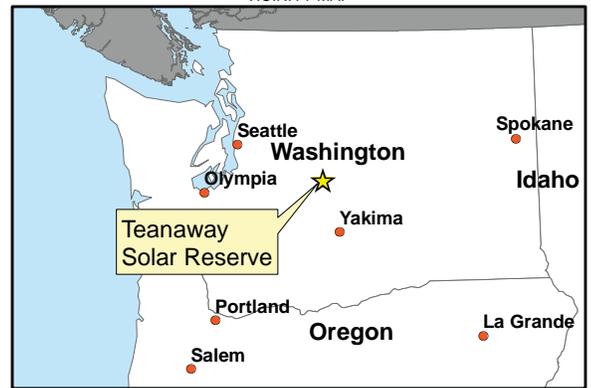
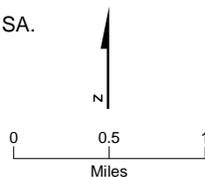
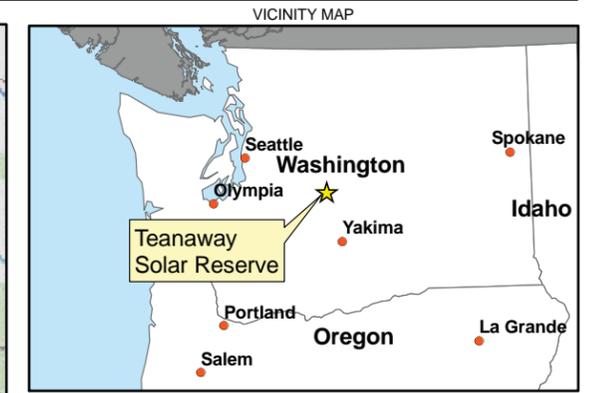
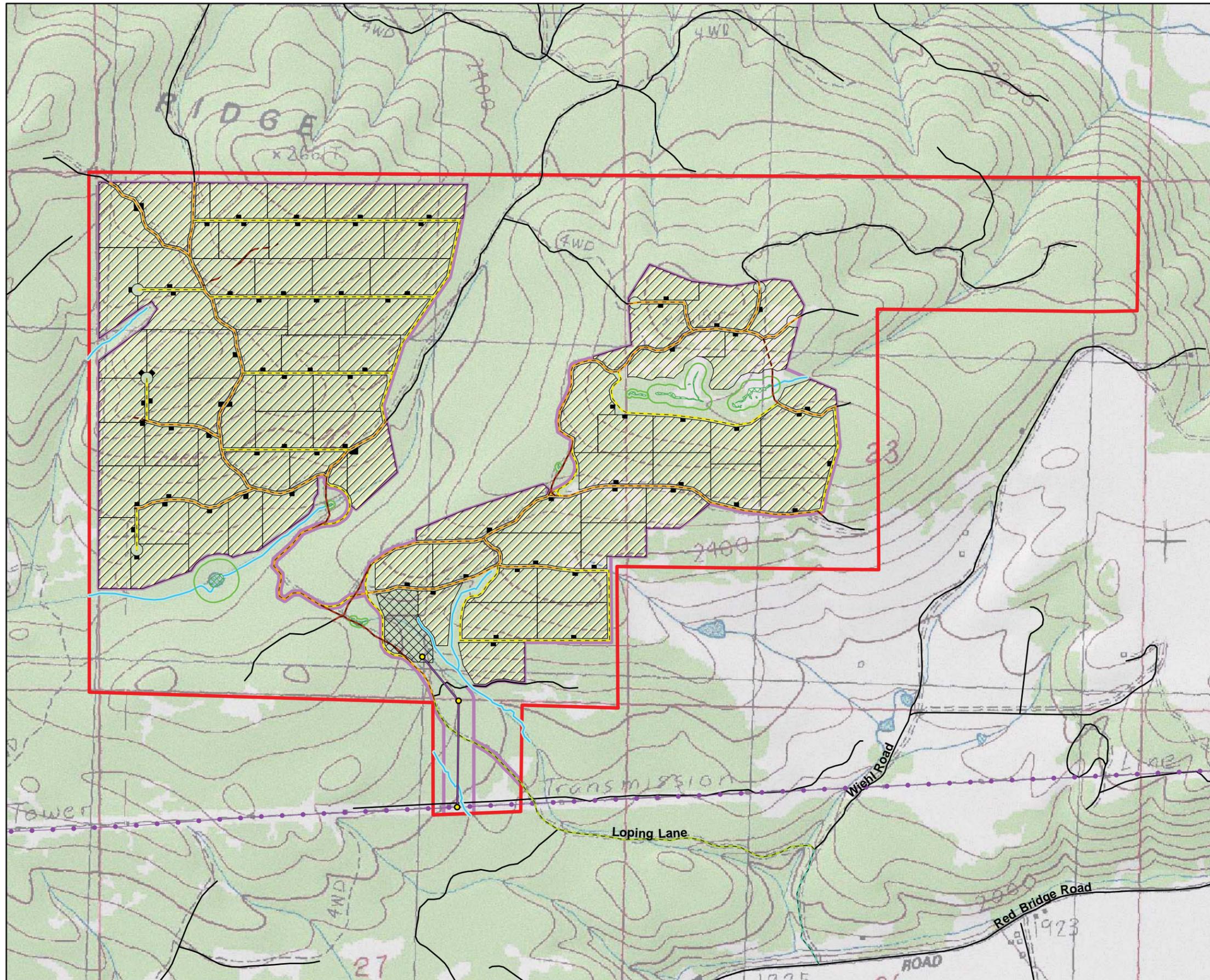


FIGURE 3
Site Access Map
 Teanaway Solar Reserve
 Kittitas County, Washington



- LEGEND**
- Proposed Project Features**
- Proposed Project Area (982 Acres)
 - Proposed Project Site (477 acres)
 - Proposed PV Array Block
 - Proposed Field Inverter and Field Transformer
 - Proposed Substation/O&M Facility
 - Proposed Transmission Line¹
 - Proposed Transmission Structure
 - Proposed Maintenance Road
 - Proposed Improved Maintenance Road
 - Existing Maintenance Road (Planned Decommissioning)
 - Proposed Improved County Access Road
 - Proposed Improved Private Access Road
- Existing Features**
- Existing BPA Transmission Line and ROW
 - Existing Road
 - Stream
 - Stream Buffer
 - Wetland
 - Wetland Buffer

Note:
 1. TSR has delineated a 300' area within which the BPA transmission line could be sited. Of this 300' area, a maximum of 200' will be cleared for the placement of the BPA transmission line. Final design and placement to be determined by BPA.

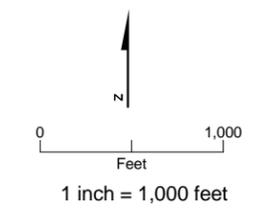
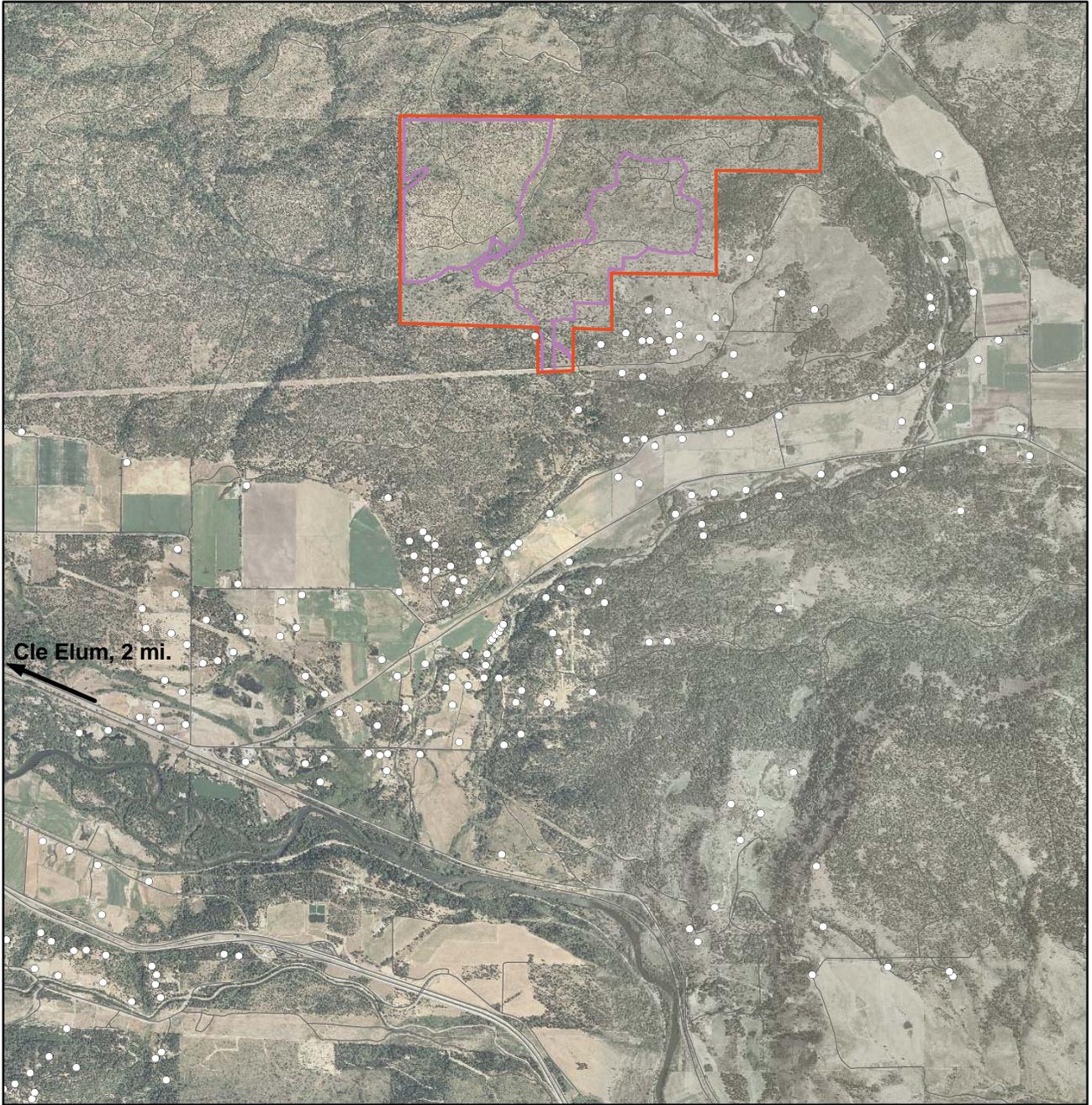


FIGURE 4
Proposed Site Layout
 Teanaway Solar Reserve
 Kittitas County, Washington



VICINITY MAP

LEGEND

- Identified Structure
- Existing Road
- Proposed Project Area (982 Acres)
- Proposed Project Site (477 acres)

Notes:

1. Aerial Imagery: 2006 1m NAIP.
2. Structures identified from aerial, not ground verified.

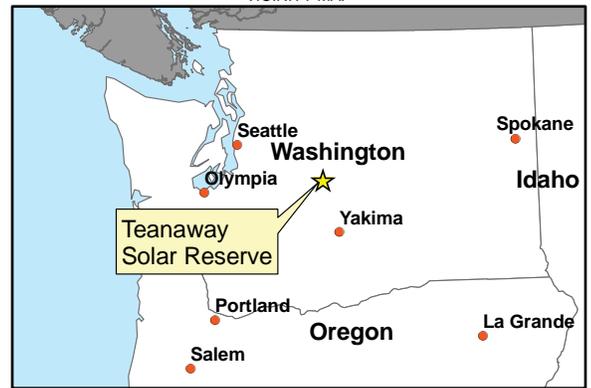
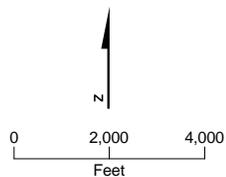
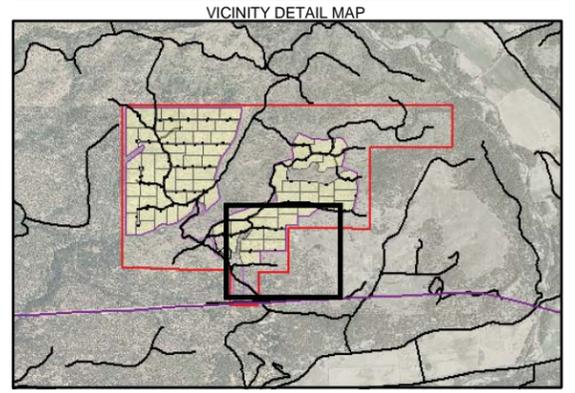
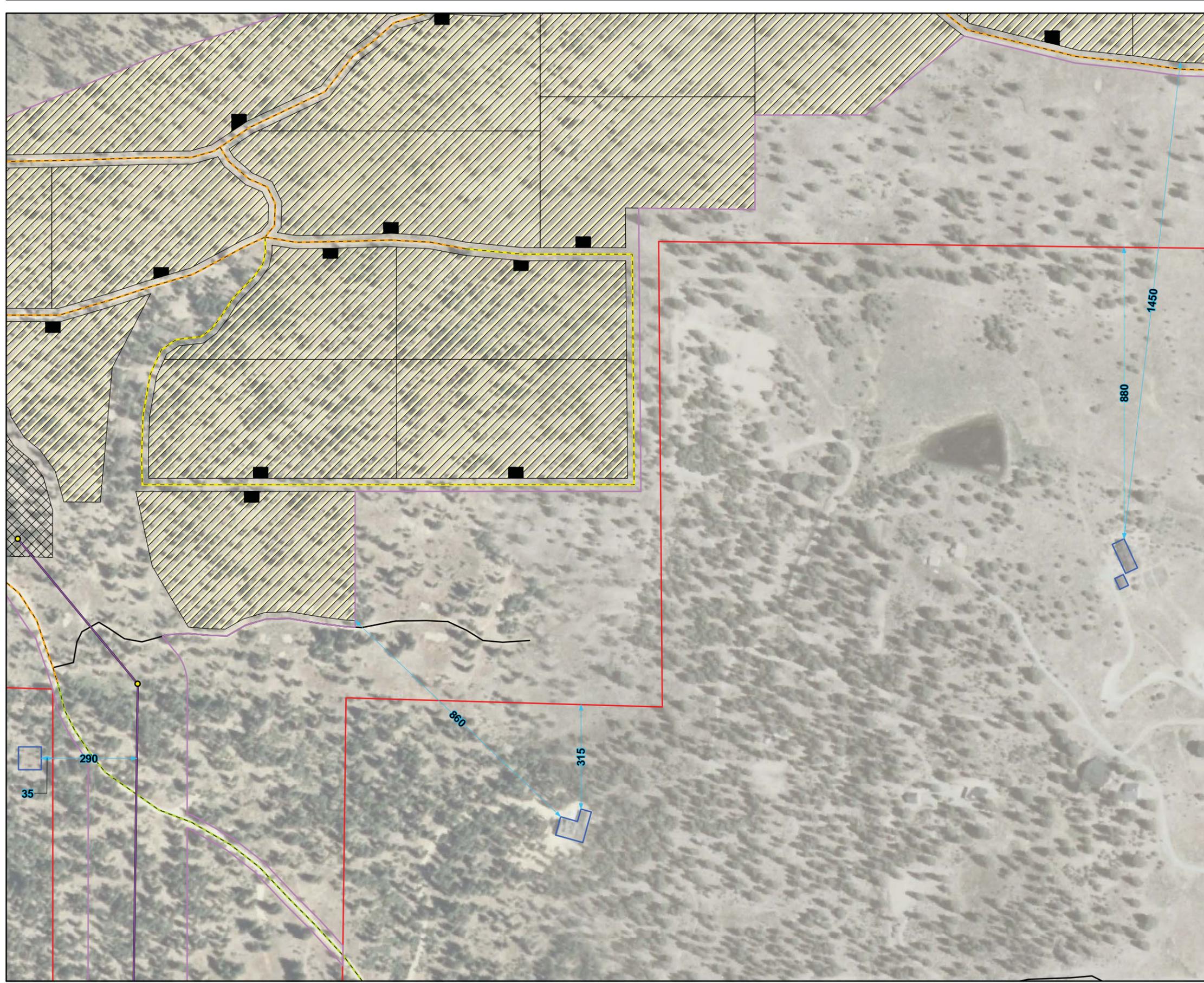


FIGURE 5
Identified Structure Map
 Teanaway Solar Reserve
 Kittitas County, Washington



- LEGEND**
- Distance in Feet Between Structure and Lease/Facility
 - Selected Residential Structure
 - Proposed Project Area (982 Acres)
 - Proposed Project Site (477 acres)
 - Proposed PV Array Block
 - Proposed Field Inverter and Field Transformer
 - Proposed Substation/O&M Facility
 - Proposed Transmission Line¹
 - Proposed Transmission Structure
 - Proposed Maintenance Road
 - Proposed Improved Maintenance Road
 - Proposed Improved Private Access Road
 - Existing Road

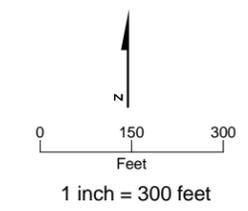
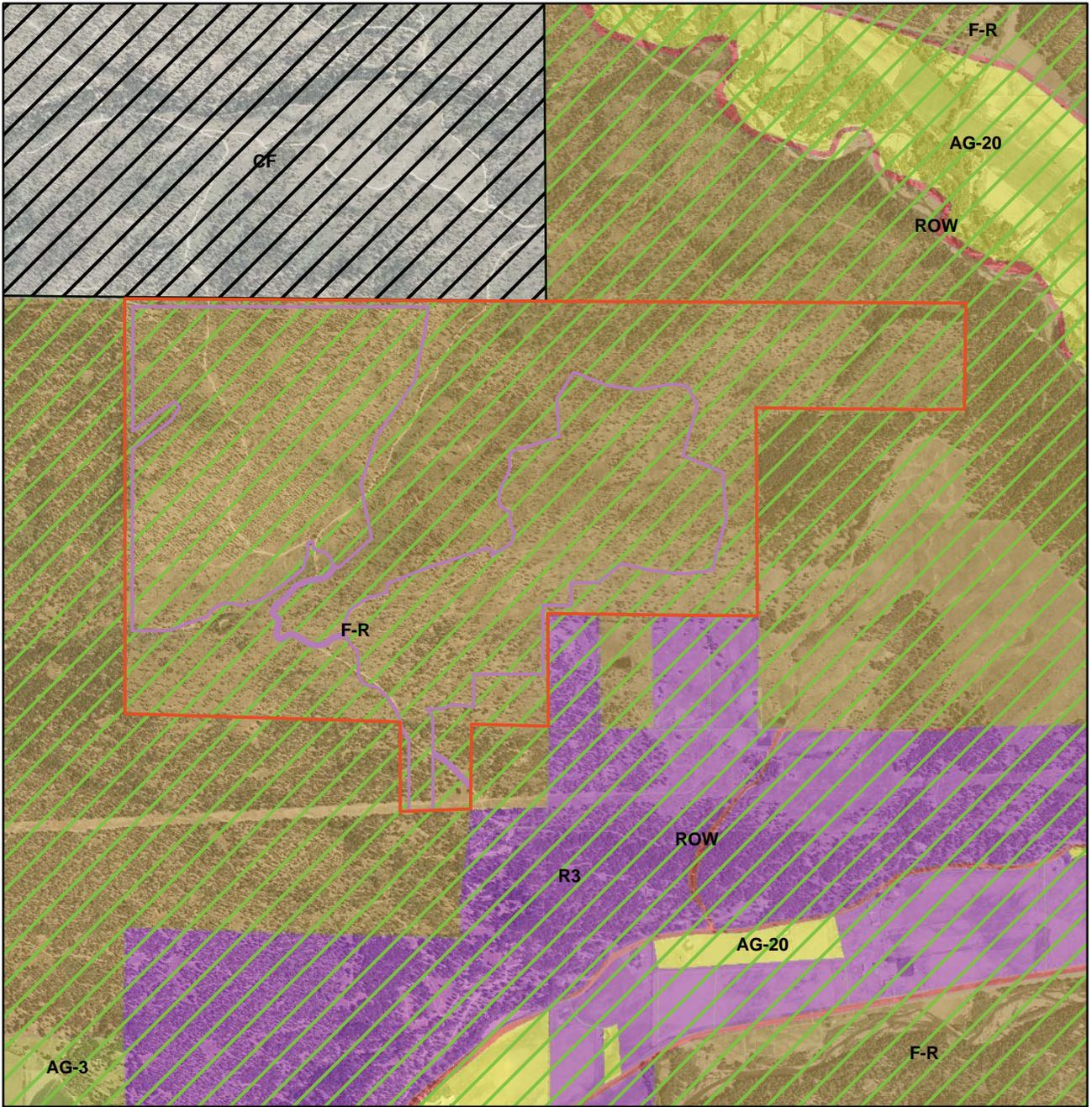


FIGURE 5a
Proximity to Closest Residences
 Teanaway Solar Reserve
 Kittitas County, Washington



VICINITY MAP

LEGEND

-  Proposed Project Area (982 Acres)
-  Proposed Project Site (477 acres)

Zoning

-  AG-20, Agricultural 20
-  AG-3, Agricultural 3
-  CF, Commercial Forest
-  F-R, Forest & Range
-  R3, Rural 3
-  ROW, Right-of-Way

Land Use

-  COMMERCIAL FOREST
-  RURAL

Note:

1. Aerial Imagery: 2006 1m NAIP.

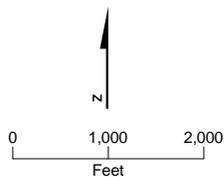


FIGURE 6
Land Use/Zoning Map

Teanaway Solar Reserve
Kittitas County, Washington

ATTACHMENT B
Photos

ATTACHMENT B

Photo Plates

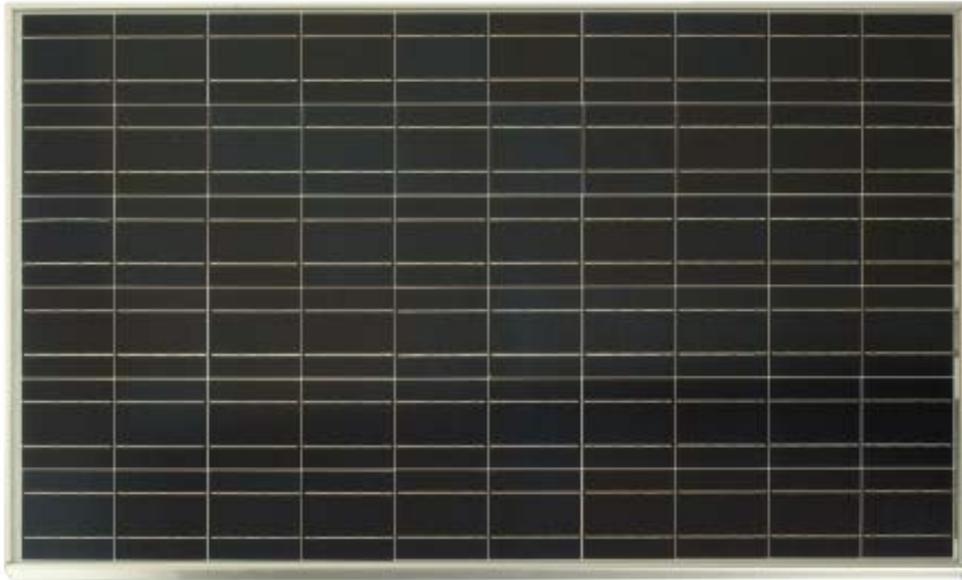


Photo Plate 1: Representative Solar Module (Source: Sharp Electronics Corporation)



Photo Plate 2: Single-Axis Tracking System by RayTracker (Source: Array Technologies)



Photo Plate 3: Proposed Fixed Tilt Mounting Structure (Source: Dreamstime.com, used with permission)



PowerGate® Plus 1 MW

PVS – 1000 (MVT)

Unparalleled Performance

With their advanced system intelligence, next-generation Edge™ MPPT technology, and industrial-grade engineering, PowerGate Plus inverters maximize system uptime and power production, even in cloudy conditions.

Power Efficiency (Inverter Only)

Power Level	Output Power	Efficiency
10%	100 kW	96.2%
20%	200 kW	97.4%
30%	300 kW	97.6%
50%	500 kW	97.8%
75%	750 kW	97.7%
100%	1000 kW	97.5%

Measured at 420V

Edge MPPT

Provides rapid and accurate control that boosts PV plant kilowatt yield

Provides a wide range of operation across all photovoltaic cell technologies

Printed Circuit Board Durability

Wide thermal operating range: -40° C (-40° F) to 85° C (185° F)

Conformal coated to withstand extreme humidity and air-pollution levels

Proven Reliability

Rugged and reliable, PowerGate Plus PV inverters are engineered from the ground up to meet the demands of large-scale installations.

Low Maintenance

Modular components make service efficient

Dual cooling fans

Safety

UBC Seismic Zone 4 compliant

Built-in DC and AC disconnect switches

Integrated DC two-pole disconnect switch isolates the inverter (with the exception of the GFDI circuit) from the photovoltaic power system to allow inspection and maintenance

Protective covers over exposed power connections

PV Inverters | PowerGate® Plus 1 MW



PowerGate Plus 1 MW Specifications		UL/CSA	CE
Input Parameters			
Maximum Array Input Voltage	900 VDC	•	•
	Floating	•	•
Input Voltage Range (MPPT; Full Power)	420–815 VDC	•	•
Maximum Input Current	2,442 ADC	•	•
Output Parameters			
Nominal Output Voltage to Transformer	265 VAC	•	•
Output Frequency Range	59.3–60.5 Hz	•	
	49.3–50.5 Hz		•
AC Voltage Range (Standard)	-12%/+10%	•	•
Nominal Output Frequency	60 Hz	•	
	50 Hz		•
Number of Phases	3	•	•
Maximum Output Current per Phase	2,178 A	•	•
CEC Weighted Efficiency (Inverter/System)	97.5%/96% ¹	•	•
Maximum Continuous Output Power	1000 kW (1000 kVA)	•	•
Power Factor at Full Load	>0.99	•	•
Harmonic Distortion	<3% THD	•	•

- Standard
- Optional

¹ System efficiency is calculated as combination of measured inverter efficiency and typical transformer efficiency.

Photo Plate 4: Specifications for a Typical Inverter (Source: Satcon Technology Corporation, 2010)

COMPONENTS

For the ultimate in value and reliability, the Central Moloney Components Operation produces the majority of the components used on Central Moloney's three-phase padmounted transformers. For over 30 years, Central Moloney Components has been a leader in the design and manufacture of transformer components. You can be assured that the primary and secondary bushings, primary switch, dual voltage switch, tap changer, current limiting fuse holders, drip shields, etc. will have the Central Moloney logo of quality on them.



PRODUCT FEATURES

Three-Phase Padmounted Transformers

Central Moloney, Inc. produces three-phase padmounted distribution transformers, oil filled, 45 kVA and above, up to 34.5 kV voltage class. Our three-phase padmounted distribution transformers are designed and manufactured in compliance with all applicable ANSI and RUS industry standards for installation on three-phase underground systems.



Recessed handle closed.



Recessed handle open.



3-point latching mechanism.



Handhole with tamper-proof cover.

TESTING

Our three-phase transformers undergo rigorous testing outlined by IEEE/ANSI Standards.

These tests include:

- Impulse
- Hipot
- No-Load Loss (Core Loss)
- Load Loss (Copper Loss) & Impedance
- Phase Relation
- Induce
- Ratio
- Other tests as required by customer or specification.

QUALITY ASSURANCE

Central Moloney's quality management system has earned ISO-9001 certification. ISO certification at Central Moloney provides the basis for control and continuous improvement. We believe that making quality products requires the full understanding and commitment of each employee. Employees are made aware of the company objectives and quality policy by training, quality assurance procedures and quality audits.

STANDARD FEATURES & ACCESSORIES

- Cabinet secured to tank with 300 series stainless studs
- Removable doors and sill
- Three point door-latching mechanism with penta head bolt
- Steel barrier separating high and low voltage compartments
- Access to high voltage compartment via penta head bolt(s)
- Tank equipped with four (4) lifting lugs
- Jacking provisions
- Tank and cabinet painted Munsell 7GY3.29/1.5 Green
- Zinc epoxy primer
- High voltage bushings are externally clamped universal wells
- Low voltage bushings are externally clamped with ANSI spades
- Removable neutral ground strap on low voltage neutral bushing
- One-inch oil fill plug
- Drain valve with sampling device
- 25°C liquid level plug
- Automatic pressure relief valve
- Externally operated HO Disconnect (WYE-WYE)
- Accessory parking stands (Dead-Front Only)
- Door stop rods
- Tank grounding provisions (1 in HV, 1 in LV)

OPTIONAL ACCESSORIES

- Draw-out expulsion fuses with isolation links or internal expulsion fuses
- Non-metallic drip shield
- Draw-out full range current limiting fuse
- Internal partial range current limiting fuse with internal or draw-out expulsion fuses
- Draw-out, non-loadbreak current limiting fuses, with interlocking loadbreak switch
- Loadbreak or non-loadbreak high voltage bushing inserts
- Integral high voltage bushings
- Low voltage bushing connectors or non-standard ANSI spades
- Dual voltage switch
- Delta-WYE switch
- Tap changer switch
- Loadbreak sectionalizing switch
- Pressure/vacuum gauge
- Temperature gauge
- Liquid level gauge
- Handhole(s) with tamper-resistant cover
- Additional support for low voltage spades

Check with a factory sales representative for availability of other optional accessories not listed.

Photo Plate 5:A Typical Transformer Cabinet (Source: Central Maloney, Inc.)



Photo Plate 6: Example of Cabling Being Installed in Trenches for Interconnection to Grid



Photo Plate 7: Example of Cabling Being Installed in Trenches for Interconnection to Grid

ATTACHMENT C

**Landowners Adjacent to Proposed Site
Boundary**

Attachment C**Landowners with Property within 500 feet of the Proposed Site Boundary**

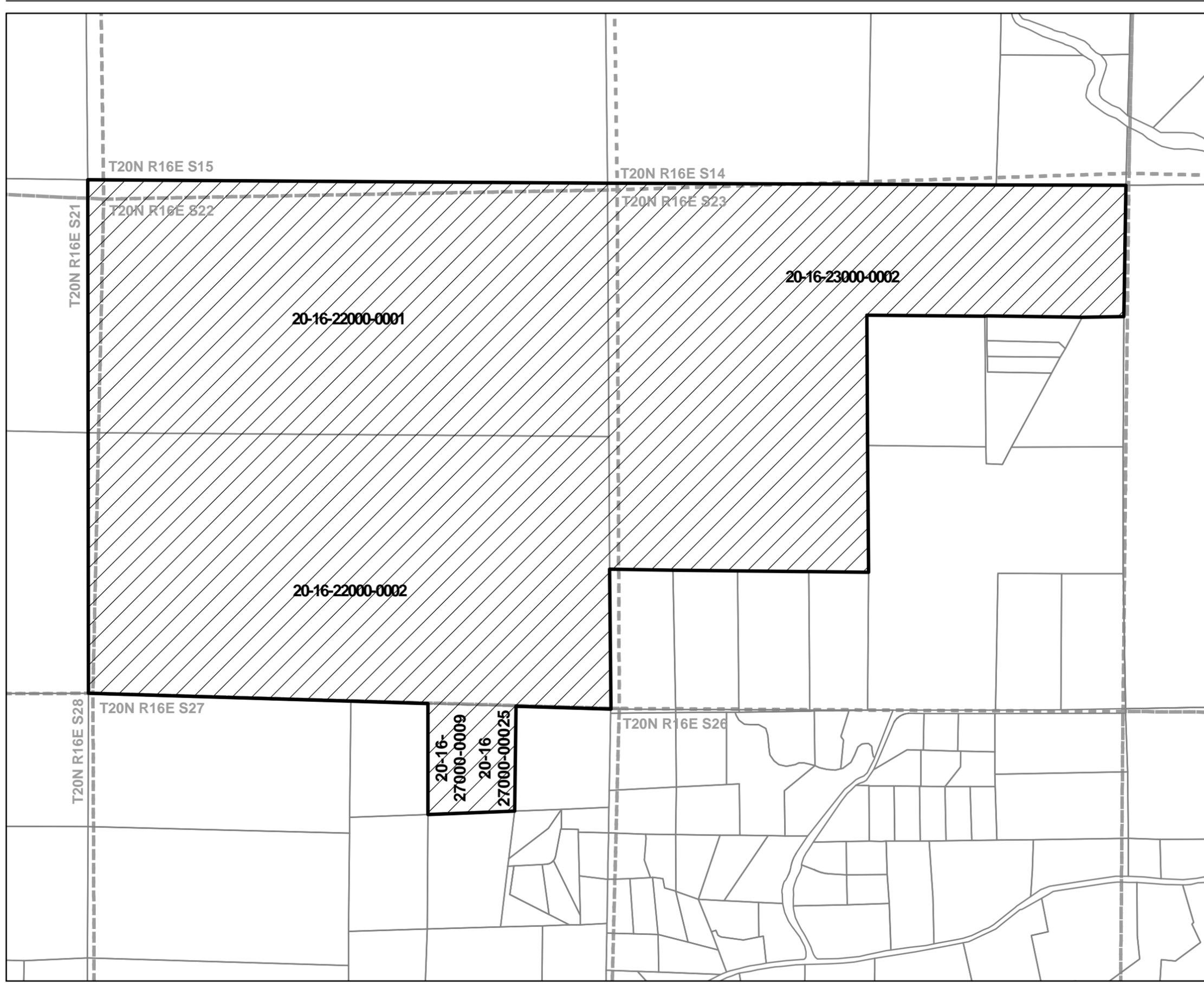
Parcel ID	Tax Lot Number	Current Owner
344935	20-16-14000-0010	AMERICAN FOREST HOLDINGS LLC
364935	20-16-14000-0012	AMERICAN FOREST HOLDINGS LLC
424935	20-16-15000-0001	AMERICAN FOREST HOLDINGS LLC
104835	20-16-13000-0018	AMERICAN FOREST HOLDINGS LLC
715836	20-16-14000-0019	AMERICAN FOREST HOLDINGS LLC
18433	20-16-27000-0017	BLACKBURN, PENNY L
18434	20-16-27000-0018	BLACKBURN, PENNY L
18431	20-16-27000-0015	BROSE, JAMES B ETUX
694935	20-16-23000-0013	BROWN, RODNEY L JR ETUX
114935	20-16-27000-0001	DUNN, REAGAN B ETUX
14727	20-16-26000-0072	GOODWIN, BRADLEY & RANDY ETUX
14723	20-16-23000-0014	GOODWIN, BRADLEY & RANDY ETUX
14735	20-16-26000-0065	GOODWIN, BRADLEY J & WILLIAM M JR
14725	20-16-23000-0016	HANSEN, MICHAEL R ETUX
14726	20-16-23000-0017	KUOLT, MILT
949882	20-16-27050-0001	L T VENTURES LLC
949883	20-16-27050-0002	L T VENTURES LLC
949884	20-16-27050-0003	L T VENTURES LLC
949885	20-16-27050-0004	L T VENTURES LLC
494935	20-16-21000-0001	MASTERSON, HARRY J.
263236	20-16-21000-0004	MASTERSON, HARRY J.
124935	20-16-28000-0001	MASTERSON, HARRY J.
274935	20-16-27000-0002	MASTERSON, HARRY J.
554935	20-16-23000-0004	MAYBO, JOSEPH S. ETUX
674935	20-16-23000-0011	MAYBO, JOSEPH S. ETUX
544935	20-16-23000-0003	PINE HILLS RANCH PTNRSHIP
564935	20-16-23000-0006	PINE HILLS RANCH PTNRSHIP
664935	20-16-23000-0010	PINE HILLS RANCH PTNRSHIP
724935	20-16-24000-0007	PINE HILLS RANCH PTNRSHIP
744935	20-16-24000-0009	PINE HILLS RANCH PTNRSHIP
434935	20-16-16000-0001	STATE OF WASH (DNR)
524935	20-16-23000-0001	WILLIAM F COCKLE FAMILY TRUST

ATTACHMENT D
Legal Description

ATTACHMENT D

Legal Description

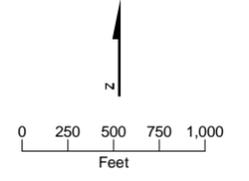
All of Section 22; the North Half of the Northeast Quarter, the Northwest Quarter and the North Half of the Southwest Quarter of Section 23; and Parcel 2 of that certain Survey as recorded May 6, 2003 in Book 28 of Surveys, pages 234, 235 and 236, under Auditor's File No. 200305060025, records of Kittitas County, Washington, being a portion of the Northeast Quarter of Section 27; All in Township 20 North, Range 16 East, W.M., in the County of Kittitas, State of Washington. A map illustrating this area is provided on the following page.



- LEGEND**
- Proposed Project Area (982 Acres)
 - Lease Boundary
 - Tax Lot Boundary
 - Public Land Survey System Boundary

Notes:

1. Tax Lot Boundary Data: Kittitas County Information Services.
2. PLSS Data: WADNR.



Legal Description
 Teanaway Solar Reserve
 Kittitas County, Washington

ATTACHMENT E

Development Agreement

PROPOSED DRAFT

DEVELOPMENT AGREEMENT

Between

KITTITAS COUNTY, WASHINGTON

and

TEANAWAY SOLAR RESERVE, LLC

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List of Attachments

- Attachment A: Project Description
Attachment B: Project Area Legal Description
Attachment C: SEPA Determination
Attachment D: Conditional Use Permit

DEVELOPMENT AGREEMENT
TEANAWAY SOLAR RESERVE PROJECT

THIS DEVELOPMENT AGREEMENT ("Agreement") is entered into and effective this ____ day of _____, 2010 by and between Kittitas County, a Washington municipal corporation ("County") and Teanaway Solar Reserve, LLC, a Wyoming limited liability company authorized to do business in the state of Washington ("Applicant") (collectively, the "Parties"). This Agreement is made pursuant to Revised Code of Washington ("RCW") 36.70B.170, Kittitas County Code ("KCC") Chapter 15A.11, and KCC Chapter 17.61, and relates to the Teanaway Solar Reserve Project.

RECITALS

A. RCW Chapter 36.70B, and KCC Chapter 15A.11 authorize the County to enter into an agreement regarding development of real property located within the County's jurisdiction with any person having an ownership interest in or control of such real property.

B. The Applicant desires and intends to develop a solar farm in Upper Kittitas County known as the Teanaway Solar Reserve Project (the "Project") located approximately four miles northeast of the town of Cle Elum. Key components and related appurtenant improvements of the Project include solar modules, inverter buildings, underground electrical conductors, substation, transmission line, maintenance and access roads, and Operations and Maintenance (O&M) building. A full description of the Project is contained in Attachment A: Project Description.

C. The Applicant's objective is to develop a commercially viable solar energy facility generating up to 75 megawatts (MWdc) of photovoltaic (PV) for distribution to utilities and communities seeking to optimize their renewable and sustainable energy sources through an interconnection point on the Pacific Northwest power grid.

D. The Project will be located on land referred to herein as the "Project Area". The Applicant entered into agreements with the owners of approximately 982 acres of real property comprising the Project Area, giving it requisite control of this land for the purpose of, and authority to, develop the Project. The Project Area is as more specifically described in Attachment B: Project Area Legal Description. A map showing the location of the Project Area is contained in Attachment A: Project Description.

E. The construction of the Project is currently scheduled for two to three consecutive seven to nine month construction seasons (generally between April 1 to October 31 as weather allows) between the years 2010 through 2012. As fully constructed, the Project is anticipated to require approximately 477 acres ("Project Site") within the overall Project Area. A site plan showing the location and layout of the Project is contained in Attachment A: Project Description.

F. A solar farm is defined by the County as a "major alternative energy facility". KCC 17.61.010(9) & (15). The transmission line and electrical substation may also be considered "special utilities." KCC 17.61.010(2). Major alternative energy facilities and special utilities may be authorized for the Project Site by the County's Board of Adjustment ("BOA") as conditional uses following a 15-day comment period and hearing, per KCC Chapter 15.61, KCC Title 15A, and KCC Chapter 17.60A.

G. In conjunction with this Agreement, the Applicant submitted a Conditional Use Permit ("CUP") Application as required by KCC 15.61.020(4)(b) & (6). One of the conditions of the CUP is that Applicant will obtain an approved development agreement with the County, and that it will be conditioned and governed by this Agreement.

H. The Applicant's submissions were deemed complete by the County on August 22, 2009. As the State Environmental Policy Act ("SEPA") Lead Agency, Kittitas County issued a Mitigated Determination of Non-significance ("MDNS") for the Project on _____, 2010. The SEPA determination is attached hereto as Attachment C. Applicant agrees to abide by the CUP, the SEPA Mitigation Measures identified in the MDNS, and the Development Standards set forth in this Agreement to mitigate impacts to the environment.

I. The CUP was the subject of a 15-day comment period and a hearing before the Board of Adjustment as required by KCC Title 15A. On - ____, 2010, the Board of Adjustment ("BOA") voted ____ to ____ to approve the CUP. The CUP is attached hereto as Attachment D.

J. As required by KCC Title 15A and accompanying Table, and RCW 36.70B.200., this Agreement was the subject of a 30-day comment period and a hearing before the Kittitas County Board of County Commissioners ("BOCC") was held on _____, 2010, and it voted ____ to ____ enter into this Agreement.

NOW, THEREFORE, in consideration of the recitals (which are incorporated into the

Agreement by this reference) and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the County and the Applicant agree as follows:

AGREEMENT

1. Effective Date, Termination and Modification.

1.1 Effective Date. The Effective Date of this Agreement is the last date upon which it was signed by the Parties hereto.

1.2 Termination. This Agreement may be terminated by mutual agreement of the Parties to this Agreement, or terminated by Applicant pursuant to Section 9 of this Agreement, or by the County upon revocation, withdrawal or termination of the underlying CUP.

1.3 Modification. This Agreement shall govern and vest the development, use, and mitigation of the Project, and shall not be modified unless as provided in Section 8 below; *Provided* that nothing herein shall be construed to limit the County's reserved authority per KCC 15A.11.020(6) to impose new or different regulations to the extent required by a serious threat to public health and safety.

2. Definitions.

For purposes of this Agreement, the following terms, phrases, words, and their derivations shall have the meaning given herein where capitalized; words not defined herein shall have their ordinary and common meaning. When not inconsistent with the context, words used in the present tense include the future, words in the plural number include the singular number, words in the singular number include the plural number, and the use of any gender shall be applicable to all genders whenever the sense requires. The words "shall" and "will" are mandatory and the word "may" is permissive. References to governmental entities (whether persons or entities) refer to those entities or their successors in authority. If specific provisions of law referred to herein are renumbered, then the reference shall be read to refer to the renumbered provision. Unless otherwise specified herein, references to laws, ordinances or regulations shall be interpreted broadly to cover government actions, however nominated, and include laws, ordinances and regulations now in force.

2.1. Agreement. "Agreement" means this Development Agreement between Kittitas County, Washington and Teanaway Solar Reserve, LLC, approved by the Board of County

Commissioners.

2.2. Applicant. "Applicant" means Teanaway Solar Reserve, LLC or any of its Transferee(s) as provided in Section 10 of this Agreement.

2.3. BOCC. "BOCC" means the Board of County Commissioners of Kittitas County, Washington.

2.4. BOA. "BOA" means Kittitas County Board of Adjustment.

2.5. CDS. "CDS" means the Kittitas County Community Development Services.

2.6. County. "County" means Kittitas County, Washington.

2.7. Construction Buildout Period. "Construction Build out Period" has the meaning set forth in Section 5.10 of this Agreement.

2.8. CUP. "CUP" means the Conditional Use Permit approved by the County's BOA for the Project, which shall be conditioned and governed by this Agreement.

2.9. Development Standards. "Development Standards" means the requirements stated in Section 5 of this Agreement.

2.10. Director. "Director" means the Director of the County Department of Community Development Services.

2.11. Effective Date. "Effective Date" has the meaning set forth in Section 1.1 of this Agreement.

2.12. Force Majeure Event. "Force Majeure Event" means any event that directly prevents or delays the performance by the Party affected of any obligation arising under this Agreement, including an event that is within one or more of the following categories: condemnation; expropriation; invasion; plague; drought; landslide; tornado; hurricane; tsunami; flood; lightning; earthquake; fire; explosion; epidemic; quarantine; war (declared or undeclared), terrorism or other armed conflict; material physical damage to the Project caused by third Parties; riot or similar civil disturbance or commotion; other acts of God; acts of the public enemy; blockade; insurrection, riot or revolution; sabotage or vandalism; embargoes; and, actions of a governmental authority other than EFSEC.

2.13. Historical Energy Production. "Historical Energy Production" means the sum of all energy generated by the Project after Substantial Completion divided by the total number of months of operation after Substantial Completion and the remaining sum multiplied by twelve.

2.14. Liability. "Liability" means all loss, damage, cost, expense (including costs of investigation and attorneys' fees and expenses at arbitration, trial or appeal and without institution of arbitration or suit), liability, claims and demands of whatever kind or nature (including those arising under the Federal Employers Liability Act), arising out of an occurrence relating to this Agreement or occurring on or relating to the Project described herein.

2.15. MDNS. "MDNS" means the Mitigated Determination of Non-significance" issued as a SEPA determination by Kittitas County for the Project on _____.

2.16. Parties. "Parties" means Kittitas County, Washington and the Applicant, Teanaway Solar Reserve, LLC, a Wyoming limited liability company.

2.17. Project. "Project" means the Teanaway Solar Reserve Project, a solar farm generating up to 75 megawatts (MWdc) of photovoltaic (PV) solar energy, together with any necessary Project components and related appurtenant improvements, including approximately 400,000 solar panels, inverter buildings, underground electrical conductors, substation, transmission line, maintenance and access roads and Operations and Maintenance (O&M) building. The Project and its components are more fully described in Attachment A: Project Description.

2.18. Project Area. "Project Area" means the overall land area in which the Project Site will be located. The Project Area covers approximately 982 acres. A map depicting the location of the Project Area is contained in Attachment A: Project Description. The land within the Project Area is as more specifically described in Attachment B: Project Area Legal Description.

2.19. Project Site. "Project Site" means the land area on which the Project will actually be sited. The Project Site covers approximately 477 acres. A map showing the approximate location of the Project Site is contained in Attachment A: Project Description.

2.20. Public Works. "Public Works" means the Kittitas County Public Works Department.

2.21.. SEPA. "SEPA" means the State Environmental Policy Act, Chapter 43.21C RCW.

2.22. Substantial Completion. "Substantial Completion" means the Project is constructed, installed, generating and delivering energy to the electric power grid.

2.23. Transferee. A party to which the Project is transferred or assigned in part or in whole under the provisions contained in Section 10.1 of this Agreement.

3. Protect Description

The Project is a proposed solar farm, along with other necessary components and related appurtenant improvements as described in Attachment A: Project Description, capable of generating up to 75 megawatts (MWdc) of photovoltaic (PV), modified as necessary in accordance with the Development Standards contained herein, the CUP, and the proposed SEPA MDNS mitigation measures.

4. Vesting

Except as otherwise noted, this Agreement vests the Project, Project Site, and Project Area to the existing County land use plans, ordinances, and regulations effective as of the Effective Date of this Agreement.

5. Development Standards

5.1. Location and Description of Project. The Project is as described in Attachment A: Project Description, and illustrated in Attachment A: Project Description, modified as necessary in accordance with this Agreement's Development Standards, CUP, and SEPA mitigation measures, see Attachments C and D. Attachment A contains a Project Vicinity Map with Landowners and Residential Locations that illustrates the location of the Project and its components in relation to existing structures in the vicinity of the Project.

5.2 Structures. As part of the Project, Applicant may require supporting structures for any related transmission line. Such structures shall not be subject to any applicable County height restriction, provided that any supporting structure taller than 150 feet will not be used without Applicant first obtaining an approved variance from the County.

5.3. Fire and Police Protection Measures. Applicant will create and maintain a

firebreak of no less than 100 feet between all outer edges of the Project Site and adjacent property lines, as illustrated in Attachment A: Project Description. The Project Area is currently subject to the fire suppression services of the Washington Department of Natural Services. Should the construction of the Project require additional or different fire protections services, the Applicant will work with Kittitas County Fire Protection District #7 to ensure that suitable fire suppression services are in place during the construction and on-going operations of the Project. Police protection of the Site Area is provided by the County's Sherriff's Office. The construction contractor will notify the fire protection and police services of staging and active construction locations so these services can respond efficiently to emergencies, should any arise. During the operational phase, the Applicant will contact fire protection and police services in the event of an emergency.

5.4. Setbacks. The Project may be located up to, but no less than, 100 feet from any bordering property as illustrated in Attachment A: Project Description.

5.5. Emergency Plans. An emergency preparedness and response plan shall be prepared and submitted to the County by the Applicant prior to construction.

5.6. Project Access and Maintenance Roads. The main Project access road entrance is from a private roadway generally known as Loping Lane extending from the Wiehl Road, also a private road, through portions of sections 26 and 27, T. 20, 16 E, W.M., Kittitas County, to the Project Area as generally depicted in Attachment A: Project Description. The Applicant's road use shall be subject to any road use agreements in effect applicable to Applicant's use of that roadway, that may include, without qualification or limitation, the Horseshoe Hills Ranch Declaration of Protective Covenants, Conditions and Easements (Kittitas County Auditor's Recoding No. 488155, dated June 5, 1985), Easement and Road Maintenance Agreement (Kittitas County Auditor's Recoding No. 200204020024 dated February 5, 2002), Declaration of Protective Covenants (Kittitas County Auditor's Recoding No. 200306060049 dated June 6, 2003), and Addendum To Protective Covenants (Kittitas County Auditor's Recoding No. 200308290105 dated August 28, 2003). The Applicant will additionally work with neighbors who use Loping Lane to identify measures that will minimize disruption to their use during construction and to the roadway itself.

The project will be served internally by a network of existing and/or new maintenance roads. The existing maintenance roads, along with Wiehl Road and Loping Lane, generally

consist of gravel and dirt and may need improvements in accordance with County requirements. The Applicant is responsible for any improvements to these roads, and will first submit a plan detailing any such improvement for review and approval by the Kittitas County Public Works Department, which shall not unreasonably be withheld.

5.7. The Relationship between this Agreement and the CUP. This Agreement incorporates by reference the terms and conditions of the CUP as approved by the BOA, which shall be further conditioned and governed by this Agreement. In the event a conflict should occur between the CUP and this Agreement, the terms and provisions of this Agreement shall control.

5.8. Concrete batch plants. Concrete batch plants will not be located on the site. ,

5.9. Project Site Access. Public access to the Project Area is already restricted by the subject landowners and will continue to be restricted in accordance with easement agreements. Access to the Project Site shall be further controlled in the form of an electric gate with an associated keypad security code for entry. The Applicant shall be responsible for the installation and maintenance of the gate, and will work with applicable landowners to determine its appropriate location. Property owners who access their property from Loping Lane and require access through the gate will be provided the necessary and applicable access. Representatives of the Washington State Department of Natural Resources currently has access to and through the Project Site and will continue to be allowed access. The Applicant will also coordinate with local landowners to identify any necessary additional security measures, including an additional access restriction on Loping Lane near its intersection with Wiehl Road. The Applicant does not have the authority to grant permission to third party recreationists, including hunters and campers, to access the Project, but may grant permission to such parties on a case-by-case basis provided such parties first secure written permission from all of the applicable landowners along Loping Lane.

5.10 Construction Buildout Period. Applicant shall be allowed to construct the Project such that Substantial Completion is achieved no later than 5 years from the date that all permits necessary to construct the Project are obtained, but in no event later than 6 years from the Effective Date of this Agreement (the "Construction Buildout Period") provided however, that such construction is not delayed by a Force Majeure Event.

6. Decommissioning and Restoration.

6.1. Initial Project Decommissioning and Site Restoration Plan. At least 30 days prior to construction of the Project, Applicant shall provide to the County for its approval an Initial Project Decommissioning and Site Restoration plan (the "Initial Plan"), prepared in sufficient detail to identify, evaluate, and resolve all major environmental, and public health and safety issues reasonably anticipated by the Applicant on the date thereof associated with decommissioning and restoring the Project Site. The Initial Plan shall describe the measures that will be taken to decommission the Project and restore the Project site, including any measures necessary to protect the public against risks or danger resulting from decommissioning the Project and restoring the Project Site.

6.2 Final Project Decommissioning and Site Restoration Plan. Ninety days prior to decommissioning the Project Site, Applicant shall submit a Final Project Decommissioning and Site Restoration Plan ("Final Plan") to the County for its approval. The Final Plan may contain measures to decommission the Project and restore the Project Site different than the Initial Plan, *provided* that Applicant explains in sufficient detail the reasons for any new or substantially different measures.

6.3. Decommissioning and Restoration: Scope and Timing.

6.3.1 Scope of Decommissioning. Decommissioning the Project shall involve removal of the Project's components, including, without limitation, the solar panels, panel trackers, anchors, supports and mounts, inverter buildings, underground electrical conductors, substation, and Operations and Maintenance (O&M) building, and any foundations or permanently fixed anchors to a depth of 3 feet below grade; the re-grading of any areas significantly impacted by the removal of any components; removal of Project maintenance roads and overhead cables (except for any roads, buildings, and/or power cables that Project Area landowners wish to retain); and final reseeding of disturbed lands with an approved seed mixture (all of which shall comprise "Decommissioning"). The Initial and Final Plans shall contain the measures necessary to fulfill Applicant's Decommissioning obligations.

6.3.2. Scope of Restoration. Restoration of the Project Site shall be to a reasonable approximation of its original condition prior to construction allowing for any

permanent improvements chosen by the underlying landowners to be left on site as provided in Section 6.3.1. The Initial and Final Plans shall contain the measures necessary to fulfill Applicant's Restoration obligations.

6.3.3. Timing; Exemptions and Extension. Applicant or any Transferee, as the case may be, shall decommission the Project and restore the Project Site within twelve (12) months following the earlier of either: (a) the date of termination of this Agreement, in accordance with Section 1.2 above; or (b) at the written request of the County, the Applicant demonstrates that the energy generated by the Project for the past 12 month period is less than 10% of the Historical Energy Production and no exemptions apply. The Applicant will be exempted from the decommissioning and restoration requirements if the twelve (12) month reduced energy output period described above is the result of (i) a repair, restoration or improvement to an integral part of the Project that affects the generation of electricity that is being diligently pursued by the Applicant, or (ii) a Force Majeure Event, including, but not limited to, an extended low solar period. The twelve (12) month period to perform the decommissioning and restoration may be extended if there is a delay caused by forces beyond the control of the Applicant including, but not limited to inclement weather conditions, planting requirements, equipment failure, wildlife considerations or the availability of equipment or personnel to support decommissioning.

6.3.4. County Access and Reporting. The County shall be granted reasonable access to the Project site during decommissioning of the Project for purposes of inspecting any decommissioning work or to perform decommissioning evaluations. County personnel on the Project site shall observe all worker safety requirements enforced and observed by the Applicant and its contractors. If requested by the County, Applicant will provide monthly status reports until this decommissioning work is completed.

6.4 Decommissioning and Restoration Funding and Surety. Except as provided in Section 6.5 below, Applicant or any Transferee, as the case may be, shall post funds sufficient for Decommissioning and Restoration in the form of a guarantee bond, or a letter of credit to ensure the availability of said funds (the "Decommissioning Funds") to Kittitas County, prior to the end of the first year after completion of the first construction season as described in Recital E herein. The Initial Plan shall provide that the Decommissioning and Restoration Funds shall

be reevaluated annually during construction of the Project and every five (5) years thereafter from the date of Substantial Completion to ensure sufficient funds for Decommissioning and Restoration and, if deemed appropriate at that time, the amount of the Decommissioning and Restoration Funds shall be adjusted accordingly. The duty to provide such security shall continue annually until this Agreement terminates as provided in Section 1.2 herein or when the Project ceases to generate electricity as defined in Section 6.2 above whichever occurs first. On or before the date on which financial security must be established, the Applicant or any Transferee, as the case may be, shall provide the County with a copy of one of the following security devices for their information:

6.4.1 Performance Bond. Applicant or any Transferee, as the case may be, shall provide financial security for the performance of its Decommissioning and Restoration obligations through a Performance Bond issued by a surety registered with the Washington State Insurance Commissioner and is, at the time of delivery of the bond, is on the authorized insurance provider list published by the Insurance Commissioner. The Performance Bond shall be in an amount equal to the Decommissioning and Restoration Funds. The Performance Bond shall be for a term of 1 year, shall be continuously renewed, extended, or replaced so that it remains in effect for the remaining term of this Agreement or until the secured decommissioning obligations are satisfied, whichever occurs sooner. In order to ensure continuous renewal of the Performance Bond with no lapse, each Performance Bond shall be required to be extended or replaced at least one month in advance of its expiration date. Failure to secure such renewal or extension shall constitute a default of the Applicant under this Agreement and under the Bond provisions.; or

6.4.2 Letter of Credit. Applicant or any Transferee, as the case may be, shall provide financial security for the performance of its Decommissioning and Restoration obligations through a letter of credit issued by a bank whose long-term debt is rated "A" or better by a Rating Service. The letter of credit shall be in an amount equal to the Decommissioning and Restoration Funds. The letter of credit shall be for a term of 1 year, shall be continuously renewed, extended, or replaced so that it remains in effect for the remaining term of this Development Agreement or until the secured decommissioning obligations are satisfied, whichever occurs sooner. Kittitas County or designees shall be authorized under the letter of credit to make one or more sight drawings thereon upon certification to the issuing bank of the Applicant's or Transferee's (as the case may be) failure to perform its Decommissioning and

Restoration obligations when due.

6.5. Financial Security and Utility Project Ownership. If, at the time the duty to provide Decommissioning and Restoration security arises under Section 6.3 above, the owner of the Project is an investor-owned electric utility regulated by the Federal Energy Regulatory Commission (FERC) and the Washington Utilities and Transportation Commission (WUTC), Applicant or any Transferee, as the case may be, shall not be required to obtain and provide proof of financial security for the performance of its Decommissioning and Restoration obligations arising hereunder, since the obligation to fully decommission the Project and restore the Project Site when due shall be a general obligation of the investor-owned electric utility owner.

7. Consistency with Local Regulations.

The County hereby acknowledges that if the Project is developed consistent with this Agreement and any Amendments thereto, the public health, safety, and welfare will be adequately protected within the bounds of the law; the Project will be considered essential and desirable to the public convenience; the Project will not be detrimental or injurious to the public health, peace, or safety, or to the character of the surrounding neighborhood; the Project will not be unreasonably detrimental to the economic welfare of the County; and the Project will not create excessive public cost for public facilities and services. Assuming the Applicant's objectives are met, the Project helps fills significant local needs in supplying electricity, creating local jobs and promoting economic development in rural areas, while also having the positive benefits of avoiding the external environmental costs associated with traditional electrical generation technologies.

The Project is located on property that is zoned as Forest & Range -20. Due to Project and equipment design and materials, the Project's O&M, the remoteness of the Project, and the surrounding vegetation, the Project poses no significant risks to residents from reflective glare, noise impacts, fire, or other disturbances from the construction, installation or use of the Project. The Project will deliver cost effective renewable energy to the electric grid and, as such, is essential and desirable to the public convenience. The Project will contribute significant tax revenues to the County which will far exceed the limited public service costs the Project will introduce.

8. Amendments and Revisions.

This Development Agreement may be amended by mutual agreement of the Parties only if the amendment is in writing and signed by Applicant and the County and is approved by the BOCC (an "Amendment"), whose approval shall not unreasonably be withheld. The following sections specify what Project actions and revisions can be undertaken without the need for amendment of the Development Agreement and what revisions require Amendment to this Agreement and the CUP.

8.1 Project Facility Repair, Maintenance and Replacement. Applicant shall be permitted, without any further land use approval from the County or amendment to this Agreement, to repair, maintain and replace the Project and its components consistent with the terms of this Agreement.

8.2 Project and Project Area Expansion. If Applicant seeks to expand the generating capacity of the Project and the geographic scope of the Project Site or Project Area, Applicant will seek an Amendment to this Agreement and amend the CUP, if and as necessary, in accordance with this Agreement and any applicable state and local regulations in effect at the time of such amendments. The Applicant acknowledges that further SEPA review may be required if the criteria for such is met as set forth in Kittitas County Code Chapter 15.04 (SEPA Regulations).

8.2.1 Authorized Amendments.

Authorized Amendments are set forth below. In regard to Authorized Amendments that concern road, stormwater, utility and other Public Works standards, the Public Works Director, or his/her designee, shall have the authority to review and render decisions on such Authorized Amendments. The CDS Director, or his/her designee, shall have the authority to review and render decisions on all other Authorized Amendments. No additional review for Authorized Amendments shall be required, provided the amendment proposed is consistent with the standards set forth below. If the amendment is not consistent with the standards set forth below, the request may be considered as an Administrative Minor Amendment or Major Amendment as provided in Section 8.2.2 and 8.2.3 below.

8.2.1.1. The proposal does not add to the site or approved structures by more than a 10 percent increase in square footage.

8.2.1.2. The proposal does not increase the overall impervious surface on the site by more than __ percent.

8.2.1.3. ***Place holder - to be completed during Development Approval review process)***

8.2.1.4. Any additions or expansions approved through a series of minor amendments that cumulatively exceed the requirements of this section shall be reviewed as an administrative minor modification or major modification.

8.2.1.5. Other *de minimus* amendments requested by the Applicant, which the County determines to be reasonably consistent with the CUP which do not result in significantly greater impacts than those contemplated in the approval.

8.2.2 Administrative Minor Amendments

Administrative Minor Amendments are set forth below. In regard to Administrative Minor Amendments that concern road, stormwater, utility and other Public Works standards, the Public Works Director, or his/her designee, shall have the authority to review and render decisions on such Administrative Minor Amendments. The CDS Director, or his/her designee, or BOA shall have the authority to review and render decisions on all other Authorized Amendments as specified below. The County or BOA, as applicable, may approve, or approve with conditions, a requested Administrative Minor Amendment upon determining that it is consistent with the standards as set forth below, otherwise it shall be denied. The decision shall be provided in writing, following a 15-day notice and comment period to property owners within 500 feet of the perimeter of the Project. The County shall maintain a cumulative list of all approved administrative minor modifications.

8.2.2.1. Decision by County Staff

8.2.2.1.1. ***(Place holder - to be completed during review process)***

8.2.2.1.2. ***(Place holder - to be completed during review process)***

8.2.2.2. Decision by BOA

8.2.2.2.1. *(Place holder - to be completed during review process)*

8.2.2.2.2. *(Place holder - to be completed during review process)*

8.2.3 Major Amendments

Major Amendments are set forth below. Proposed Major Amendments shall be reviewed using the standards, requirements, criteria, and approval process for conditional use permits and development agreements existing at the time of the proposed Major Amendment. For vesting purposes a Major Amendment is considered to be a new application. However, the change in vesting shall only apply to that aspect of the Project or Project Area being proposed for a Major Amendment.

A proposed change shall be considered a Major Amendment when it is not an Authorized Amendment or Administrative Minor Amendment. In addition, the following shall be considered a Major Amendment:

8.2.3.1. *(Place holder - to be completed during review process)*

8.2.3.2. *(Place holder - to be completed during review process)*

9. Termination.

Applicant shall have the option, in its sole discretion, to terminate this Agreement prior to Substantial Completion of the Project, *Provided* such termination will not relieve the Applicant of any obligation owed the County under the terms of this Agreement and outstanding at the time of such termination. If it elects to terminate this Agreement, Applicant shall submit a Notice to this effect to Kittitas County at least thirty (30) days prior to such termination.

10. General Provisions.

10.1 Assignment. The County and Applicant acknowledge that development of the Project may involve the sale and/or assignment of all or substantially all of the assets or all or substantially all of the membership interests to third parties. In addition the County and Applicant acknowledge that Applicant and its permitted Transferees may obtain financing for all or a portion of the costs of the Project. Applicant shall have the right to assign or transfer all or

any portion of its interest in the Project at any time, including rights, obligations and responsibilities arising hereunder, to third parties acquiring all or substantially all the assets of the Project or all or substantially all the membership interests in Applicant (each such third party, a "Transferee"), provided such assignments or transfers are made in accordance with the following:

10.1.1 Assignments or Transfers Requiring the Consent of the County.

Applicant may at any time enter into a written agreement with a Transferee other than those described in Sections 10.1.2 and 10.1.3 to transfer all or substantially all the assets of the Project or all or substantially all the membership interests in Applicant, including rights, obligations and responsibilities arising hereunder (such agreement, a "Transfer Agreement"); provided that Applicant obtains the prior written consent of the County as described in this section:

(a) Such Transfer Agreement shall not take effect unless and until the County has consented in writing to such transfer or assignment, which consent shall not be unreasonably withheld, conditioned, or delayed. Written notice of the proposed Transfer Agreement shall be mailed, first-class, to the County at least thirty (30) days in advance of the proposed date of transfer or assignment. Failure by the County to respond within thirty (30) days after receipt of a request made by Applicant for such consent shall be deemed to be the County's approval of the Transfer Agreement.

(b) Any Transfer Agreement shall be binding on the Applicant, the County and the Transferee. Upon approval of a Transfer Agreement by the County, the Applicant shall be released from those obligations and responsibilities assumed by the Transferee therein.

(c) Applicant shall be free from any and all liabilities accruing on or after the date of any assignment or transfer with respect to those obligations assumed by a Transferee pursuant to an approved Transfer Agreement. No breach or default hereunder by any person that assumes any portion of Applicant's obligations under this Agreement pursuant to an approved transfer shall be attributed to Applicant, nor shall any of Applicant's remaining rights hereunder be cancelled or diminished in any way by any such breach or default.

(d) No breach or default hereunder by Applicant shall be attributed to any person succeeding to any portion of Applicant's rights or obligations under this Agreement, nor shall

such Transferee's rights be cancelled or diminished in any way by any such breach or default.

(e) Upon any transfer made in accordance with this Section 10.1.1 for which the County has consented, the Transferee shall be entitled to all interests and rights and be subject to all obligations under this Agreement, and Applicant shall be automatically released of all liabilities and obligations under this Agreement as to that portion of its interest so transferred or assigned.

10.1.2 Collateral Assignments Without the Consent of the County.

Notwithstanding anything herein to the contrary, Applicant or any Transferee shall be permitted to collaterally assign its interest in the Project to a lender providing financing for the Project without the consent of the County, provided that Applicant or any Transferee delivers written notice to the County at least thirty (30) days prior to the date of such collateral assignment and identifies such lender.

10.1.3 Assignments or Transfers without the Consent of the County.

Applicant may transfer or assign all or any portion of its interest in the Project at any time, including rights, obligations and responsibilities arising hereunder, to third parties acquiring all or substantially all the assets of the Project or all or substantially all the membership interests in Applicant without the consent of the County provided that:

(a) Transferee is (i) an investor-owned electric utility regulated by the Federal Regulatory Energy Commission ("FERC") and the Washington Utilities and Transportation Commission ("WUTC") or a wholly owned subsidiary of such an investor-owned electric utility, or; (ii) an entity having, at the time of transfer or assignment, a senior unsecured long term debt rating ("Credit Rating") of (1) if such entity has a Credit Rating from Standard and Poor's but not from Moody's, BBB- or better from Standard and Poor's or (2) if such entity has a Credit Rating from Moody's but not from Standard and Poor's, Baa3 or better from Moody's or (3) if such entity has a Credit Rating from both Standard and Poor's and Moody's, BBB- or better from Standard and Poor's and Baa3 or better from Moody's; and

(b) Transferee agrees to be bound by the rights, obligations and responsibilities of Applicant hereunder, on and after the date of such transfer or assignment. In the event that Applicant transfers or assigns all or any portion of its interest in and to the Project in accordance with this provision, Applicant shall be released from all obligations or liabilities under this

Agreement on and after the date of such transfer or assignment as to that portion of Applicant's interest so transferred or assigned.

10.2 Binding Effect. This Agreement shall be binding upon, and inure to the benefit of, the Parties and their respective heirs, successors (by merger, consolidation or otherwise) and assigns, devisees, administrators, representatives, lessees and all other persons or entities acquiring all or any portion of the Project, any lot, parcel or any portion thereof within the Project Area, or any interest therein, whether by sale, operation of law, devise, or in any manner whatsoever.

10.3 Washington Law. This Agreement is entered into under the laws of the State of Washington, and the parties hereto intend that Washington law shall apply to the interpretation hereof.

10.4 Severability. If any provisions of this Agreement are determined to be unenforceable or invalid, this Agreement shall thereafter be modified, to implement the intent of the Parties to the maximum extent allowable under law and the remainder of this Agreement shall remain unaffected and in full force and effect.

10.5 Authority. Each Party represents and warrants that it has the respective power and authority, and is duly authorized, to enter into this Agreement on the terms and conditions herein stated, and to execute, deliver and perform its obligations under this Agreement.

10.6 No Third-Party Beneficiary. This Agreement is made and entered into for the sole protection and benefit of the Parties hereto and their successors and assigns. No other person shall have any right of action based upon any provision of this Agreement.

10.7 Duty to Act Reasonably and in Good Faith. Unless otherwise expressly provided, each party shall act reasonably in giving consent, approval, or taking any other action under this Agreement. The Parties agree that each of them shall at all times act in good faith in order to carry out the terms of this Agreement and each of them covenants that it will not at any time voluntarily engage in any actions which frustrate the purpose and intent of the Parties to develop the Project in conformity with the terms and conditions specified in this Agreement. The Parties understand and agree that the process described in this Agreement depends upon timely and open communication and cooperation between the Parties. The Parties agree to use best efforts to communicate regarding issues, changes, or problems that arise in the

notice shall be deemed delivered forty-eight (48) hours after deposited. Any party at any time by Notice to the other party may designate a different address or person to which such notice or communication shall be given.

12. Default and Remedies.

No party shall be in default under this Agreement unless it has failed to perform as required under this Agreement for a period of thirty (30) days after written notice of default from the other party. Each notice of default shall specify the nature of the alleged default and the manner in which the default may be cured satisfactorily. If the nature of the alleged default is such that it cannot be reasonably cured within the thirty (30) day period, then commencement of the cure within such time period and the diligent prosecution to completion of the cure shall be deemed a cure of the alleged default.

12.1 Dispute Resolution Process.

12.1.1. In the event of any dispute relating to this Agreement, each Party, upon the request of the other Party, shall meet within seven (7) calendar days to confer and seek to resolve the dispute ("Conference"). The Conference shall be attended by the following parties: (a) the County shall send department director(s) and County employees and contractors with information relating to the dispute, and (b) Applicant shall send an Applicant's representative and any Applicant's consultant(s) with technical information or expertise related to the dispute. The parties shall, in good faith, endeavor to resolve their disputes through the Conference.

12.1.2. Mediation. If this Conference process does not resolve the dispute within the 7 day Conference period, the Parties shall in good faith submit the matter to mediation. The Parties shall send the same types of representatives to mediation as specified for the "Conference" process. Additionally the Parties shall have representatives present at the mediation with full authority to make a settlement within the range of terms being discussed, should settlement be deemed prudent. The mediation shall take place within 45 days of the parties submitting the dispute to mediation.

In order to expedite the mediation, during the Conference process the Parties shall select the mediator. The mediator must be a neutral professional full time mediator with time available to meet with the parties within the 45 day mediation period following the 7 day Conference period.

To prepare for mediation, during the 7 day Conference period, the County will select three qualified mediators, as specified above, who are available in the following 45 days. At the end of the 7 day Conference period, if the matter has not been resolved, the Applicant shall, within the 24 hours of being given the three names select one of the three. The parties will in good faith attempt to resolve the dispute in the 45 day mediation period.

If the dispute is not able to be resolved through the mediation process in the 45 day period, the parties may pursue their legal remedies in accordance with Washington law.

13. Indemnity.

The Project owners shall indemnify and hold harmless the County and its elected officials and employees from and against any and all claims, actions, suits, liability, loss, costs, expenses, and damages of any nature whatsoever ("Claims") that are caused by or result from the negligent act or omission of Applicant's employees, officers, or agents in the operation of the Project; provided, however, that the total and cumulative obligation hereunder for all such Claims is limited to and shall not exceed five million dollars (\$5,000,000.00). In the event of concurrent negligence, Applicant shall indemnify and hold harmless the County only to the extent of Applicant's negligence, subject to the foregoing five-million-dollar limitation for any and all Claims.

14. Entire Agreement.

This Agreement, together with all Attachments hereto, constitutes the entire agree between the Parties with respect to the subject matter of this Agreement. Agreement is specifically intended by the Parties to supersede all prior agreements whether written or oral.

APPROVED this _____ day of _____, 2010.

BOARD OF COUNTY COMMISSIONERS
Kittitas County, Washington

Chairman, Alan A. Crankovich

Vice Chairman, Paul Jewell

Clerk of the Board, Julie Kjorsvik

Commissioner, Mark McClain

Approved by:

Kittitas County Prosecuting Attorney, Deputy
Neil Caulkins

TEANAWAY SOLAR RESERVE, LLC,
a Wyoming limited liability company

By: _____

Name: _____

Title: _____

ATTACHMENT A: PROJECT DESCRIPTION

This section provides an overview of the project. Topics addressed include the project description, the project purpose and need, the proposed schedule, site setting, key components, permits and authorizations, summary of construction activities and components, and a summary of operations and maintenance activities and components.

TSR proposes to construct and operate the project on approximately 982 acres of private land within the F&R zoning district in an unincorporated area of Kittitas County, Washington. The project will generate up to 75 MWdc of PV solar energy utilizing approximately 477 acres of land within the proposed project area.

A.1 Purpose and Need

The purpose of the proposed project is to generate up to 75 MWdc of PV solar energy for distribution to utilities seeking to optimize their renewable and sustainable energy sources. The project was conceived in response to the growing importance of and need for sustainable energy sources. In 2001, Kittitas County recognized the importance of facilitating new alternative energy facilities, proclaiming that:

Kittitas County recognizes the value of facilitating the construction and operation of both alternative and conventional energy producing facilities in reducing the disruption of commerce and governmental services caused by potential energy shortages, all of which adversely affect the economy, public health, safety and welfare. (Kittitas County Ordinance No. 2001-12)

In recognition of the importance alternative energy could play in the future of Kittitas County, the County amended its land use code to, among other things, allow alternative energy facilities as conditional uses in a number of zones. See Kittitas County Code (KCC) Chapter 17.61.

The State of Washington also recognizes the importance of locally produced renewable energy. For example, the State of Washington's Renewable Electricity Standard, Revised Code of Washington (RCW) Title 19, mandates that by the year 2020, the state's largest electric utilities meet 15 percent of their retail electric load with renewable electricity (for example, wind and solar energy). The standard first takes effect in 2012 with a requirement of 3 percent

through 2015, then 9 percent from 2016 through 2019, and 15 percent thereafter. Oregon and California have adopted similar standards. Depending on the commercial terms available for the power sales, the utilities that may buy power from the project could change over time.

The Governor of Washington has also proclaimed that renewable energy production, including the project, is integral to the economic health of Washington: “If we seize on the economic opportunities presented by the clean energy revolution...then we can achieve our other important goals: a healthier environment and more energy independence” (Speech to the Seattle Chamber of Commerce by Gov. Chris Gregoire, October 22, 2009, found at: http://www.tvw.org/media/mediaplayer.cfm?evid=2009100047C&TYPE=V&CFID=1701129&CF_TOKEN=11324713&bhcp=1).

A.2 Project Schedule

The proposed project schedule is outlined in below.

Task/Milestone	Start	Finish
Obtain Necessary Permits	June 2009	June 1, 2010
Engineering	June 2009	October 2010
Construction	April 1, 2010	As early as October 2011 or as late as December 2012
Initial Operation	Fall 2010	Not applicable

Note: Two to three 7- to 9-month construction seasons are anticipated.

A.3 Site Setting

The proposed project site is located approximately 4 miles northeast of Cle Elum, Washington, in Township 20N, Range 16E, within Sections 22, 23, and 27 (see Conditional Use Permit [CUP] Application Supplement Attachment A, Figure 1 for site location). The site is located on the eastern slopes of the Cascade Mountains on Cle Elum Ridge, which runs generally from east to west at elevations ranging from approximately 2,200 to 2,600 feet (see CUP Application Supplement Attachment A, Figure 2). The Teanaway River is approximately 1 mile to the northeast of Cle Elum Ridge. The site is accessed from Highway 970 by way of County roads such as Red Bridge Road (see CUP Application Supplement Attachment A,

Figure 3), and private roads such as Loping Lane. The site is also accessed via Wiehl Road, which is a dedicated public road but is not maintained by the County; it is maintained privately.

The proposed project area consists of 982 acres. This site was chosen for the project by TSR for a variety of reasons.

First, the property is not occupied by any threatened or endangered species, such as the northern spotted owl, nor does it contain any high quality habitats, such as shrub steppe grasslands. TSR was thus able to initially consider the entire 982 acres for potential solar placement. TSR then conducted numerous site surveys, as explained in the technical reports attached to the Expanded SEPA Checklist Supplement, including those for wetlands, plants and wildlife, cultural resources, and critical areas. Based on the site surveys and topography, the project will utilize approximately 477 acres within the proposed project area. Solar arrays will be placed on approximately 399 acres. The remaining 505 acres are currently undeveloped open space, a portion of which will be preserved as part of the wildlife mitigation plan (see Expanded SEPA Checklist Supplement, Attachment H, Wildlife Mitigation Plan). An open corridor will be maintained to allow for potential wildlife migration through the site.

Second, the site has been managed for timber harvesting and has been frequently disturbed. Currently zoned F&R (see CUP Application Supplement Attachment A, Figure 6), the project area has been repeatedly selectively logged since the early 1900s. Harvests have occurred in the 1920s, 1950s, 1980s, and 2000s. Pre-commercial thinning occurred in the decades between logging. Prior to 1900, the site had a fire frequency of 9 to 12 years, indicating that a healthy understory and small trees did not exist, creating a park-like stand of larger trees that were fire resistant to low-intensity periodic fires (Wright, 1996; Agee and Wright, 1997). The site was most recently selectively logged in 2001, and existing site vegetation consists of low grasses, shrubs, and plants with scattered 50- to 60-foot, 6- to 18-inch-diameter ponderosa pine (*Pinus ponderosa*) trees. Shrub and riparian plant communities are predominantly snowberry (*Symphoricarpos albus*) and Rose (*Rosa* spp.) bushes. Herbaceous plant communities are predominantly Lupine (*Lupinus seiceus*), yarrow (*Achillea millefolium*), arrowleaf balsamroot (*Balsamorhiza sagittata*), and various grass species. Wetland plant communities are dominated by rushes (*Juncus* spp.), sedges (*Carex* spp.), wild onion (*Allium douglasii*), and various grass species. Some structural and residential developments have taken place on the site's southern boundary. Figure 5 in CUP Application Supplement Attachment A shows the identified structures within the vicinity of the site boundary.

Third, the Bonneville Power Administration's (BPA) 345-kilovolt (kV) Rocky Reach-Maple Valley transmission line is in close proximity to the site, running east to west along the southern site boundary (see CUP Application Supplement Attachment A, Figure 2). The proposed project is expected to interconnect to the regional transmission grid using this line (see CUP Application Supplement Attachment A, Figure 4). An interconnection substation with an approximate footprint of 6 acres will be located on the project site. Siting the project close to the existing BPA transmission line significantly minimizes the environmental impacts that could arise from using other sites further away from the line. Construction of transmission lines is costly; therefore, siting a project in close proximity to a transmission is economically beneficial to the project.

Finally, TSR proposes to develop the site described below to maximize its solar energy potential, based on its commitment to providing renewable energy and becoming the leading (in terms of energy production and environmentally sensitive development and management of its solar production site) sustainable energy production location in North America. The following factors have been analyzed to determine optimal location within the site defined below:

- Significant solar radiation (insolation)
- Site accessibility
- Avoidance of and minimization of impacts to environmentally sensitive areas
- Limited visibility from offsite locations

A.4 Key Components

The proposed project will consist of the following key components:

- Solar modules
- Field inverters
- Field transformers
- Electrical conductors
- Electrical substation and switchyard
- Operations and maintenance (O&M) building and supervisory control and data acquisition (SCADA) system
- Overhead interconnection transmission line
- Access and maintenance roads

Key components are described in the following subsections.

A.4.1 Solar Modules

Solar modules in a metal frame on supporting mounting structures will be used for the proposed project. Approximately 399 acres of modules will be installed within the 982-acre proposed project area. The solar modules are manufactured offsite and will be delivered to the site by truck in wooden crates or cardboard boxes. TSR seeks flexibility in choosing a solar array system that best suits the site conditions. A representative module is shown in CUP Application Supplement Attachment B, Photo 1. Each module measures 65 inches by 38 inches (5.4 feet by 3.2 feet) and is rated at 216 watts (Sharp Electronics, 2009) and will be mounted so that they are at least 4 feet above the ground surface. The solar modules are mounted in a fashion that orients the modules toward the sun.

Several module mounting types will be considered to best address the slope of land and soil stability at the project site. For example, large land areas with a slope toward the south are excellent for single-axis tracking systems. Land areas that are sloped to the east, southeast, west, or southwest will not as easily accommodate single-axis tracking systems, and are better suited to a fixed-tilt mounting structure.

The mounting system foundations could consist of embedded posts, poles, or structural steel angle. For one type of single-axis support approach, 1,936 posts are needed for every megawatt of energy. If the entire 75 MWdc were to be installed with this mounting system, then approximately 145,200 posts would need to be set. If a fixed-tilt approach is used, up to 8,000 steel angles would be needed. The impervious surface associated with these structures is presented in more detail in the Expanded SEPA Checklist Supplement, Attachment F, Hydrologic Analysis.

The posts will not be anchored unless a patch of bedrock is encountered during installation. The embedment could be completed via a vibratory drill or similar installation method to depths of approximately 8 feet. After the posts are installed, they are held in place by friction from the surrounding soil, without the use of concrete. Driven piles develop their strength by utilizing a definable skin friction between the pile and the soil. As the pile is forced into the ground, the displaced material compresses and that, in turn, creates the friction at the pile/soil interface. Piles are typically driven to a depth that prevents seasonal and temporary changes from affecting their strength. A geotechnical engineer will determine the parameters to be used in the structural design.

The modules will be arranged in 1-MW fields and up to 75 fields will be installed at the project site. A representative single-axis tracking system is presented in CUP Application Supplement Attachment B, Photo 2. Fixed-tilt systems typically have a galvanized or corrosion-resistant metal frame to hold the solar modules at a 20 to 30 degree tilt, as shown in CUP Application Supplement Attachment B, Photo 3. A.4.2 Field Inverters

Up to 80 field inverters will be needed for the project. The inverters will be placed outdoors in enclosures to attenuate noise and protect the equipment from the elements. An example inverter is shown in CUP Application Supplement Attachment B, Photo 4.

A.4.3 Field Transformers

Up to 80 field transformers will be required for the solar field arrays. The field transformers are approximately 8 feet by 6 feet and 8 feet in height. They may be contained within prefabricated cabinets that will rest on concrete pads. A typical transformer cabinet is presented in CUP Application Supplement Attachment B, Photo 5.

A.4.4 Electrical Conductors

Underground 34.5-kV electrical conductors will connect the solar array field transformers and the proposed BPA substation transformers. These will be installed in trenches along improved maintenance roads onsite at depths of 36 inches or greater (KCC, Chapter 12.24.040). Conductors will be direct burial or in a polyvinyl chloride (PVC) conduit. A photo of typical trenching for underground cables is included in CUP Application Supplement Attachment B, Photos 6 and 7.

Electrical conductors from the array field to the field inverters will be supported aboveground within the solar module framework and installed per National Electrical Code (NEC) standards.

A.4.5 Electrical Substation and Switchyard

A new electric primary transmission line dedicated to the project will be constructed to connect the proposed project substation to the existing BPA line. It has yet to be determined if certain elements of the line and substation will be owned and constructed by BPA, but for purpose of environmental review and this permit application, all elements of the line and the substation (up to the point of interconnection with BPA's existing transmission line) are

proposed as part of the project. The substation will be located in the southern part of the project site, to minimize the size of the associated transmission line. The substation will require a level, fenced area of approximately 6 acres. The 6-acre area will be graveled with no vegetation. The substation will contain a small control house, transformer(s), circuit breakers and switches, steel support structures, a dead-end tower structure, and overhead electrical bus work. The control house will be up to 16 feet high, 60 feet long, and 30 feet wide. The dead-end tower structure will be up to 120 feet high. Transformers and oil-filled equipment will be underlain with appropriate containment structures. The appearance of the substation will be similar to that of many other substations throughout the Pacific Northwest.

A.4.6 Operations and Maintenance (O&M) Building and SCADA System

A storage and O&M building will store spare parts (e.g., modules and fuses), testing equipment, and cleaning equipment. The building will be of cinderblock construction or pre-engineered with an overall footprint of approximately 1,000 square feet and will be located within the 6-acre fenced substation area.

A SCADA system will be installed within the substation boundary to collect operating and performance data from the TSR facilities, and provide remote operation of the solar panels. The SCADA system will be associated with the BPA-owned facilities (substation and transmission line). The fiber-optic cable system needed for the SCADA components will be determined by BPA and will be installed per BPA standards.

A.4.7 Overhead Interconnection Transmission Line

A new 345-kV transmission line is required to connect the new substation to the existing BPA line and up to 200 feet of clearance will be needed for the proposed overhead line. Similar to the substation, it has yet to be determined if certain elements of the line will be owned and constructed by BPA, but for purpose of environmental review and this permit application, all elements of the line and the substation (up to the point of interconnection with BPA's existing transmission line) are proposed as part of the project.. Therefore, TSR can not specify the exact placement of the overhead line and the transmission structures at this time. As illustrated on CUP Application Supplement Attachment A, Figure 4, TSR has delineated a 300 foot area within which the BPA transmission line could be sited. Of this 300-foot area, a maximum of 200 feet will be cleared for the transmission line. In April 2006, the North American Electric Reliability Corporation (NERC) issued mandatory standards that govern the height of vegetation

growing near certain high-voltage power lines. NERC is in charge of improving the reliability and management standards for electric transmission lines. NERC has authority over eight regional entities in North America, known as regional reliability organizations, which include all segments of the electric industry: investor-owned utilities; federal power agencies; rural electric cooperatives; state, municipal and provincial utilities; independent power producers; power marketers; and end-use customers. The regional entity that has jurisdiction over Washington State is the Western Electric Coordinating Council (WECC)(Puget Sound Energy Fact Sheet, 2007).

Along with the regional reliability organizations, NERC has the legal authority to enforce compliance with NERC reliability standards. NERC achieves compliance through a rigorous program of monitoring, audits and investigations, and the imposition of financial penalties and other enforcement actions for non-compliance (Puget Sound Energy Fact Sheet, 2007).

New NERC vegetation standards, effective June 2007, require utilities to actively manage vegetation in all transmission line corridors that operate at more than 200 kV. Vegetation that matures at a height of more than 15 feet must be removed from the areas underneath and beside transmission rights of way (ROW). These areas are known as the wire and border zones (Puget Sound Energy Fact Sheet, 2007). Per the BPA Business Plan Environmental Impact Statement (BPEIS, 1995), typical ROW widths for 230-kV transmission lines are 105 to 115 feet on either side of the line, for a total of 210 to 230 feet. Typical ROW widths for 500-kV transmission lines are 120 to 170 feet on either side of the line, for a total of 240 to 340 feet (BPEIS, 1995). Typical ROW widths for 345-kV lines are not outlined in the BPEIS.

A new BPA structure will be required to replace the existing lattice tower located within the BPA easement (see CUP Application Supplement Attachment A, Figure 4). The BPA replacement tower would reroute the three existing 345-kV power lines via an existing 200-foot-wide ROW within the leasehold through the substation and back to the replacement BPA tower. Two additional grounding lines may be required by BPA to bring the total number of power lines between the replacement tower and substation to eight. A visual simulation of the replacement tower is shown in Expanded SEPA Checklist Supplement, Attachment L, Potential Visual Impact Assessment) In addition to the replacement structure, two new transmission structures will be required to support the new transmission lines between the replacement BPA tower and the substation. New transmission structures are indicated on the site plan (see CUP Application

Supplement Attachment A, Figure 4) and will be steel monopole structures.

A.4.8 Access and Maintenance Roads

The site will be accessed via Kittitas County and private roads that interconnect with Highway 970. The major County access road is Red Bridge Road. Only the southern portion of this road will be used and no construction access or delivery vehicles will cross the Red Bridge. TSR has easement rights over Wiehl Road, a dedicated public road maintained privately and not by the County, and Loping Lane, a private road. Loping Lane is subject to several road use and cost-sharing agreements, and TSR will comply with any such applicable agreement. Additionally, TSR will work with neighbors who use Loping Lane to identify measures that will minimize disruption to their use during construction and to the roadway itself. TSR will videotape the conditions of the roads prior to construction to ensure the roads are returned to the same or better than conditions once the project is decommissioned. The project will be served internally by a network of existing and new maintenance roads. The existing maintenance roads will be widened and graveled, where necessary. The roads will be improved pursuant to County requirements and turnarounds adequate for fire protection service vehicles will be established.

Per the Kittitas County Code and roadway standards (KCC, Chapter 12.01.090), Wiehl Road and Loping Lane would likely be improved to 24-foot wide roads to allow vehicles in both directions to pass safely at the same time. These roads could be paved, with culverts or drainage ditches constructed along the shoulders to prevent water from collecting on the roadway surface. Water could be channelized into a detention pond or catchment area, where it would be slowly released back into the ground. The County road standards suggest asphalt concrete pavement for roads with grades exceeding 10 percent. Because Wiehl Road (between Red Bridge and Loping Lane) is fairly steep, paving would likely be recommended. An alternative to paving is using layers of crushed stone or gravel to level and stabilize the roadway. The gravel layer would likely need to be between 8 and 21 inches deep, depending on the topography of the existing road. The size of the gravel and the density of the layers would need to be determined during engineering. Although gravel roads would allow some drainage to occur on the roadway surface, drainage ditches or culverts would likely still be necessary to prevent water from collecting.

As set forth in the Draft DA, TSR will coordinate any improvements to these roads with the Kittitas County Public Works Department. CUP Application Supplement Attachment A,

Figure 3 shows the location of the access and maintenance roads in relation to the project site.

A.5 Permits and Authorizations

The table below outlines the permits and authorizations required to construct the proposed project.

Act/Law	Permit/Authorization	Permit Trigger	Agency/Contact
Federal Permits			
Section 404 Clean Water Act Compliance	Section 404— Nationwide Permit	May be required if road improvements impact wetlands along Loping Lane	U.S. Army Corps of Engineers
State Permits			
Historic Preservation Act Compliance	Section 106 Review	TSRs receiving a section 404 permit from the U.S. Army Corps must undergo a Section 106 review	WA Authority Delegated to State Department of Archaeology and Historic Preservation (DAHP)
State Environmental Policy Act	Chapter 197-11 Washington Administrative Code	Conditional use permit per Kittitas County	Authority Delegated to Kittitas County
Clean Water Act— Section 401 Compliance	Water Quality Certification	TSRs receiving a section 404 permit from the U.S. Army Corps are required to obtain a section 401 water quality certification	Washington Department of Ecology
National Pollutant Discharge Elimination System (NPDES)	General Construction Permit	Required for land disturbances greater than 1 acre	Washington Department of Ecology
Forest Practices Act (76.09 RCW)	Forest Practices Permit	Harvesting trees from onsite	Washington Department of Natural Resources (WDNR)
County Permits			
Land Use Review	Conditional Use Permit	Development occurring within Kittitas County	Kittitas County
Land Use Review	Development Agreement	Development occurring within Kittitas County	Kittitas County

Act/Law	Permit/Authorization	Permit Trigger	Agency/Contact
Land Use Review	Cultural Resources	Development occurring within Kittitas County	Kittitas County
Land Use Review	Stormwater	Development occurring within Kittitas County	Kittitas County
Land Use Review	Critical Areas Ordinance	Development occurring within Kittitas County	Kittitas County
Land Use Review	Construction Permit	Development occurring within Kittitas County	Kittitas County

A.6 Summary of Construction Activities and Components

Site preparation will consist of clearing the existing vegetation only in those areas where construction, grading, and road improvements will occur. Site preparation will be limited to maintenance roads, the O&M facility, the substation, and the solar facility. Once the site is prepared, and the materials are delivered to the staging areas within the cleared portion of the site, the installation of module foundations, field inverter pads and enclosures, field transformer pads, electrical conductors, substation switchyard foundation, overhead interconnection transmission line, and access and maintenance roads will begin. Materials and equipment used for the installation of the facilities are described in Section A.6.5, “Construction Materials and Equipment”.

A.6.1 Site Preparation

The project site will require clearing to address the potential for damage to the project from blown down trees, decreased power efficiency of the solar modules from shading, the risk of fire from fuel buildup within the project area, and the need to create a 100-foot firebreak along the project's perimeters as described below. To clear the site for installing the project, trees will be harvested within the project area on an as-needed basis for facilitating each construction phase of the project (see table above). Trees will generally be harvested to a stump level of 6 to 12 inches above ground level. TSR will obtain a permit from the Washington Department of Natural Resources (WDNR) and contract with a professional forester to harvest these trees in accordance with the Forest Practices Act (FPA). Because the bottoms of the solar modules will be approximately 3 feet above grade, any vegetation taller than 3 feet or expected to exceed 3 feet in height will be removed. Shrubs, grass, and groundcover will, to the maximum extent practicable, remain between rows and under the solar modules.

Trees within the 100-foot firebreak will be limbed up to 12 feet, as negotiated with Kittitas County Fire District 7. This minimizes the need to remove the entire tree, thus potentially decreasing the visual impact to nearby landowners. In addition, existing trees with a diameter base of 3 inches or greater will be replanted at a 3:1 ratio. Although there is no legal requirement for this mitigation, TSR is committed to undertaking efforts that will further the long-term sustainability of the land. These two measures will provide greater carbon sequestration, wildlife habitat, and soil stabilization opportunities than are currently available onsite. A more detailed discussion on vegetation management is included in Expanded SEPA Checklist Supplement, Attachment G, Vegetation Management Plan.

Construction equipment such as tractors, backhoes, loaders, dozers, and graders will be needed to clear brush and vegetation from the site as needed, and to grade roads and foundation locations. If the slope of the land is excessive, terracing, or retaining walls may be required.

A.6.2 Staging Areas

Staging areas for parts and materials such as solar modules, electric cable, and structural supports will be needed. These staging areas will be located in areas where solar arrays will eventually be constructed and will change location throughout the duration of the project. These will not add additional impact acreage to the project area and will not be permanent components of the project site. Staging will also occur near the O&M Building. Mobilization will last approximately 1 month during each phase of construction.

A.6.3 Construction Materials and Equipment

A concrete batch plant will not be located on site. Gravel and concrete for the project will be sourced in the Cle Elum area to the extent possible. Construction equipment such as backhoes, loaders, concrete trucks, and graders will likely be used. A crane may be necessary, but is typically not required.

A.6.3.1 Module Foundation Installation

Several module mounting types will be considered to best address the slope of land and soil stability at the project site. For example, large land areas with a slope toward the south are excellent for single-axis tracking systems (see Expanded SEPA Checklist Supplement Attachment J, Figure 4b). Land areas that are sloped to the east, southeast, west, or southwest

will not as easily accommodate single-axis tracking systems, and are better suited to a fixed-tilt mounting structure (see Expanded SEPA Checklist Supplement Attachment J, Figure 4c).

The foundations securing the solar modules will be designed to withstand high winds and snow loads. The site may have multiple foundation types to match the ground conditions and type of mounting structures used. The mounting-system support structures could consist of embedded posts, poles, or structural steel angle. The embedment could be completed via a vibratory drill or similar installation method to depths of approximately 8 feet. Pending final design, the solar module foundations will require site work and potential boring.

The posts will not be anchored unless a patch of bedrock is encountered during installation. The embedment could be completed via a vibratory drill or similar installation method to depths of approximately 8 feet. After the posts are installed, they are held in place by friction from the surrounding soil, without the use of concrete. Driven piles develop their strength by utilizing a definable skin friction between the pile and the soil. As the pile is forced into the ground, the displaced material compresses and that, in turn, creates the friction at the pile/soil interface. Piles are typically driven to a depth that prevents seasonal and temporary changes from affecting their strength. A geotechnical engineer will determine the parameters to be used in the structural design. Expanded SEPA Checklist Supplement Attachment J, Figure 4d illustrates the footing installation methods for both the fixed tilt and single axis panels.

No concrete will be used when installing the foundations for the modules.

For one type of single-axis support approach, 1,936 posts are needed for every megawatt of energy. If the entire 75 MWdc were to be installed with this mounting system, then approximately 145,200 posts would need to be set. If a fixed-tilt approach is used, up to 8,000 steel angles would be needed. The impervious surface associated with these structures is presented in more detail in Expanded SEPA Checklist Supplement, Attachment F, Hydrological Analysis.

Fixed-tilt systems typically have a galvanized or corrosion-resistant metal frame to hold the solar modules at a 20 to 30 degree tilt, as shown in CUP Application Supplement Attachment B, Photo 3.

Dependent upon weather conditions at the site, installation of foundations, trackers, and modules will occur over a period of approximately 7 to 9 months during two or three construction

seasons.

A.6.3.2 Field Inverter Pad and Enclosure Installation

Concrete use will be limited to the foundations for field inverters and field transformers, as well as the foundations for the substation buildings. Up to 80 field inverters will be needed for the project. A total of approximately 250 cubic yards of concrete, or 25 truck loads, will be needed for the 80 field inverter concrete pads.

Dependent upon weather conditions at the site, installation of field inverter pads and enclosures will occur over a period of approximately 5 to 6 months.

A.6.3.3 Field Transformer Pad Installation

Concrete use will be limited to the foundations for field inverters and field transformers, as well as the foundations for the substation buildings. A total of approximately 150 cubic yards of concrete, or 15 truck loads, will be needed for the 80 field transformer concrete pads. Dependent upon weather conditions at the site, installation of field transformer pads will occur over a period of approximately 5 to 6 months.

A.6.3.4 Electrical Conductor Installation

Underground 34.5-kV electrical conductors will connect the solar array field transformers and the proposed BPA substation transformers. These will be installed in trenches along improved maintenance roads onsite at depths of 36 inches or greater (KCC, Chapter 12.24.040). Conductors will be direct burial or in a polyvinyl chloride (PVC) conduit.

Electrical conductors from the array field to the field inverters will be supported aboveground within the solar module framework and installed per NEC standards. Photos of typical trenching for underground cables is included in CUP Application Supplement Attachment B, Photos 6 and 7.

A.6.3.5 Substation and Switchyard Foundation Installation

The substation will require an area of approximately 6 acres. The substation consists of a steel support structure that is 15 to 20 feet tall. The substation will be surrounded by a cyclone fence that is approximately 10 feet tall. The substation will include a small, enclosed, air conditioned control building, approximately 1,000 square feet in area.

Approximately 135 truckloads of concrete will be necessary for the substation foundations and associated facilities. The concrete necessary for the substation includes 70 yards for the BPA control building (7 trucks), 40 yards for the switchgear buildings (4 trucks), 50 yards for the operations and maintenance building (5 trucks), 660 yards for the dead-end towers and overhead transmission line support structures (66 trucks), and 530 yards for the substation electrical equipment, including transformer, breakers, switches, and overhead bus foundations (53 trucks).

A.6.3.6 Overhead Interconnection Transmission Line Installation

Pending location of the substation, overhead electrical distribution lines may be required to connect the substation with BPA's transmission line. Two new structures supporting the overhead lines will be required from the facility to the substation and will be approximately spaced as indicated in the site plan. Spans between structures can range from 1,000 to 1,200 feet.

A.6.3.7 Access and Maintenance Road Installation

A network of existing and new maintenance roads will serve the project internally. The existing maintenance roads will be widened and graveled, where necessary. Approximately 751,000 square feet of roadway may require gravel surfacing improvements. These improved roadways will be approximately 8 inches deep, and will require up to 1,900 truckloads of gravel.

Paths for new maintenance roadways will be cut from existing grades. At least half of the cut material will be spread out on site. The remaining amount of cut earthwork will be hauled off-site in approximately 950 truckloads. The roads will be improved pursuant to County requirements and turnarounds adequate for fire protection service vehicles will be established.

A.6.4 Transportation and Traffic

Materials for the project (e.g., solar modules, supporting racks, foundation materials, electrical gear) will be brought to the site by truck. The trucks will travel on Interstate 90 (I 90) and access Highway 970 by way of County roads such as Red Bridge Road (see CUP Application Supplement Attachment A, Figure 3), private roads such as Loping Lane, and public roads that are privately maintained such as Wiehl Road. An existing network of maintenance roads will provide Road service within the project area, although new maintenance roads or segments may be necessary. Road improvements will be conducted as needed, and are

anticipated to include upgrades to local gravel and dirt roads as discussed above in Section A.6.1. Road improvements are further addressed in the DA with Kittitas County. For further discussion of traffic impacts, see the Expanded SEPA Checklist Supplement, Attachment I, Transportation Road Plan.

A.6.5 Employment

A typical construction workforce for a multiple-megawatt solar facility consists of between 200 and 450 full-time workers during the construction period. Typically, 100 to 150 workers are involved in the site prep, and 100 to 150 are involved in installing the module footings. When the solar installation begins, the workload will peak, and will likely remain at between 300 and 450 workers for a period of up to 27 months (two to three 7- to 9-month construction seasons). Workers could be brought in by vanpool or bus. Workers will stay at local hotels and motels, as described in the Housing section of the Expanded SEPA Checklist Supplement. Security crews will likely consist of up to eight workers. In addition, access control in the form of an electric gate with an associated keypad security code for entry will be installed.

A.6.6 Safety and Fire Protection

The fire protection needs of the site are currently served by WDNR. After the project is constructed, the site will likely be served by the Kittitas County Fire District 7, under a contractual agreement with TSR (see Expanded SEPA Checklist Supplement, Attachment M, Fire Protection Agreement). Further, the project will be bordered by a firebreak no less than 100 feet wide. Should the construction of the project require supplemental fire protection services, TSR will work with Kittitas County Fire District 7 to ensure that suitable fire suppression services are in place during the construction and ongoing operations of the project. Separate safety or fire protection systems will not be required at the site. Basic safety and fire protection equipment such as fire extinguishers, personal protective equipment, and other equipment as determined by the site's safety and emergency response plan can be stored in the O&M equipment storage building.

Police protection of the proposed project area is provided by the County's Sheriff's Office. The construction contractor will notify the fire protection and police services of staging and active construction locations so these services can respond efficiently to emergencies, should any arise.

A.6.7 Water Use

Water will be needed for activities such as dust control and module cleaning. TSR proposes to truck in water from the Cle Elum area or elsewhere. Subject to any restrictions imposed by the County or Washington Department of Ecology (Ecology), an alternative approach would be to establish a groundwater well onsite. For initial project permitting, it is assumed that water will be trucked to the site.

A.6.8 Sewer and Solid Waste

Sewer services are not anticipated. Portable toilets will be placed onsite during construction. The onsite toilets will require regular service visits.

A.7 Summary of O&M Activities and Components

Photovoltaic power plants typically have low O&M requirements. During the life of the plant, there will be regular O&M site activity. The actual O&M requirements will be determined by the specific plant components.

A.7.1 Materials and Equipment

A storage and O&M building will store spare parts (e.g., modules and fuses), equipment testing equipment, and cleaning equipment. The building will be constructed on site or pre-engineered in accordance with local and state building codes and it will have an overall footprint of approximately 1,000 square feet.

A.7.2 Transportation and Traffic

Routine vehicular traffic will occur along the site access roads and any maintenance roads within the PV array. One to two small to medium-duty pickup trucks will be required. Larger delivery trucks occasionally may be required if major equipment is in need of replacement such as structural elements, inverters, or large quantities of PV modules (not likely).

A.7.3 Employment

Personnel for system monitoring, maintenance, and troubleshooting will likely be needed on site. The staff will work out of the O&M building and make frequent trips to the facility by way

of passenger pickup truck or off-road vehicle. If issues regarding plant performance are detected, additional troubleshooting or maintenance may be required through special visits from vendors or specialty technicians.

A.7.4 Maintenance Activities

Routine onsite activities will consist of maintaining vegetation so that it does not interfere with operation of the plant (as often as weekly during periods of high rain and growth), and cleaning the solar modules of dirt and debris. Routine weed control will be required to ensure vegetation growth does not interfere with the operation of any equipment. For more details on noxious weed control, see Expanded SEPA Checklist Supplement Attachment G, Vegetation Mitigation Plan. The frequency of visits will be determined by the growth rate and density of the vegetation left on the site once construction is complete. In a heavily vegetated area such as the proposed site, it is not anticipated that cleaning will be required on a weekly basis (as it would be in a desert environment). The firebreak will require periodic monitoring and clearing to remove vegetation buildup. It is anticipated that additional personnel may be required to monitor and secure the site.

In addition to maintaining the vegetation on site during project operations, TSR has committed to maintenance and operation of Wiehl and Loping during all seasons. That includes winter plowing of these roads.

A.7.5 Safety and Fire Protection

As previously discussed, separate safety or fire protection systems will not be required at the site. TSR will create and maintain a firebreak of no less than 100 feet between all outer edges of the project site and adjacent property lines. Basic safety and fire protection equipment such as fire extinguishers, personal protective equipment, and other equipment as determined by the site's safety and emergency response plan can be stored in the O&M equipment storage building.

A copy of the contractual agreement between TSR and Kittitas County Fire District 7 is included as Attachment M to the Expanded SEPA Checklist Supplement.

Police protection of the proposed project area is provided by the County's Sheriff's Office. During the operational phase, TSR will contact fire protection and police services in the event of an emergency.

A.7.6 Water Use

The solar modules must be kept clear from dirt and debris, the presence of which can affect the performance of the PV plant. Because the proposed site is heavily vegetated and has sufficient rainfall, it is not anticipated that monthly washing will be required. Annual cleaning may be recommended based on soiling conditions. It may be possible to use special brushes in lieu of water to remove any dirt that accumulates on the solar modules. However, if it is determined that water is required for cleaning the solar modules or other purposes, a water tanker truck could be brought onsite to fill portable canisters with water to be used throughout the PV array.

A.7.7 Sewer and Solid Waste

Sewer services are not anticipated. If necessary, portable toilets can be placed onsite. Onsite toilets would require regular service visits.

A.8 Decommissioning and Site Restoration

In the event TSR decides to terminate operation of the project, the project will be decommissioned and the site will be restored.

At least 30 days prior to construction of the project, TSR will provide to the County for its approval an Initial Project Decommissioning and Site Restoration Plan (the "Initial Plan"), prepared in sufficient detail to identify, evaluate, and resolve all major environmental impacts, costs, and public health and safety issues reasonably anticipated by TSR at that time associated with decommissioning and restoring the project site. The Initial Plan will describe the measures that will be taken to decommission the project and restore the project site, including any measures necessary to protect the public against risks or danger resulting from decommissioning the project and restoring the project site.

Ninety days prior to decommissioning the project site, TSR shall submit a Final Project Decommissioning and Site Restoration Plan ("Final Plan") to the County for its approval. The Final Plan may contain measures to decommission the project and restore the project site different than the Initial Plan, provided that TSR explains in sufficient detail the reasons for any new or substantially different measures.

Subject to the Initial and Final Plans, decommissioning the project shall involve removal of the project's components, including the solar panels, panel trackers, anchors, supports and

mounts, inverter buildings, electrical conductors, substation, the O&M building, and any foundations or permanently fixed anchors to a depth of 3 feet below grade; the re-grading of any areas significantly impacted by the removal of any components; and removal of project maintenance roads and overhead cables (except for any roads, buildings, and/or power cables that project area landowners wish to retain) (all of which shall comprise "Decommissioning"). The Initial and Final Plans shall contain the measures necessary to fulfill TSR's Decommissioning obligations.

Restoration of the project site shall be to a reasonable approximation of its original condition prior to construction allowing for any permanent improvements chosen by the underlying landowners to be left on site. Restoration procedures would be based on site-specific requirements and forest management techniques commonly employed at the time the area is to be reclaimed, and would include regrading, adding topsoil, and replanting of all disturbed areas with an approved seed mixture (all of which shall comprise "Restoration"). Decommissioned roads would be reclaimed or left in place. The Initial and Final Plans shall contain the measures necessary to fulfill TSR's Restoration obligations.

Decommissioning the project and restoring the project site will occur within 12 months following the earlier of either terminating the Agreement or when the project is no longer in substantive operation. However, if the project stops generating electricity due to force majeure, mechanical breakdown, or malfunction, TSR may repair rather than decommission the affected project component(s).

Prior to commencing construction, TSR will post a bond or letter of credit in favor of the County to cover decommissioning costs. The initial amount of the bond or letter of credit will be set forth in the Initial Plan. If the project were terminated, the necessary authorization from any appropriate regulatory agencies would be obtained to decommission the project and restore the project site in accordance with the approved Final Plan.

As set forth in the Initial and Final Plans, aboveground facilities would be removed from the site, and unsalvageable material would be disposed of at authorized sites.

Decommissioning would consist of removing aboveground equipment, such as inverters, substations, and their associated foundations, to a depth of 3 feet below grade. Any foundations below 3 feet would remain. The ground surface would be regraded to natural contours and revegetated to a natural condition. For several years after decommissioning, site disturbance

would likely be visible upon close examination and the visual impacts of those aboveground elements that are not removed would remain. During the decommissioning process, similar impacts to those experienced during construction would occur but to a lesser extent because less construction material would likely be removed than was delivered to the project site. To avoid environmental damage and unnecessary land disturbance, underground collector cables likely would be retired in place, and any building or structural foundations would be removed to a depth of approximately 3 feet below grade, with the remainder likely retired in place. Decommissioned roads would be reclaimed or left in place. The soil surface would be restored as close as reasonably possible to its original condition. The Initial and Final Plans shall be prepared in sufficient detail to identify, evaluate, and resolve all major environmental impacts, costs, and public health and safety issues associated with decommissioning and restoring the project site. Accordingly, no significant unavoidable adverse environmental impacts, including those to rare or sensitive plants or animals from construction, operation, decommissioning, or restoration of the proposed project are expected.

ATTACHMENT B: PROJECT AREA LEGAL DESCRIPTION

ATTACHMENT C: SEPA DETERMINATION

ATTACHMENT D: CONDITIONAL USE PERMIT

Expanded SEPA Checklist Supplement

**Teanaway Solar Reserve
Expanded SEPA
Checklist Supplement
Kittitas County, Washington**

Submitted to
Kittitas County, Washington

by
Teanaway Solar Reserve, LLC

February 2010



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Acronyms and Abbreviations

ADT	average daily traffic
BMP	best management practice
BPA	Bonneville Power Administration
CAO	Critical Areas Ordinance
CF	Commercial Forest
Checklist	Expanded SEPA Checklist
CO	carbon monoxide
CUP	conditional use permit
cy	cubic yards
DA	Development Agreement
dBA	decibels on an A-weighted scale
Ecology	Washington Department of Ecology
F&R	Forest and Range
FAA	Federal Aviation Administration
FDCP	Fugitive Dust Control Plan
FPA	Forest Practices Act
GIS	geographic information system
I-90	Interstate 90
JARPA	Joint Aquatic Resources Permit Application
KCC	Kittitas County Code
kV	kilovolt(s)
MP	milepost
mph	miles per hour
MW	megawatt
MWdc	direct current megawatt
N/A	Information not available

NEC	National Electrical Code
NHP	Natural Heritage Program
NO _x	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NPDES 1200-C	National Pollutant Discharge Elimination System and State Wastewater Discharge General Permit for stormwater discharges associated with construction activities
O&M	operations and maintenance
PEM	palustrine emergent
PHS	Priority Habitats and Species
PM ₁₀	particulate matter less than 10 micrometers in aerodynamic diameter
PV	photovoltaic
PVC	polyvinyl chloride
RCW	Revised Code of Washington
ROW	right-of-way
SEPA	State Environmental Policy Act
SR	State Route
TSR	Teaway Solar Reserve, LLC
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources
WSDOT	Washington State Department of Transportation

Environmental Checklist

State Environmental Policy Act (SEPA)

WAC 197-11-960

Background

1. *Name of proposed project:*

Teanaway Solar Reserve

2. *Name of Applicant:*

Teanaway Solar Reserve, LLC ("TSR")

3. *Address and phone number of applicant and contact person:*

Applicant

Howard Trott
Teanaway Solar Reserve, LLC
218 E. First Street, Suite B
Cle Elum, WA 98922
(206) 972-3800

Contact Person

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CH2M HILL
2020 SW Fourth Ave., Suite 300
Portland, OR 97201
(503) 872-4803

4. *Date checklist prepared:*

August 14, 2009; Supplement prepared February 22, 2010

5. *Agency requesting checklist:*

Kittitas County Planning Department

6. *Proposed timing or schedule:*

Project construction will occur over a period of 2 to 3 years, with 7- to 9-month construction periods (weather dependent) in each year. Table 1 presents the start and finish dates for major tasks and key milestones. The schedule will depend on time of year, ability to obtain permits, and weather and ground conditions.

Timber harvesting will be done only as necessary to facilitate construction and will be performed pursuant to the terms and conditions of a Washington Department of Natural Resources (WDNR) Forest Practices Act (FPA) permit.

The proposed project schedule is outlined in Table 1.

TABLE 1
Revised Project Schedule

Task/Milestone	Start	Finish
Obtain Necessary Permits	June 2009	June 1, 2010
Engineering	June 2009	October 2010
Construction	April 1, 2010	As early as October 2011 or as late as December 2012
Initial Operation	Fall 2010	Not applicable

Note: Two or three 7- to 9-month construction seasons are anticipated in 2010, 2011, and 2012.

7. *Do you have any plans for future additions, expansion, or further activity related to this proposal?*

Future additions, expansion, or further activities are not known at this time.

8. *List any environmental information that has/will be prepared related to this proposal.*

Contractors conducted the following supplemental environmental studies in preparation for the submittal of the Expanded SEPA Checklist on August 14, 2009:

- Sensitive Species surveys were conducted in June and July 2009 (see Attachment A)
- Wetlands and waters of the U.S. and State were delineated in June and July 2009 (see Attachment B)
- Cultural resource surveys were conducted in June and July 2009 (see Attachment C [restricted distribution])

Contractors conducted the following supplement environmental studies and activities in preparation for the submittal of the Expanded SEPA Checklist Supplement on February 22, 2010:

- Geology and soils hazards surveys were conducted in November 2009 (see Attachment D)
- Fugitive Dust Control Plan was created in January 2010 (see Attachment E)
- Hydrological analysis was conducted in January 2010 (see Attachment F)
- Vegetation Management Plan was created in January 2010 (see Attachment G)
- Wildlife mitigation efforts were developed after meetings with the resource agencies in October 2009, November 2009, December 2009, and January 2010 (see Attachment H)
- Transportation Road Plan was prepared in January 2010 (see Attachment I)
- Updated Figures (see Attachment J)

- Updated Photos (see Attachment K)
 - Additional simulations and visual analysis were created as part of the updated Potential Visual Impact Assessment (see Attachment L)
 - Fire Protection Agreement is currently under negotiation with Kittitas County Fire District #7 (see Attachment M)
 - Economic Impact Analysis was created in October 2009 (see Attachment N - resubmitted)
 - Comprehensive public outreach listing was compiled in February 2010 (see Attachment O)
9. *Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal?*

TSR is not aware of pending approvals for any other projects directly affecting the properties involved in this application.

10. *Government approvals or permits needed:*

Table 2 outlines the permits and authorizations required to construct the proposed project.

TABLE 2
Required Permits and Authorizations

Act/Law	Permit/Authorization	Permit Trigger	Agency/Contact
Federal Permits			
Section 404 Clean Water Act Compliance	Section 404— Nationwide Permit	May be required if road improvements impact wetlands along Loping Lane	U.S. Army Corps of Engineers
State Permits			
Historic Preservation Act Compliance	Section 106 Review	TSRs receiving a section 404 permit from the U.S. Army Corps must undergo a Section 106 review	WA Authority Delegated to State Department of Archaeology and Historic Preservation (DAHP)
State Environmental Policy Act	Chapter 197-11 Washington Administrative Code	Conditional use permit per Kittitas County	Authority Delegated to Kittitas County
Clean Water Act— Section 401 Compliance	Water Quality Certification	TSRs receiving a section 404 permit from the U.S. Army Corps are required to obtain a section 401 water quality certification	Washington Department of Ecology
National Pollutant Discharge Elimination System (NPDES)	General Construction Permit	Required for land disturbances greater than 1 acre	Washington Department of Ecology
Forest Practices Act	Forest Practices Permit	Harvesting trees from	Washington Department of

TABLE 2
 Required Permits and Authorizations

Act/Law	Permit/Authorization	Permit Trigger	Agency/Contact
(76.09 RCW)		onsite	Natural Resources (WDNR)
County Permits			
Land Use Review	Conditional Use Permit	Development occurring within Kittitas County	Kittitas County
Land Use Review	Development Agreement	Development occurring within Kittitas County	Kittitas County
Land Use Review	Cultural Resources	Development occurring within Kittitas County	Kittitas County
Land Use Review	Stormwater	Development occurring within Kittitas County	Kittitas County
Land Use Review	Critical Areas Ordinance	Development occurring within Kittitas County	Kittitas County
Land Use Review	Construction Permit	Development occurring within Kittitas County	Kittitas County

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site.

This section provides an overview of the project. Topics addressed include the project description, the project purpose and need, the proposed schedule, site setting, key components, permits and authorizations, summary of construction activities and components, and a summary of operations and maintenance activities and components.

Project Description

The Applicant (TSR) proposes to construct and operate the project on approximately 982 acres of private land within the Forest and Range (F&R) zoning district in an unincorporated area of Kittitas County, Washington. The project will generate up to 75 direct current megawatts (MWdc) of photovoltaic (PV) solar energy utilizing approximately 477 acres of land within the proposed project area.

Purpose and Need

The purpose of the proposed project is to generate up to 75 MWdc of PV solar energy for distribution to utilities and communities seeking to optimize their renewable and sustainable energy sources. The project was conceived in response to the growing importance of and need for sustainable energy sources. In 2001, Kittitas County recognized the importance of facilitating new alternative energy facilities, proclaiming that:

Kittitas County recognizes the value of facilitating the construction and operation of both alternative and conventional energy producing facilities in reducing the disruption of commerce and governmental services caused by

potential energy shortages, all of which adversely affect the economy, public health, safety and welfare. (Kittitas County Ordinance No. 2001-12)

In recognition of the importance alternative energy could play in the future of Kittitas County, the County amended its land use code to, among other things, allow alternative energy facilities as conditional uses in a number of zones. See Kittitas County Code (KCC) Chapter 17.61.

The State of Washington also recognizes the importance of locally produced renewable energy. For example, the State of Washington's Renewable Electricity Standard, Revised Code of Washington (RCW) Title 19, mandates that by the year 2020, the state's largest electric utilities meet 15 percent of their retail electric load with renewable electricity (for example, wind and solar energy). The standard first takes effect in 2012 with a requirement of 3 percent through 2015, then 9 percent from 2016 through 2019, and 15 percent thereafter. Oregon and California have adopted similar standards. Depending on the commercial terms available for the power sales, the utilities that may buy power from the project could change over time.

The Governor of Washington has also proclaimed that renewable energy production, including the project, is integral to the economic health of Washington: "If we seize on the economic opportunities presented by the clean energy revolution...then we can achieve our other important goals: a healthier environment and more energy independence" (Speech to the Seattle Chamber of Commerce by Gov. Chris Gregoire, October 22, 2009, found at: <http://www.tvw.org/media/mediaplayer.cfm?evid=2009100047C&TYPE=V&CFID=1701129&CFTOKEN=11324713&bhcp=1>).

Project Schedule

The proposed project schedule is outlined in Table 1, above.

Site Setting

The proposed project site is located approximately 4 miles northeast of Cle Elum, Washington, in Township 20N, Range 16E, within Sections 22, 23, and 27 (see Attachment J, Figure 1 for site location). The site is located on the eastern slopes of the Cascade Mountains on Cle Elum Ridge, which runs generally from east to west at elevations ranging from approximately 2,200 to 2,600 feet (see Attachment J, Figure 2). The Teanaway River is approximately 1 mile to the northeast of Cle Elum Ridge. The site is accessed from Highway 970 by way of County roads such as Red Bridge Road (see Attachment J, Figure 3), and private roads such as Loping Lane. The site is also accessed via Wiehl Road, which is a dedicated public road but is not maintained by the County; it is maintained privately.

The proposed project area consists of 982 acres. This site was chosen for the project by TSR for a variety of reasons.

First, the property is not occupied by any threatened or endangered species, such as the northern spotted owl, nor does it contain any high quality habitats, such shrub steppe

grasslands. TSR was thus able to initially consider the entire 982 acres for potential solar placement. As explained in the attached technical reports, TSR then conducted numerous site surveys, including those for wetlands, plants and wildlife, cultural resources, and critical areas. Based on the site surveys and topography, the project will utilize approximately 477 acres within the proposed project area. Solar arrays will be placed on approximately 399 acres. The remaining 505 acres are currently undeveloped open space, a portion of which will be preserved as part of the wildlife mitigation plan (see Attachment H, *Wildlife Mitigation Plan*). An open corridor will be maintained to allow for potential wildlife migration through the site.

Second, the site has been managed for timber harvesting and has been frequently disturbed. Currently zoned F&R (see Attachment J, Figure 6), the project area has been repeatedly selectively logged since the early 1900s. Harvests have occurred in the 1920s, 1950s, 1980s, and 2000s. Pre-commercial thinning occurred in the decades between logging. Prior to 1900, the site had a fire frequency of 9 to 12 years, indicating that a healthy understory and small trees did not exist, creating a park-like stand of larger trees that were fire resistant to low-intensity periodic fires (Wright, 1996; Agee and Wright, 1997). The site was most recently selectively logged in 2001, and existing site vegetation consists of low grasses, shrubs, and plants with scattered 50- to 60-foot, 6- to 18-inch-diameter ponderosa pine (*Pinus ponderosa*) trees. Shrub and riparian plant communities are predominantly snowberry (*Symphoricarpos albus*) and Rose (*Rosa* spp.) bushes. Herbaceous plant communities are predominantly Lupine (*Lupinus seiceus*), yarrow (*Achillea millefolium*), arrowleaf balsamroot (*Balsamorhiza sagittata*), and various grass species. Wetland plant communities are dominated by rushes (*Juncus* spp.), sedges (*Carex* spp.), wild onion (*Allium douglasii*), and various grass species. Some structural and residential developments have taken place on the site's southern boundary. Figure 5 in Attachment J shows the identified structures within the vicinity of the site boundary.

Third, the Bonneville Power Administration's (BPA) 345-kilovolt (kV) Rocky Reach-Maple Valley transmission line is in close proximity to the site, running east to west along the southern site boundary (see Attachment J, Figure 2). The proposed project is expected to interconnect to the regional transmission grid using this line (see Attachment J, Figure 4). An interconnection substation with an approximate footprint of 6 acres will be located on the project site (see Attachment J, Figure 4a). Siting the project close to the existing BPA transmission line significantly minimizes the environmental impacts that could arise from using other sites further away from the line and reduces the costs associated with constructing the transmission line.

Finally, TSR proposes to develop the site described below to maximize its solar energy potential, based on its commitment to providing renewable energy and becoming the leading (in terms of energy production and environmentally sensitive development and management of its solar production site) sustainable energy production location in North America. The following factors have been analyzed to determine optimal location within the site defined below:

- Significant solar radiation (insolation)
- Site accessibility
- Avoidance of and minimization of impacts to environmentally sensitive areas

- Limited visibility from offsite locations

Key Components

The proposed project will consist of the following key components:

- Solar modules
- Field inverters
- Field transformers
- Electrical conductors
- Electrical substation and switchyard
- O&M building and SCADA system
- Overhead interconnection transmission line
- Access and maintenance roads

Key components are described in the following subsections.

Solar Modules

Solar modules in a metal frame on supporting mounting structures will be used for the proposed project. Approximately 399 acres of modules will be installed within the 982-acre proposed project area. The solar modules are manufactured offsite and will be delivered to the site by truck in wooden crates or cardboard boxes. TSR seeks flexibility in choosing a solar array system that best suits the site conditions. A representative module is shown Attachment K, Photo 1. Each module measures 65 inches by 38 inches (5.4 feet by 3.2 feet) and is rated at 216 watts (Sharp Electronics, 2009) and will be mounted so that they are at least 4 feet above the ground surface. The solar modules are mounted in a fashion that orients the modules toward the sun.

The modules will be arranged in 1-MW fields and up to 75 fields will be installed at the project site. A single-axis 1-MW field is illustrated in Attachment J, Figure 4e and a fixed-panel array is shown in Attachment J, Figure 4f. A representative single-axis tracking system is presented in Attachment K, Photo 2 and a fixed-tilt mounting structure is shown in Attachment K, Photo 3.

Field Inverters

Up to 80 field inverters will be needed for the project. The inverters will be placed outdoors in enclosures to attenuate noise and protect the equipment from the elements. An example inverter is shown in Attachment K, Photo 4.

Field Transformers

Up to 80 field transformers will be required for the solar field arrays. The field transformers are approximately 8 feet by 6 feet and 8 feet in height. They may be contained within prefabricated cabinets that will rest on concrete pads. A typical transformer cabinet is presented in Attachment K, Photo 5.

Electrical Conductors

Underground 34.5-kV electrical conductors will connect the solar array field transformers and the proposed BPA substation transformers. These will be installed in trenches along improved maintenance roads onsite at depths of 36 inches or greater (KCC, Chapter 12.24.040). Conductors will be direct burial or in a polyvinyl chloride (PVC) conduit. A photo of typical trenching for underground cables is included in Attachment K, Photos 6 and 7.

Electrical conductors from the array field to the field inverters will be supported aboveground within the solar module framework and installed per National Electrical Code (NEC) standards.

Electrical Substation and Switchyard

TSR proposes to construct, in compliance with design and installation requirements from BPA, an electrical substation that will interconnect the solar field with the existing 345-kV BPA transmission line. It has yet to be determined if certain elements of the line and substation will be owned and constructed by BPA, but for purpose of environmental review and this permit application, all elements of the line and the substation (up to the point of interconnection with BPA's existing transmission line) are proposed as part of the project. The substation will be located in the southern part of the project site, to minimize the size of the associated transmission line (see Attachment J, Figure 4a). The substation will require a level, fenced area of approximately 6 acres. The 6-acre area will be graveled with no vegetation. The substation will contain a small control house, transformer(s), circuit breakers and switches, steel support structures, a dead-end tower structure, and overhead electrical bus work. The control house will be up to 16 feet high, 60 feet long, and 30 feet wide. The dead-end tower structure will be up to 120 feet high. Transformers and oil-filled equipment will be underlain with appropriate containment structures. The appearance of the substation will be similar to that of many other substations throughout the Pacific Northwest.

O&M Building and SCADA System

A storage and O&M building will store spare parts (e.g., modules and fuses), testing equipment, and cleaning equipment. The building will be of cinderblock construction or pre-engineered with an overall footprint of approximately 1,000 square feet and will be located within the 6-acre fenced substation area.

A SCADA system will be installed within the substation boundary to collect operating and performance data from the TSR facilities, and provide remote operation of the solar panels. The SCADA system will be associated with the BPA-owned facilities (substation and transmission line). The fiber-optic cable system needed for the SCADA components will be determined by BPA and will be installed per BPA standards.

Overhead Interconnection Transmission Line

A new 345-kV transmission line is required to connect the new substation to the existing BPA line and up to 200 feet of clearance will be needed for the proposed overhead line. Similar to the substation, it has yet to be determined if certain elements of the transmission

line will be owned and constructed by BPA, but for purposes of the environmental review and of this permit application, all elements of the line and the substation (up to the point of interconnection with BPA's existing transmission line) are proposed as part of the project. TSR cannot specify the exact placement of the overhead line and the transmission structures at this time. As illustrated on Attachment J, Figure 4, TSR has delineated a 300-foot area within which the BPA transmission line could be sited. Of this 300-foot area, a maximum of 200 feet will be cleared for the transmission line. In April 2006, the North American Electric Reliability Corporation (NERC) issued mandatory standards that govern the height of vegetation growing near certain high-voltage power lines. NERC is in charge of improving the reliability and management standards for electric transmission lines. NERC has authority over eight regional entities in North America, known as regional reliability organizations, which include all segments of the electric industry: investor-owned utilities; federal power agencies; rural electric cooperatives; state, municipal and provincial utilities; independent power producers; power marketers; and end-use customers. The regional entity that has jurisdiction over Washington State is the Western Electric Coordinating Council (WECC)(Puget Sound Energy Fact Sheet, 2007)

Along with the regional reliability organizations, NERC has the legal authority to enforce compliance with NERC reliability standards. NERC achieves compliance through a rigorous program of monitoring, audits and investigations, and the imposition of financial penalties and other enforcement actions for non-compliance (Puget Sound Energy Fact Sheet, 2007).

New NERC vegetation standards, effective June 2007, require utilities to actively manage vegetation in all transmission line corridors that operate at more than 200 kV. Vegetation that matures at a height of more than 15 feet must be removed from the areas underneath and beside transmission rights of way (ROW). These areas are known as the wire and border zones (Puget Sound Energy Fact Sheet, 2007). Per the BPA Business Plan Environmental Impact Statement (BPEIS, 1995) BPA typical ROW widths for 230-kV transmission lines are 105 to 115 feet on either side of the line, for a total of 210 to 230 feet. Typical ROW widths for 500-kV transmission lines are 120 to 170 feet on either side of the line, for a total of 240 to 340 feet (BPEIS, 1995). Typical ROW widths for 345-kV lines are not outlined in the BPEIS.

A new BPA structure will be required to replace the existing lattice tower located within the BPA easement (see Attachment J, Figure 4). The BPA replacement tower would reroute the three existing 345-kV power lines via an existing 200-foot-wide ROW within the leasehold through the substation and back to the replacement BPA tower. Two additional grounding lines may be required by BPA to bring the total number of power lines between the replacement tower and substation to eight. A visual simulation of the replacement tower is shown in Attachment L, Figure 10b). In addition to the replacement structure, two new transmission structures will be required to support the new transmission lines between the replacement BPA tower and the substation. New transmission structures, which will be steel monopole structures, are indicated on the site plan (see Attachment J, Figure 4).

Access and Maintenance Roads

The site will be accessed via Kittitas County and private roads that interconnect with Highway 970. The major County access road is Red Bridge Road. Only the southern portion of this road will be used and no construction access or delivery vehicles will cross the Red

Bridge. TSR has easement rights over Wiehl Road, a dedicated public road maintained privately and not by the County, and Loping Lane, a private road. Loping Lane is subject to several road use and cost-sharing agreements, and TSR will comply with any such applicable agreement. Additionally, TSR will work with neighbors who use Loping Lane to identify measures that will minimize disruption to their use during construction and to the roadway itself. TSR will videotape the conditions of the roads prior to construction to ensure the roads are returned to the same or better than conditions once the project is decommissioned. A network of existing and new maintenance roads will serve the project internally. The existing maintenance roads will be widened and graveled, where necessary. The roads will be improved pursuant to County requirements and turnarounds adequate for fire-protection-service vehicles will be established.

Per the Kittitas County Code and roadway standards (KCC, Chapter 12.01.090), Wiehl Road and Loping Lane would likely be improved to a 24-foot width to allow vehicles in both directions to pass safely at the same time. These roads could be paved, with culverts or drainage ditches constructed along the shoulders to prevent water from collecting on the roadway surface. Water could be channelized into a detention pond or catchment area, where it would be slowly released back into the ground. The County road standards suggest asphalt concrete pavement for roads with grades exceeding 10 percent. Because Wiehl Road (between Red Bridge and Loping Lane) is fairly steep, paving would likely be recommended. An alternative to paving is using layers of crushed stone or gravel to level and stabilize the roadway. The gravel layer would likely need to be between 8 and 21 inches deep, depending on the topography of the existing road. The size of the gravel and the density of the layers would need to be determined during engineering. Although gravel roads would allow some drainage to occur on the roadway surface, drainage ditches or culverts would likely still be necessary to prevent water from collecting. Attachment J, Figure 4f illustrates the proposed road improvements and turnarounds.

As set forth in the Draft DA, TSR will coordinate any improvements to these roads with the Kittitas County Public Works Department. Attachment J, Figure 3 shows the location of the access and maintenance roads in relation to the project site.

Summary of Construction Activities

Site preparation will consist of clearing the existing vegetation only in those areas where construction, grading, and road improvements will occur. Site preparation will be limited to maintenance roads, the O&M facility, the substation, and the solar facility. Once the site is prepared, and the materials are delivered to the staging areas within the cleared portion of the site, the installation of module foundations, field inverter pads and enclosures, field transformer pads, electrical conductors, substation switchyard foundation, overhead interconnection transmission line, and access and maintenance roads will begin. Materials and equipment used for the installation of the facilities is described below in the section titled, "Construction Materials and Equipment".

Site Preparation

The project site will require clearing to address the potential for damage to the project from blown down trees, decreased power efficiency of the solar modules from shading, the risk of

fire from fuel buildup within the project area, and the need to create a 100-foot firebreak along the project's perimeters as described below. To clear the site for installing the project, trees will be harvested within the project area on an as-needed basis for facilitating each construction phase of the project (Table 1). Trees will generally be harvested to a stump level of 6 to 12 inches above ground level. TSR will obtain a permit from WDNR and contract with a professional forester to harvest these trees in accordance with the Forest Practices Act (FPA). Because the bottoms of the solar modules will be approximately 3 feet above grade, any vegetation taller than 3 feet or expected to exceed 3 feet in height will be removed. Shrubs, grass, and groundcover will remain, to the maximum extent practicable, between rows and under the solar modules.

Trees within the 100-foot firebreak will be limbed up to 12 feet, as negotiated with Kittitas County Fire District 7. This minimizes the need to remove the entire tree, thus potentially decreasing the visual impact to nearby landowners. In addition, existing trees with a diameter base of 3 inches or greater will be replanted at a 3:1 ratio. Although there is no legal requirement for this mitigation, TSR is committed to undertaking efforts that will further the long-term sustainability of the land. These two measures will provide greater carbon sequestration, wildlife habitat, and soil stabilization opportunities than are currently available onsite. A more detailed discussion on vegetation management is included in Attachment G, *Vegetation Management Plan*.

Construction equipment such as tractors, backhoes, loaders, dozers, and graders will be needed to clear brush and vegetation from the site as needed, and to grade roads and foundation locations. If the slope of the land is excessive, terracing, or retaining walls may be required.

Staging Areas

Staging areas for parts and materials such as solar modules, electric cable, and structural supports will be needed. These staging areas will be located in areas where solar arrays will eventually be constructed, and will change location throughout the duration of the project. These will not add additional impact acreage to the project area and will not be permanent components of the project site. Staging will also occur near the O&M Building. Mobilization will last approximately 1 month during each phase of construction.

Construction Materials and Equipment

A concrete batch plant will not be located on site. Gravel and concrete for the project will be sourced in the Cle Elum area to the extent possible. Construction equipment such as backhoes, loaders, concrete trucks, and graders will likely be used. A crane may be necessary, but is typically not required.

Module Foundation Installation

Several module mounting types will be considered to best address the slope of land and soil stability at the project site. For example, large land areas with a slope toward the south are excellent for single-axis tracking systems (see Attachment J, Figure 4b). Land areas that are sloped to the east, southeast, west, or southwest will not as easily accommodate single-axis tracking systems, and are better suited to a fixed-tilt mounting structure (see Attachment J, Figure 4c).

The foundations securing the solar modules will be designed to withstand high winds and snow loads. The site may have multiple foundation types to match the ground conditions and type of mounting structures used. The mounting-system support structures could consist of embedded posts, poles, or structural steel angle. The embedment could be completed via a vibratory drill or similar installation method to depths of approximately 8 feet. Pending final design, the solar module foundations will require site work and potential boring.

The posts will not be anchored unless a patch of bedrock is encountered during installation. The embedment could be completed via a vibratory drill or similar installation method to depths of approximately 8 feet. After the posts are installed, they are held in place by friction from the surrounding soil, without the use of concrete. Driven piles develop their strength by utilizing a definable skin friction between the pile and the soil. As the pile is forced into the ground, the displaced material compresses and that, in turn, creates the friction at the pile/soil interface. Piles are typically driven to a depth that prevents seasonal and temporary changes from affecting their strength. A geotechnical engineer will determine the parameters to be used in the structural design. Attachment J, Figure 4d illustrates the footing installation methods for both the fixed tilt and single axis panels.

No concrete will be used when installing the foundations for the modules.

For one type of single-axis support approach, 1,936 posts are needed for every megawatt of energy. If the entire 75 MWdc were to be installed with this mounting system, then approximately 145,200 posts would need to be set. If a fixed-tilt approach were used, up to 8,000 steel angles would be needed. The impervious surface associated with these structures is presented in more detail in Attachment F.

Fixed-tilt systems typically have a galvanized or corrosion-resistant metal frame to hold the solar modules at a 20 to 30 degree tilt, as shown in Attachment K, Photo 8.

Dependent upon weather conditions at the site, installation of foundations, trackers, and modules will occur over a period of approximately 7 to 9 months during two or three construction seasons.

Field Inverter Pad and Enclosure Installation

Concrete use will be limited to the foundations for field inverters and field transformers, as well as the foundations for the substation buildings. Up to 80 field inverters will be needed for the project. A total of approximately 250 cubic yards of concrete, or 25 truck loads, will be needed for the 80 field inverter concrete pads.

Dependent upon weather conditions at the site, installation of field inverter pads and enclosures will occur over a period of approximately 5 to 6 months.

Field Transformer Pad Installation

Concrete use will be limited to the foundations for field inverters and field transformers, as well as the foundations for the substation buildings. A total of approximately 150 cubic yards of concrete, or 15 truck loads, will be needed for the 80 field transformer concrete pads. Dependent upon weather conditions at the site, installation of field transformer pads will occur over a period of approximately 5 to 6 months.

Electrical Conductor Installation

Underground 34.5-kV electrical conductors will connect the solar array field transformers and the proposed BPA substation transformers. These will be installed in trenches along improved maintenance roads onsite at depths of 36 inches or greater (KCC, Chapter 12.24.040). Conductors will be direct burial or in a polyvinyl chloride (PVC) conduit. A photo of typical trenching for underground cables is included in Attachment K, Photos 6 and 7.

Electrical conductors from the array field to the field inverters will be supported aboveground within the solar module framework and installed per NEC standards. Photos of typical trenching for underground cables are included in Attachment K, Photos 6 and 7.

Substation and Switchyard Foundation Installation

The substation will require an area of approximately 6 acres. The substation consists of a steel support structure that is 15 to 20 feet tall. The substation will be surrounded by a cyclone fence that is approximately 10 feet tall. The substation will include a small, enclosed, air-conditioned control building, approximately 1,000 square feet in area.

Approximately 135 truckloads of concrete will be necessary for the substation foundations and associated facilities. The concrete necessary for the substation includes 70 yards for the BPA control building (7 trucks), 40 yards for the switchgear buildings (4 trucks), 50 yards for the operations and maintenance building (5 trucks), 660 yards for the dead-end towers and overhead transmission line support structures (66 trucks), and 530 yards for the substation electrical equipment, including transformer, breakers, switches, and overhead bus foundations (53 trucks).

Overhead Interconnection Transmission Line Installation

Pending location of the substation, overhead electrical distribution lines may be required to connect the substation with BPA's transmission line. Two new structures supporting the overhead lines will be required from the facility to the substation and will be approximately spaced as indicated in the site plan. Spans between structures can range from 1,000 to 1,200 feet.

Access and Maintenance Road Installation

A network of existing and new maintenance roads will serve the project internally. The existing maintenance roads will be widened and graveled, where necessary. Approximately 751,000 square feet of roadway may require gravel surfacing improvements. These improved roadways will be approximately 8 inches deep, and will require up to 1,900 truckloads of gravel.

Paths for new maintenance roadways will be cut from existing grades. At least half of the cut material will be spread out on site. The remaining amount of cut earthwork will be hauled off-site in approximately 950 truckloads. The roads will be improved pursuant to County requirements and turnarounds adequate for fire-protection-service vehicles will be established.

Transportation and Traffic

Materials for the project (e.g., solar modules, supporting racks, foundation materials, electrical gear) will be brought to the site by truck. The trucks will travel on Interstate 90 (I-90) and access Highway 970 by way of County roads such as Red Bridge Road (see Attachment J, Figure 3), private roads such as Loping Lane, and public roads that are privately maintained such as Wiehl Road. An existing network of maintenance roads will provide road service within the project area, although new maintenance roads or segments may be necessary. Road improvements will be conducted as needed, and are anticipated to include upgrades to local gravel and dirt roads as discussed above in “Site Clearing and Grading”. Road improvements are further addressed in the DA with Kittitas County (see CUP, Attachment E). For further discussion of traffic impacts, see Attachment I, *Transportation Road Plan*.

Employment

A typical construction workforce for a multiple-megawatt solar facility consists of between 200 and 450 full-time workers during the construction period. Typically, 100 to 150 workers are involved in the site prep, and 100 to 150 are involved in installing the module footings. When the solar installation begins, the workload will peak, and will likely remain at between 300 and 450 workers for a period of up to 27 months (three 9-month construction seasons). Workers could be brought in by vanpool or bus. Workers will stay at local hotels and motels, as described in the Housing section of this document. Security crews will likely consist of up to eight workers. In addition, access control in the form of an electric gate with an associated keypad security code for entry will be installed.

Safety and Fire Protection

The fire protection needs of the site are currently served by WDNR. After the project is constructed, the site will likely be served by the Kittitas County Fire District 7, under a contractual agreement with TSR (see Attachment M). This agreement is currently pending finalization and approval. Further, the project will be bordered by a firebreak no less than 100 feet wide. Should the construction of the project require supplemental fire protection services, TSR will work with Kittitas County Fire District 7 to ensure that suitable fire suppression services are in place during the construction and ongoing operations of the project. Separate safety or fire protection systems will not be required at the site. Basic safety and fire protection equipment such as fire extinguishers, personal protective equipment, and other equipment as determined by the site’s safety and emergency response plan can be stored in the O&M equipment storage building.

A copy of the contractual agreement between TSR and Fire District 7 is included as Attachment M.

Police protection of the proposed project area is provided by the County Sheriff's Office. The construction contractor will notify the fire protection and police services of staging and active construction locations so these services can respond efficiently to emergencies, should any arise.

Water Use

Water will be needed for activities such as dust control and module cleaning. TSR proposes to truck in water from the Cle Elum area or elsewhere. Subject to any restrictions imposed by the County or the Washington Department of Ecology (Ecology), an alternative approach would be to establish a groundwater well onsite. For initial project permitting, it is assumed that water will be trucked to the site.

Sewer and Solid Waste

Sewer services are not anticipated. Portable toilets will be placed onsite during construction. The onsite toilets will require regular service visits.

Summary of O&M Activities and Components

Photovoltaic power plants typically have low O&M requirements. During the life of the plant, there will be regular O&M site activity. The actual O&M requirements will be determined by the specific plant components.

Materials and Equipment

A storage and O&M building will store spare parts (e.g., modules and fuses), equipment testing equipment, and cleaning equipment. The building will be constructed on site or pre-engineered in accordance with local and state building codes and it will have an overall footprint of approximately 1,000 square feet.

Transportation and Traffic

Routine vehicular traffic will occur along the site access roads and any maintenance roads within the PV array. One to two small to medium-duty pickup trucks will be required. Larger delivery trucks occasionally may be required if major equipment is in need of replacement such as structural elements, inverters, or large quantities of PV modules (not likely).

Employment

Personnel for system monitoring, maintenance, and troubleshooting will likely be needed onsite. The staff will work out of the O&M building and make frequent trips to the facility by way of passenger pickup truck or off-road vehicle. If issues regarding plant performance are detected, additional troubleshooting or maintenance may be required through special visits from vendors or specialty technicians.

Maintenance Activities

Routine onsite activities will consist of maintaining vegetation so that it does not interfere with operation of the plant (as often as weekly during periods of high rain and growth), and cleaning the solar modules of dirt and debris. Routine weed control will be required to ensure vegetation growth does not interfere with the operation of any equipment. For more details on noxious weed control, see Attachment G, *Vegetation Mitigation Plan*. The frequency of visits will be determined by the growth rate and density of the vegetation left

on the site once construction is complete. In a heavily vegetated area such as the proposed site, it is not anticipated that cleaning will be required on a weekly basis (as it would be in a desert environment). The firebreak will require periodic monitoring and clearing to remove vegetation buildup. It is anticipated that additional personnel may be required to monitor and secure the site.

In addition to maintaining the vegetation on site during project operations, TSR has committed to maintenance and operation of Wiehl and Loping during all seasons. That includes winter plowing of these roads.

Safety and Fire Protection

As previously discussed, separate safety or fire protection systems will not be required at the site. TSR will create and maintain a firebreak of no less than 100 feet between all outer edges of the project site and adjacent property lines. Basic safety and fire protection equipment such as fire extinguishers, personal protective equipment, and other equipment as determined by the site's safety and emergency response plan can be stored in the O&M equipment storage building.

A copy of the contractual agreement between TSR and Fire District 7 is included as Attachment M.

Police protection of the proposed project area is provided by the County Sheriff's Office. During the operational phase, TSR will contact fire protection and police services in the event of an emergency.

Water Use

The solar modules must be kept clear from dirt and debris, the presence of which can affect the performance of the PV plant. Because the proposed site is heavily vegetated and has sufficient rainfall, it is not anticipated that monthly washing will be required. Annual cleaning may be recommended based on soiling conditions. It may be possible to use special brushes in lieu of water to remove any dirt that accumulates on the solar modules. However, if it is determined that water is required for cleaning the solar modules or other purposes, a water tanker truck could be brought onsite to fill portable canisters with water to be used throughout the PV array.

Sewer and Solid Waste

Sewer services are not anticipated. If necessary, portable toilets can be placed onsite. Onsite toilets would require regular service visits.

Decommissioning and Site Restoration

In the event TSR decides to terminate operation of the project, the project will be decommissioned and the site will be restored.

At least 30 days prior to construction of the project, TSR will provide to the County for its approval an Initial project Decommissioning and Site Restoration Plan (the "Initial Plan"), prepared in sufficient detail to identify, evaluate, and resolve all major environmental

impacts, costs, and public health and safety issues reasonably anticipated by TSR at that time associated with decommissioning and restoring the project site. The Initial Plan will describe the measures that will be taken to decommission the project and restore the project site, including any measures necessary to protect the public against risks or danger resulting from decommissioning the project and restoring the project site.

Ninety days prior to decommissioning the project site, TSR shall submit a Final project Decommissioning and Site Restoration Plan (“Final Plan”) to the County for its approval. The Final Plan may contain measures to decommission the project and restore the project site different from the Initial Plan, provided that TSR explains in sufficient detail the reasons for any new or substantially different measures.

Subject to the Initial and Final Plans, decommissioning the project shall involve removal of the project’s components, including the solar panels, panel trackers, anchors, supports and mounts, inverter buildings, electrical conductors, substation, the O&M building, and any foundations or permanently fixed anchors to a depth of 3 feet below grade; the re-grading of any areas significantly impacted by the removal of any components; and removal of project maintenance roads and overhead cables (except for any roads, buildings, and/or power cables that project area landowners wish to retain) (all of which shall comprise “Decommissioning”). The Initial and Final Plans shall contain the measures necessary to fulfill TSR’s Decommissioning obligations.

Restoration of the project site shall be to a reasonable approximation of its original condition prior to construction allowing for any permanent improvements chosen by the underlying landowners to be left on site. Restoration procedures would be based on site-specific requirements and forest management techniques commonly employed at the time the area is to be reclaimed, and would include regrading, adding topsoil, and replanting of all disturbed areas with an approved seed mixture (all of which shall comprise “Restoration”). Decommissioned roads would be reclaimed or left in place. The Initial and Final Plans shall contain the measures necessary to fulfill TSR’s Restoration obligations.

Decommissioning the project and restoring the project site will occur within 12 months following the earlier of either terminating the Agreement or when the project is no longer in substantive operation. However, if the project stops generating electricity due to *force majeure*, mechanical breakdown, or malfunction, TSR may repair rather than decommission the affected project component(s).

Prior to commencing construction, TSR will post a bond or letter of credit in favor of the County to cover decommissioning costs. The initial amount of the bond or letter of credit will be set forth in the Initial Plan. If the project were terminated, the necessary authorization from any appropriate regulatory agencies would be obtained to decommission the project and restore the project site in accordance with the approved Final Plan.

As set forth in the Initial and Final Plans, aboveground facilities would be removed from the site, and unsalvageable material would be disposed of at authorized sites.

Decommissioning would consist of removing aboveground equipment, such as inverters, substations, and their associated foundations, to a depth of 3 feet below grade. Any foundations below 3 feet would remain. The ground surface would be regraded to natural

contours and revegetated to a natural condition. For several years after decommissioning, site disturbance would likely be visible upon close examination and the visual impacts of those aboveground elements that are not removed would remain. During the decommissioning process, similar impacts to those experienced during construction would occur but to a lesser extent because less construction material would likely be removed than was delivered to the project site. To avoid environmental damage and unnecessary land disturbance, underground collector cables likely would be retired in place, and any building or structural foundations would be removed to a depth of approximately 3 feet below grade, with the remainder likely retired in place. Decommissioned roads would be reclaimed or left in place. The soil surface would be restored as close as reasonably possible to its original condition. The Initial and Final Plans shall be prepared in sufficient detail to identify, evaluate, and resolve all major environmental impacts, costs, and public health and safety issues associated with decommissioning and restoring the project site. Accordingly, no significant unavoidable adverse environmental impacts, including those to rare or sensitive plants or animals from construction, operation, decommissioning, or restoration of the proposed project are expected.

Environmental Elements

Earth

a. General description of the site:

The proposed project site is located approximately 4 miles northeast of Cle Elum, Washington, in Township 20N, Range 16E, within Sections 22, 23, and 27 (see Attachment J, Figure 1 for site location). The site is located on the eastern slopes of the Cascade Mountains on Cle Elum Ridge, which runs generally from east to west at elevations ranging from approximately 2,200 to 2,600 feet (see Attachment J, Figure 2). The Teanaway River is approximately 1 mile to the northeast of Cle Elum Ridge. The site is accessed from Highway 970 by way of county roads such as Red Bridge Road, private roads such as Loping Lane, and Wiehl Road, which is a dedicated public road that is maintained privately and not by the County (see Attachment J, Figure 3). The project is located on approximately 477 acres of land within the 982-acre proposed project area.

The solar facility components and other related appurtenant improvements are described in detail in the project description above.

The ground surface elevation within the boundaries of the proposed solar facility ranges between 2,200 and 2,600 feet. The elevation along the potential transmission line varies from approximately 2,200 feet (near the location of the existing BPA transmission line) to approximately 2,300 feet (near the substation).

b. What is the steepest slope on the site and the approximate percentage of the slope?

The site would be located on a relatively flat terrace above the Teanaway River valley. Slopes on the site range from flat (0 percent) to approximately 25 percent. South-facing slopes where facilities would be constructed typically range from 10 to 20 percent. The project area does not contain steep slopes (i.e. greater than 33 percent slope) that will be impacted.

During the initial corridor selection process, TSR selected a corridor that minimized the need to site the facility components and other related appurtenant improvements in steep-slope areas. During the final design phase, TSR will conduct detailed slope evaluations to establish site gradients, and will locate structures, roads, and facilities to avoid adverse slopes.

- c. *What general types of soils are found on the site (e.g., clay, sand, gravel, peat, muck)? Please specify the classification of agricultural soils and note any prime farmland.*

The majority of the soils that underlie the project site consist of clayey-, silty-, sandy-loam of the Teanaway series. The Teanaway Loam series in the vicinity have similar soil texture and characteristics, but are divided into units based on slope angles. The Teanaway Loam is divided into soils on slopes from 3 to 10 percent, and on slopes from 25 to 50 percent. The loam is described as grayish-brown, well-drained soil formed in loess over glacial drift and alluvium terrace deposits. These soils occur at both the lower and higher elevations. Some volcanic ash influence exists near the surface at higher elevations. Although the NRCS data indicates the Teanaway soils have slopes up to 50 percent (NRCS, 2009), slopes measured during an on-site evaluation (November 2009) range from 0 to 25 percent.

The Teanaway loam is used for timber production, cropland, livestock grazing, wildlife habitat, recreation, and watershed. This soil type is not traditionally used for agriculture and do not constitute prime farmland. The native vegetation is ponderosa pine and Douglas-fir.

The subsurface conditions and engineering properties of the soils across the site can influence the engineering design and construction. Each of the components of the facility requires specific design calculations, drawings, and final engineering design for successful construction and future operation. Therefore, during final design of the facility a detailed geotechnical investigation and testing program will be conducted to evaluate the engineering properties of the soils. The information from the geotechnical investigation will be used to design the foundations securing the solar modules, inverter pads, and substation; and design proper roadway sections to carry the anticipated traffic loads, as well as applicable portions of the Kittitas County Code.

The potential geologic and soils hazards and erosion potential are discussed in detail in Attachment D: *Geology and Soil Hazards Evaluation*.

- d. *Are there surface indications or history of unstable soils in the immediate vicinity? If so, please describe.*

There is no indication of unstable soils in the immediate vicinity of the project. Unstable slopes and landslides are mapped along the steep valley walls along the Teanaway River valley; but none are mapped in the site boundaries and none were observed during the geologic reconnaissance. If, during geotechnical investigation and engineering design efforts, unstable soils are found, TSR will locate the project to avoid those areas. Areas with a slope of 0 to 25 percent are considered to have a low risk of erosion and landslides.

- e. *Describe the purpose, type, and approximate quantities of any filling or proposed grading. Also, indicate the source of fill.*

The construction contract may use imported gravel from a quarry located in West Cle Elum to fill the 10-acre area level-ground substation. The substation will contain a 6-inch-thick

layer of gravel, and no vegetation will be present. The overall estimated amount of gravel fill required for the substation will be 8,100 cubic yards (cy).

The construction contractor may use imported gravels or crushed rock as backfill for the transmission-structure auger holes, if required. If imported gravel is not required, the construction contractor will use native materials, removed when the auger holes are made, for backfill. If imported materials are used, the construction contractor will spread the native materials, resulting in a level area in the vicinity. The approximate quantity of fill material is 4.2 cy per structure. The project will include approximately up to four transmission line structures, which will require a total of 500 cy of fill. The construction contractor may also grade some areas to enable construction access and to create level areas for the structure locations.

The estimated transmission line-structure-related fill is no more than 500 cy. The amount of material required for surfacing the access roads is estimated to be 4,000 cy.

f. Could erosion occur as a result of clearing, construction, or use? If so, please describe.

The soils onsite are rated as moderately susceptible to erosion by water. Existing vegetation helps to resist erosion, and clearing of the vegetation during construction of roads will expose the soil to a higher risk of erosion during rainfall. To alleviate potential soil erosion, the construction contractor will use a Storm Water Pollution Prevention Plan (SWPPP) and Best Management Practices (BMPs) to minimize erosion and sediment transport during construction activities. These are described in Section *h* below, and in Attachment D: *Geology and Soil Hazards Evaluation*.

g. What percentage of the site will be covered with impervious surfaces after the project construction (e.g., asphalt or buildings)?

An increase in impervious area on the proposed project site is expected to be generated by the following: solar modules, power inverter enclosures, concrete pads, tower and transmission lines and three buildings that include a control house, switchgear building, and operations and maintenance facility. It should be noted that the impervious area created by a solar panel is considered to be the area of the foundation of the panels, not the panels themselves. The panels are considered a disconnected impervious surface because the infiltration capability of the soil is only affected by the foundation and native vegetation will be maintained underneath the panels. These project components total 1.17 acres of impervious area, which is less than one percent of the total project site.

Other project components that include maintenance and access roads and a 6-acre substation area are planned as gravel surfaces, which will allow for some infiltration. In addition, adjacent soils will absorb stormwater runoff.

h. Proposed measures to reduce or control erosion, or other impacts to the earth include:

The construction contractor will implement erosion-control measures during construction, including the following measures from the required Ecology National Pollutant Discharge Elimination System (NPDES) Individual Permit:

1. Maintenance of vegetative buffer strips between the areas affected by construction activities and any receiving waters

2. Installation of sediment fence and straw bale barriers
3. Straw mulching at locations that have suffered impacts
4. Provision of temporary sediment traps downstream of intermittent stream crossings
5. Provision of sediment-type mats downstream of perennial stream crossings
6. Planting of designated seed mixes at affected areas
7. Installation of a sediment fence along the downslope side of pulling and tensioning areas, as appropriate

The construction contractor will reseed all areas temporarily disturbed by the construction, as agreed upon with landowners. Where installed, sediment fences and check dams will remain in place until the affected areas are well vegetated and the risk of erosion has been eliminated. The construction contractor may remove the sediment fence at that time.

The construction contractor will construct roadways so that natural surface drainage is maintained.

Additional mitigation measures for soil erosion and geologic hazards are presented in Attachment D: *Geology and Soil Hazards Evaluation*.

Decommissioning

In the event TSR decides to terminate operation of the project, the project will be decommissioned and the site will be restored. TSR's decommissioning and restoration obligations are set forth in the CUP, Attachment E, and are summarized below.

Subject to a County-approved decommissioning plan, decommissioning the project shall involve removal of the project's components, including the solar panels, panel trackers, anchors, supports and mounts, inverter buildings, electrical conductors, substation, and O&M building, and any foundations or permanently fixed anchors to a depth of 3 feet below grade; the re-grading of any areas significantly impacted by the removal of any components; and removal of project maintenance roads and overhead cables (except for any roads, buildings, and/or power cables that project Area landowners wish to retain) (all of which shall comprise "decommissioning").

Following decommissioning, the project site shall be restored in accordance with a County-approved plan. The project restoration procedures will be based on site-specific requirements and forest management techniques commonly employed at the time the area is to be reclaimed, and will include regrading, adding topsoil, and replanting of all disturbed areas with an approved seed mixture (all of which shall comprise "restoration"). Decommissioned roads will be reclaimed or left in place. In sum, restoration of the project site shall be to a reasonable approximation of its original condition prior to construction allowing for any permanent improvements chosen by the underlying landowners to be left on site. Accordingly, there will be no increased incidence of erosion or impacts to soil quality are anticipated as a result of project decommissioning and site restoration. BMPs will be utilized to ensure no water or wind erosion will occur as a result of the removal of the project's components. In addition, all waste will be disposed of by a local waste removal company to an offsite location. This will prevent any potential soil contamination from oil,

herbicides, or other routinely used solvents. Accordingly, no significant unavoidable adverse environmental impacts from construction, operation, decommissioning, or restoration of the proposed project are expected. Please see the Project Description for more information about decommissioning and restoration.

Air

a. *What types of emissions to the air would result from this proposal (e.g., dust, automobile, odors, industrial wood smoke) during construction and after completion? Please describe and give approximate quantities.*

Construction activities will produce dust and heavy-duty-vehicle emissions. These emissions, which will include nitrogen oxides (NO_x), carbon monoxide (CO), and particulate matter less than 10 micrometers in aerodynamic diameter (PM₁₀; dust), will be temporary in nature. Although the quantity of these emissions is unknown at this time, the small number of vehicles to be used (see the Transportation section of this checklist) and the relatively short duration of the construction period will limit such emissions. The potential for dust generation will be greatest during dry, windy weather.

When the project is operational, no emissions from any source are expected.

Burning of woody debris from land clearing will produce combustion emissions, including NO_x, CO, and PM₁₀. It is TSR's intent not to burn woody debris, slash, or logging refuse. Any woody debris chipped on site will be put to a beneficial use (e.g., chipped material will be sent to a compost facility, used for paper or ground cover). If burning is necessary, TSR will secure the necessary permits from state agencies and no more than approximately 130 consumable tons of material will be burned.

b. *Are there any offsite sources of emissions or odor that may affect your proposal? If so, please describe.*

None. No offsite sources of emissions will affect the proposed project.

c. *Proposed measures to reduce or control emissions or other impacts to air:*

A Fugitive Dust Control Plan (FDCP), to help minimize air emissions from construction-related ground disturbance and traffic, will be developed before this project begins. The FDCP will include the following BMPs:

- Vehicles and equipment will comply with applicable state and federal emissions standards.
- Vehicles and equipment used during construction will be properly maintained to minimize exhaust emissions.
- Operational measures such as limiting engine idling time, minimizing driving speeds and shutting down equipment when not in use will be implemented.
- Open soil areas and road surfaces will be watered. TSR expects to have one water truck onsite during construction to minimize fugitive dust. In addition, a chemical tacifier may be utilized at the request of Kittitas County.

- Bussing and carpooling among construction workers will be required to minimize construction-related traffic and associated emissions.
- Disturbed sites will be revegetated in a timely manner with a seed mixture consistent with local vegetation.

Because the construction equipment and vehicles will be dispersed across a large, sparsely populated area, no impacts to surrounding residences are anticipated. Because the construction is of limited duration total construction emissions will be relatively minor.

Decommissioning

In the event TSR decides to terminate operation of the project, the project will be decommissioned and the site will be restored. TSR's decommissioning and restoration obligations are set forth in the CUP, Attachment E, and are summarized below.

Subject to a County-approved decommissioning plan, decommissioning the project shall involve removal of the project's components, including the solar panels, panel trackers, anchors, supports and mounts, inverter buildings, electrical conductors, substation, and O&M building, and any foundations or permanently fixed anchors to a depth of 3 feet below grade; the re-grading of any areas significantly impacted by the removal of any components; and removal of project maintenance roads and overhead cables (except for any roads, buildings, and/or power cables that project Area landowners wish to retain) (all of which shall comprise "decommissioning").

Following decommissioning, the project site shall be restored in accordance with a County-approved plan. The project restoration procedures will be based on site-specific requirements and forest management techniques commonly employed at the time the area is to be reclaimed, and will include regrading, adding topsoil, and replanting of all disturbed areas with a seed mixture consistent with local vegetation (all of which shall comprise "restoration"). Decommissioned roads will be reclaimed or left in place. In sum, restoration of the project site shall be to a reasonable approximation of its original condition prior to construction allowing for any permanent improvements chosen by the underlying landowners to be left on site. Accordingly, there will be no additional adverse impacts to the air quality are anticipated as a result of project decommissioning and site restoration. Proper BMPs will be utilized to ensure fugitive dust control. No burning of project components will occur as a result of decommissioning. There will be increased vehicle use, similar to that of construction levels. Accordingly, no significant unavoidable adverse environmental impacts from construction, operation, decommissioning, or restoration of the proposed project are expected. Please see the project Description for more information about decommissioning and restoration.

Water

a. Surface

1. *Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, and wetlands)? If yes, describe the type and provide names and into which stream or river it flows.*

Biologists identified and delineated a total of 12 wetlands and six ephemeral streams within the site survey area (see Attachment J, Figure 5). The wetlands cover 0.97 acre within the survey area.

Wetland boundaries were determined using procedures found in *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory, 1987) and in *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valley and Coast* (USACE, 2008). Some wetlands extend outside the proposed project area.

Eleven of the wetlands (W1 through W11) are classified as palustrine emergent (PEM) (Cowardin), depressionnal (HGM) wetlands. Wetlands W1 through W6 are located in the northeast portion of the project area, and W7 through W11 are located adjacent to roads. W12 is a manmade pond located near the southwest corner of the project area (see Attachment J, Figure 5) and is classified as a PEM, riverine wetland. W12 is NWI-mapped as *palustrine emergent, semi-permanently flooded*.

Six streams within the Teanaway River and Yakima River watersheds flow within the survey area (see Attachment J, Figure 5). Five streams were mapped by WDNR. All five are classified as *non-fish, seasonal*. All of the streams flow into ponds, ditches, and vegetated swales. Water from these tributaries not used for irrigation practices may eventually flow into the Yakima River several miles to the south with the following exception. One unnamed tributary (S6) flows directly into the Teanaway River, which flows into the Yakima River.

Table 3 shows the waterbody name, width, type, and eventual hydrologic connection for each drainage of the potentially jurisdictional waters.

TABLE 3
Streams Summary Table

Waterbody Name	Width (feet)	Type	Hydrologic Connection
S1	2-5	Ephemeral	Yakima River
S2	2-6	Ephemeral	Yakima River
S3	2-5	Ephemeral	Yakima River
S4	2-4	Ephemeral	Yakima River
S5	2-5	Ephemeral	Yakima River
S6	1-2	Ephemeral	Yakima River

The biologists presume that all of the investigated wetlands and waterbodies are potentially jurisdictional under federal regulations for wetlands and waters of the United States. A final determination will be made by USACE.

TSR recognizes that there are six Type-4 streams with widths greater than 2 feet within the proposed project area. These streams will contain the maximum required riparian buffer of 20 feet, pursuant to 17A.07.010 of the KCC, which will not be impacted by any permanent or temporary structure (see Attachment J, Figure 5). The proposed design of the project

incorporates a 100-150 foot buffer around wetlands W1-W11 and a 150-300 foot buffer around wetland W12 where no permanent structures are proposed.

The *Wetland Delineation Report* (see Attachment B) provides additional discussion of wetlands and drainages within the project corridor.

2. *Will the project require any work within 200 feet of the described waters? If yes, please describe and attach available plans.*

TSR will work within 200 feet of described waters but will avoid siting solar modules directly within potentially jurisdictional waters (see Attachment J, Figure 4). All wetland and stream buffers pursuant to the KCC will be followed. Impacts to all potentially jurisdictional wetlands and waters are avoided (see Attachment J, Figure 4).

3. *Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of the fill material.*

The proposed project will not result in any fill or removal of material in surface waters or wetlands.

4. *Will the proposal require surface water withdrawals or diversions? Please provide description, purpose, and approximate quantities:*

The proposed project will not require new surface water withdrawals or diversions.

5. *Does the proposal lie within a 100-year floodplain? If so, please note the location on the site plan.*

The proposed project does not lie within a 100-year floodplain (see Attachment J, Figure 8).

6. *Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.*

The proposed project does not involve any discharge of waste materials to surface waters.

b. Ground

1. *Will ground water be withdrawn, or will water be discharged to ground water? Please give description, purpose, and approximate quantities.*

The construction contractor will neither withdraw groundwater nor discharge water to groundwater during project construction. Construction of the project may involve water use for dust control. The construction contractor will arrange for delivery of water to the active construction site using water trucks from a source with an existing water right. TSR will neither withdraw groundwater nor discharge to groundwater during project operations.

2. *Describe waste material that will be discharged into the ground from septic tanks or other sources (e.g., domestic sewage; industrial, containing the following chemicals...; agricultural; etc.). Describe the size and number of the systems, houses to be served; or, the number of animals or humans the systems are expected to serve.*

TSR does not anticipate the discharge of waste materials into the ground during construction or operation. The construction contractor will use onsite portable toilets during construction.

c. Water Runoff (Including Stormwater):

1. *Describe the source of runoff (including storm water) and method of collection and disposal. Include quantities, if known. Describe where the water will flow, and whether it will flow into other water.*

Runoff on the site will come from rainfall and snowstorm events in the project area. Impervious areas created by the construction of the proposed project are disconnected. Thus, the natural drainage of the project site is not expected to change.

There are two main drainage basins on the project site, the North Drainage Basin drains north to the Teanaway River and the South Drainage Basin drains south to a stream that flows to the Teanaway River. Existing and proposed project conditions were modeled using the Natural Resources Conservation Service Technical Release 55 Methodology. The 2-, 10- and 100- year, 6-hour and 10-year, 24-hour storms were evaluated using Type 1A storm distributions for each basin.

The largest increase in peak discharge for the 6-hour storm events occurred during the 100-year storm in the South drainage basin (9.90 cfs). At the point of discharge to the Teanaway River, the total contributing drainage basin area is 195 square miles. Using a direct proportion of drainage basin area to flow (FEMA data reports recorded the total size of the drainage basin to be 207 square miles and have a 100-year discharge of 7,350 cfs), the flow in the Teanaway River at the discharge point is expected to be approximately 6,924 cfs during a 100-year storm event. An increase of 9.90 cfs results in a 0.14 percent increase in flow during the 100-year storm event. From a flooding standpoint, this increase is determined to be negligible when compared to the contribution of the entire watershed at the point of discharge from the project site.

For the 10-year, 24-hour duration storm, the largest increase in peak discharge occurred in the South drainage basin (33.60 cfs). Again, using a direct proportion of drainage basin area to flow (FEMA data reports recorded the total size of the drainage basin to be 207 square miles and have a 10-year discharge of 5,300 cfs), the flow in the Teanaway River at the discharge point is expected to be approximately 4,993 cfs during a 10-year storm event. An increase of 33.60 cfs results in a 0.67 percent increase in flow during the 10-year storm event. From a flooding standpoint, this increase is determined to be negligible when compared to the contribution of the entire watershed at the point of discharge from the project site.

Increases in rainfall runoff rates and volumes experienced by the onsite natural drainages will be managed using infiltration to the maximum extent practicable and stormwater BMPs will also be implemented if necessary.

2. *Could waste materials enter ground or surface waters? If so, please describe.*

Waste materials will not enter ground or surface waters. Waste materials stored at the staging areas will have secondary containment to prevent entrance into ground or surface waters. The construction contractor will establish buffers to prevent waste materials from entering surface waters. The construction contractor will also remove waste materials from the project area upon completion of construction activities. The construction contractor will implement the following BMPs to minimize the release of waste materials into ground or surface waters:

- During project construction, vehicle servicing and refueling will occur offsite in a temporary staging area equipped for fuel or oil spills.
- Existing roads located immediately adjacent to jurisdictional wetlands within the project area will be disused during project construction.
- Construction flagging and signage will be installed to clearly identify stream and wetland buffers within the project area so that they are avoided by project activities.
- Onsite vehicles will be monitored for petroleum leaks. Spills will be cleaned up immediately upon recovery and reported to the appropriate agency.
- Few hazardous materials will be used during project construction or operation – primarily small amounts of lubricants and cleaning solutions. Any hazardous waste material generated by project construction or operation will be disposed of in a manner specified by local and state regulations or by the manufacturer.
- Cleanup materials will be kept readily available onsite, either at the equipment storage area, O&M building or on the construction contractor’s trucks.

d. Proposed Measures to Reduce or Control Surface, Ground, and Runoff Water Impacts, If Any:

A Washington Construction Stormwater Individual Permit (1200-C) administered by the Washington State Department of Ecology will regulate construction activities. This permit requires BMPs to minimize possible impacts from erosion or other impacts to soil and waterways. Increases in rainfall runoff rates and volumes will be managed by on-site infiltration to the maximum extent practicable. As required by the conditions outlined in the permit authorization, any permanent erosion-control measures will be implemented with final design of the project.

There are three basic types of stormwater BMPs that will be considered during the design and implementation of the project: source control, water quality treatment, and flow control. Source control BMPs are measures that are directed toward pollutant-generating activities that will help prevent pollution or other adverse effects of stormwater. Water quality treatment BMPs remove pollutants from stormwater by filtration, biological uptake, adsorption, and gravity settling. The need for water quality BMPs is based on the types of pollutants generated by a project and the vulnerability of the receiving waters to the pollutants of concern. Flow control BMPs control the rate, frequency, and/or flow duration of stormwater runoff through infiltration, evaporation, or detention facilities with infiltration being the preferred method wherever possible. The concept of detention is to collect runoff from a developed area and release it at a slower rate than it would typically run off the site.

Stormwater management involves careful application of source controls, site design principles, and construction techniques in order to protect a watershed. Some potential stormwater BMPs for the site include, but are not limited to, infiltration ponds; infiltration trenches; infiltration swales; large, extended-detention wet ponds; and extended-detention wetlands. Facilities will be designed in accordance with the standards outlined in the Eastern Washington Stormwater Management Manual in order to protect water quality in

the receiving waters and reduce the impacts of development on the watershed. Guidance on stormwater BMPs and Low Impact Development (LID) were provided by the Washington Department of Ecology; however, they were not included in the list of facilities above. Stormwater BMPs provided in the Eastern Washington Stormwater Management Manual were more applicable to the rural setting of the project and also account for location and climate in the project area.

Decommissioning

In the event TSR decides to terminate operation of the Project, the Project will be decommissioned and the site will be restored. TSR's decommissioning and restoration obligations are set forth in the CUP, Attachment E, and are summarized below.

Subject to a County-approved decommissioning plan, decommissioning the Project shall involve removal of the Project's components, including the solar panels, panel trackers, anchors, supports and mounts, inverter buildings, electrical conductors, substation, and O&M building, and any foundations or permanently fixed anchors to a depth of 3 feet below grade; the re-grading of any areas significantly impacted by the removal of any components; and removal of project maintenance roads and overhead cables (except for any roads, buildings, and/or power cables that project Area landowners wish to retain) (all of which shall comprise "decommissioning").

Following decommissioning, the project site shall be restored in accordance with a County-approved plan. The project restoration procedures will be based on site-specific requirements and forest management techniques commonly employed at the time the area is to be reclaimed, and will include regrading, adding topsoil, and replanting of all disturbed areas with an approved seed mixture (all of which shall comprise "restoration"). Decommissioned roads will be reclaimed or left in place. In sum, restoration of the project site shall be to a reasonable approximation of its original condition prior to construction allowing for any permanent improvements chosen by the underlying landowners to be left on site. Accordingly, no additional adverse impacts to water quality or increased water use are anticipated as a result of project decommissioning and site restoration. Impacts to wetlands and streams are not anticipated during decommissioning through the use of avoidance measures and BMPs. BMPs will be also be utilized to ensure no water quality impacts from increased soil erosion and sedimentation. In addition, all waste will be disposed of by a local waste removal company to an offsite location. This will prevent any potential water contamination from oil, herbicides, or other routinely used solvents. Accordingly, no significant unavoidable adverse environmental impacts from construction, operation, decommissioning, or restoration of the proposed project are expected. Please see the project Description for more information about decommissioning and restoration.

Plants

a. Check or circle types of vegetation found on the site:

The following sections describe the vegetation categories found in the survey area. Detailed plant descriptions are included in Attachment A.

Results indicated five natural habitat types within the survey area. Most of these can be named by using the Chappel et al. (2001) system of vegetation classification. Project area natural vegetation types are as follows:

- Ponderosa Pine Forest and Woodlands
- Open Water – Lakes, Rivers, and Streams
- Herbaceous Wetlands
- Riparian
- Upland Aspen Forest

These habitat types are described below.

Ponderosa Pine Forest and Woodlands

Ponderosa Pine Forest and Woodlands vegetation is the dominant vegetation category found on the proposed project site. The project site has been actively managed as commercial timberlands for the past 100 years. The proposed project area was last logged in 2001-2002, leaving relatively few trees per acre and open stands of predominantly ponderosa pine (*Pinus ponderosa*). Crown cover of larger ponderosa pine, commercial grade, (greater than 8 inches diameter at breast height [dbh]) currently is approximately 10 to 15 percent across the proposed project site. Ponderosa pine stands growing on site are dominated by an overstory of 50-year-old ponderosa pine trees with a subcomponent of Douglas fir (*Pseudotsuga menziesii*) trees. Saplings of both species are present in the understory.

The understory is dominated by a mixture of native bunchgrass species, including Idaho fescue (*Festuca idahoensis*), bluebunch wheatgrass (*Pseudoroegneria spicata*), squirreltail (*Elymus elymoides*), and western wheatgrass (*Pascopyrum smithii*). Common native forbs in the understory are arrowleaf balsamroot (*Balsamorhiza sagittata*), yarrow (*Achillea millefolium*), silky lupine (*Lupinus* spp.), sticky purple geranium (*Geranium viscosissimum*), and Oregon checkermallow (*Sidalcea oregana* var. *procera*).

The variety of Oregon checkermallow found on site is the more common of two varieties of this species. A second variety of this checkermallow (*Sidalcea oregana* var. *calva*) was federally listed under the Endangered Species Act as Endangered on December 22, 1999 (64 FR 71680). Rare plant surveys completed for the proposed project site in 2009 determined that the Oregon checkermallow variety found on site is not the endangered variety. An additional rare plant survey and habitat inventory may need to be completed in the spring of 2010, prior to construction.

Non-native species, such as bulbous bluegrass (*Poa bulbosa*), ventenata (*Ventenata dubia*), and rush skeletonweed (*Chondrilla juncea*) are abundant in many areas. Rush skeletonweed is a Class B noxious weed in Washington.

Open Water—Lakes, Rivers, and Streams

Several ephemeral streams and one artificially ponded area occur within the proposed project area. Streambeds were vegetated to varying extents and all dry at the time of the field visits (June and July 2009). Typical herbaceous grass and forb species within most dry channels include Brewer's navarretia (*Navarretia brewerii*), poverty oatgrass (*Danthonia spicata*), and small tarweed (*Madia exigua*). Other channels were dominated by dense shrub

and herb species including Woods' rose (*Rosa woodsii*), snowberry (*Symphoricarpos albus*), cinquefoil (*Potentilla* spp.), and Oregon checkermallow (*Sidalcea oregana* var. *procera*).

Herbaceous Wetlands

Herbaceous wetland habitats within the survey area consist of depressional wetlands dominated by herbaceous vegetation. Exposed soils were cracked, which is evident of altering drying and wetting periods. Water arrives as either snowmelt or rain. These wetlands support hydrophytic herbaceous vegetation and meet the criteria for hydric soils and wetland hydrology. Common plant species within these wetlands were creeping spikerush (*Eleocharis palustris*), Parry's rush (*Juncus parryi*), marsh cudweed (*Gnaphalium palustre*), and several sedge (*Carex* spp.) species. The non-native, annual grass ventenata (*Ventenata dubia*) had invaded most of the depressional wetlands and dominated them as they dried. Herbaceous wetlands are located within the proposed project area boundary but will not be impacted by project activities (see Appendix A, Figure 2).

Riparian

Riparian habitat is found adjacent to some of the ephemeral stream channels in the survey area. Riparian habitat is located in the transitional area between the stream channel and ponderosa pine forest. It typically consists of a dense shrub layer composed of a mixture of oceanspray (*Holodiscus discolor*), mountain spiraea (*Spiraea betulifolia*), Woods' rose (*Rosa woodsii*), and ponderosa pine. Oregon checkermallow (*Sidalcea oregana* var. *procera*) was often found in the understory of these areas.

Upland Aspen Forest

A small grove of aspen (*Populus tremuloides*) forest occurs along one drainage and around an artificially impounded pond in the southwestern portion of the survey area. Associated species include ponderosa pine, snowberry, and wild rose. This aspen grove is within the proposed project area boundary, but will not be impacted by project activities as it is located outside of the proposed project site boundary (see Appendix A, Figure 2).

b. *What kind and amount of vegetation will be removed or altered?*

The project site will require clearing to address the potential for damage to the project from blown down trees, decreased power efficiency of the solar modules, the risk of fire from fuel buildup within the project area, and the need to create a 100-foot firebreak along the project's perimeters as provided below. To clear the site for installing the project, trees will be harvested within the project area on an as-needed basis for facilitating the next construction phase of the project. Trees will generally be harvested to a stump level of 6 to 12 inches above ground level. The Applicant will obtain a permit from WDNR and contract with a professional forester to harvest these trees in accordance with the permit. Because the bottoms of the solar modules will be approximately 3-4 feet above grade, any vegetation taller than 3 feet or expected to exceed 3 feet in height will be removed. Shrubs, grass, and groundcover will remain, to the maximum extent practicable, between rows and under the solar modules.

The project will not affect any listed Washington Department of Fish and Wildlife (WDFW) Priority Habitat or habitats listed under the WDNR Natural Heritage Program (NHP)

database. No high-value or Category I or II habitats will be affected (see Attachment A). Any impacts to Category III habitats will be mitigated and minimized as described below.

c. *List threatened or endangered species known to be on or near the site.*

No threatened or endangered plant species were identified within the survey area.

d. *Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:*

Detailed information on the proposed mitigation measures for vegetation is included in Attachment G. In summary, the following measures are proposed:

- Vegetation removal and disturbance during construction will be restricted to the area designated for solar modules and related facilities, and vegetation adjacent to the access roads. Soil disturbances will be reduced by seeding with an approved native seed mix once project construction is complete.
- Vegetation clearing will occur along some existing ROWs for road widening and improvement. Vegetation along existing ROWs is primarily herbaceous plant species. Some shrubs and trees may be removed for the widening of access roads; however, TSR proposes to minimize the removal of these species when possible.
- Herbaceous vegetation taller than 3 feet will be temporarily cleared for the placement of the solar modules. After construction, vegetation inspections will be performed and herbaceous vegetation growth will be allowed up to a height of 3 feet, at which time the vegetation will be trimmed. Noxious weeds such as spotted knapweed (*Centaurea stoebe*) will be controlled within the project area.
- The solar modules will contain nonvegetated buffers. These buffers will be maintained as a firebreak. To prevent shading, soiling, and damage from windthrow, no trees will be permitted within the buffer. The site will be maintained to prevent the regrowth and reestablishment of saplings or trees in these areas.
- The proposed project is designed to avoid impacts to wetlands and streams. Thus, no wetland or stream vegetation will be cleared during project development or maintenance. All impacts to wetlands and waters will be avoided.
- Vehicles will avoid riparian areas, areas within wetlands, or areas within wetland buffers by driving only on access roads. Sediment will be prevented from entering streams and wetlands through the use of BMPs. For further discussion of the BMPs that will be implemented to prevent soil erosion and stream sedimentation, please see the Earth and Water sections of this SEPA Supplement.
- Up to 200 feet of clearance will be needed for the proposed overhead line. Vegetation will be cleared for the proposed powerline route to grid interconnection. Similar to the substation, it has yet to be determined if certain elements of the transmission line will be owned and constructed by BPA, but for purpose of environmental review and this permit application, all elements of the line and the substation (up to the point of interconnection with BPA's existing transmission line) are proposed as part of the

project. Areas cleared of vegetation will be maintained for noxious weed control and to prevent woody seedling growth

- Where appropriate, development will be located in already disturbed areas, including previously logged lands, existing transmission corridors, and ROWs. However, when impacts are unavoidable, alternative means of compensation mitigation will be considered.

WDFW Wind Power Guidelines

In 2003 and 2009, WDFW adopted guidelines to address fish and wildlife habitat protection, conservation and mitigation related to the development of wind energy facilities. The purpose of the WDFW Wind Power Guidelines is to provide consistent statewide guidance for the development of land-based wind energy projects that avoid, minimize and mitigate impacts to fish and wildlife habitats in Washington State. Specifically, the guidelines were largely designed to address concerns due to the unique nature of wind turbines and wind power projects, including avian and bat strikes, liability under the Migratory Bird Treaty Act, avian behavioral modification and migration displacement through the installation of tall wind turbines, and lack of research regarding avian migration and response to FAA-approved lighting configurations. Because the concerns over high wind turbines largely do not apply to solar farms, the Guidelines are not applicable to the TSR project. Nonetheless, TSR has used the same approach to species and habitat identification, and will implement the following additional measures to minimize and mitigate any impacts that may occur.

Best Management Practices

BMPs will be implemented during construction to avoid and reduce temporary and permanent impacts to the extent practicable. No state or federally listed species were observed onsite. However, in the event that a state or federally listed threatened or endangered plant or wildlife species is observed during project development, work will be halted immediately and a qualified biologist notified.

BMPS will be implemented wherever surface disturbances occur. These measures include, but are not limited to, the following:

- Trees will generally be harvested to a stump level of 6 to 12 inches above ground level. TSR will obtain a permit from the WDNR and contract with a professional forester to harvest these trees in accordance with the Forest Practices Act.
- It is TSR's intent not to burn woody debris, slash, or logging refuse. Any woody debris chipped on site will be put to a beneficial use (e.g., chipped material will be sent to a compost facility, used for paper or ground cover). If burning is necessary, TSR will secure the necessary permits from the state agencies and no more than approximately 130 consumable tons of material will be burned.
- Slash production from logging will use a chipper, such as the Hydro-ax, to de-limb and process slash and small trees. This will be done in confined staging areas on or next to proposed or current roadways. The resulting chips could be used as composting chips, ground cover, or erosion control material, or taken to a mulch center for recycling. Kittitas County has a new compost center north in Ellensburg, which is approximately

25 miles from the project site. No slash or brush piles permanently left on the project site to inadvertently impact herbaceous vegetation cover.

- All trees, shrubbery, and other vegetation not designated for removal will be protected from damage caused by the project construction.
- Areas of temporary soil disturbance will be seeded with the specified temporary seed mix.
- Install filter bags, sediment fences, sediment filter fabric traps, and graveled construction accesses as necessary for erosion control, where possible.
- Cover stockpiles with impervious materials when unattended or during rainfall.
- Locate construction staging areas for storage, maintenance, and fueling of construction equipment minimum of 150 feet from creeks or wetlands. Show staging areas on the construction plans.
- Petroleum products and other harmful material will be prevented from entering wetland or waterways at all times.
- Upon completion of construction, seed or plant all areas temporarily disturbed by construction activities with native plants.
- Erect construction fencing along buffered boundaries of all wetland and riparian areas and aspen groves within the proposed project site prior to construction to avoid inadvertent impacts to these habitats.
- Monitor areas used for staging after construction to determine if impacts to these areas are temporary. If weeds invade or native plants on these sites appear dead or unhealthy the year following construction, weeds will be controlled and these areas will be overseeded with the same seeding mixture described for other disturbed areas.
- Where seeding is necessary, seeding mixture consisting of 12 pounds of PLS from a certified weed-free source will be planted on this prepared surface at a ratio of 4 pounds of bluebunch wheatgrass (*Pseudoroegneria spicata*), 2 pounds of Idaho fescue (*Festuca idahoensis*), 2 pounds of prairie junegrass (*Koeleria macrantha*), 2 pounds needle-and-thread grass (*Hesperostipa comata*), 1 pound of arrowleaf balsamroot (*Balsamorhiza sagittata*), and 1 pound of silky lupine (*Lupinus sericeus*).
- Weed monitoring and any necessary control efforts will be completed annually.
- Ground application of herbicides will be with a dripless wand applicator carried over the site either on foot in a backpack sprayer or in a tank on a rubber-tired all-terrain vehicle (ATV). Herbicide(s) used will be limited to types that do not move through the soil and whose affect is immediate but short-lived. Herbicide(s) used will be approved for use near or in wetlands to avoid unintentional affects to aquatic species.
- Herbicide mixes may be colored with dye to aid in post-application monitoring.
- The first pass of each application will be made parallel to the buffer zones in such a way that chemicals cannot drift into the buffers.

- Wetland buffers will be maintained and are described in detail in Attachment B, *Wetland Delineation Report*.

Mitigation

Possible avoidance and mitigation measures may include the following:

- Implement micrositeing: slight relocations of project facilities to avoid rare plant populations.
- Remove and conserve plants; replant following construction.
- Replant disturbed area with seed obtained from a qualified cultivator of rare plants.
- Mitigate by seeding an approved offsite area with the same species.

Mitigation will require approval of the agencies, as well as monitoring for a defined period of time.

Specific Mitigation Measures

Existing trees with a diameter at breast height (dbh) of 3 inches or greater will be replanted at a 3:1 ratio. Although there is no legal requirement for this mitigation TSR is committed to undertaking efforts that will further the long term sustainability of the land. This measure will provide greater carbon sequestration, wildlife habitat, and soil stabilization opportunities than are currently available onsite.

TSR proposes to form a TAC to address mitigation for tree replacement. Stakeholders invited to participate in TAC include TSR, Kittitas County, Kittitas County Fire District 7, WDNR, and WDFW at a minimum. At this time, Kittitas County, WDFW, and WDNR have agreed to participate (see Appendix C to Attachment G). Once plantings are in place, the success of plantings will be monitored annually for 3 years by TSR by installing monitoring plots. Plots will be monitored for seedling survival for the duration of 3 years. If the viable seedlings meet or exceed 150 stems 3 years post planting, the site is considered fully stocked and WDNR will close the FPA permit. An annual monitoring report will be sent to Kittitas County, WDNR, and WDFW, at a minimum.

Areas temporarily disturbed by construction activities, including the areas under solar arrays, will be revegetated with native species. Annual revegetation monitoring will be undertaken to ensure that all seeded revegetation sites meet a minimum cover standard of 70 percent cover composed of predominantly native species within 3 years. A general seeding mixture consisting of 12 pounds per acre of pure live seed (PLS) from a certified weed-free source will be planted on disturbed sites at a ratio of 4 pounds of bluebunch wheatgrass (*Pseudoroegneria spicata*), 2 pounds of Idaho fescue (*Festuca idahoensis*), 2 pounds of prairie junegrass (*Koeleria macrantha*), 2 pounds needle-and-thread grass (*Hesperostipa comata*), 1 pound of arrowleaf balsamroot (*Balsamorhiza sagittata*), and 1 pound of silky lupine (*Lupinus sericeus*).

Several small roads segments located near wetlands will be abandoned during construction of the project to avoid impacts to the wetland resource.

Decommissioning

In the event TSR decides to terminate operation of the project, the Project will be decommissioned and the site will be restored. TSR's decommissioning and restoration obligations are set forth in the CUP, Attachment E, and are summarized below.

Subject to a County-approved decommissioning plan, decommissioning the project shall involve removal of the Project's components, including the solar panels, panel trackers, anchors, supports and mounts, inverter buildings, electrical conductors, substation, and O&M building, and any foundations or permanently fixed anchors to a depth of 3 feet below grade; the re-grading of any areas significantly impacted by the removal of any components; and removal of project maintenance roads and overhead cables (except for any roads, buildings, and/or power cables that project area landowners wish to retain) (all of which shall comprise "decommissioning").

Following decommissioning, the project site shall be restored in accordance with a County-approved plan. The project restoration procedures will be based on site-specific requirements and forest management techniques commonly employed at the time the area is to be reclaimed, and will include regrading, adding topsoil, and replanting of all disturbed areas with an approved seed mixture (all of which shall comprise "restoration"). Decommissioned roads will be reclaimed or left in place. In sum, restoration of the project site shall be to a reasonable approximation of its original condition prior to construction allowing for any permanent improvements chosen by the underlying landowners to be left on site. Accordingly, there will be no additional adverse impacts to vegetation onsite are anticipated as a result of project decommissioning and site restoration. Disturbed areas will be restored through replanting with a native seed mixture. Accordingly, no significant unavoidable adverse environmental impacts from construction, operation, decommissioning, or restoration of the proposed project are expected. Please see project Description for more information about decommissioning and restoration.

Animals

No federal- or state-listed threatened or endangered species were found during field surveys. CH2M HILL biologists conducted reconnaissance-level field surveys on June 16 through June 19 and on July 9, 2009. Surveys were conducted by walking transects spaced 30 meters apart. Both audible and visual observations of avian and mammal species were recorded. Attachment A, *Sensitive Species Surveys* report (see Attachment A), further discusses the results of the wildlife field survey. Measures designed to avoid, minimize, or mitigate impacts to wildlife are as provided above.

- a. *Circle any birds and animals which have been observed on or near the site or are known to be on or near the site:*

Birds – hawks, heron, eagle, songbirds, other

The Priority Habitat and Species (PHS) database identifies three species that are *candidates* for federal or state listing with some, however unlikely, potential to occur within the proposed project area (see Attachment A, Tables 3 and 4). The database includes potential occurrences of both black-backed woodpecker and mountain quail approximately 1.0 mile from the project area. In addition, several occurrences of northern goshawk are documented

approximately 1.5 to 1.8 miles from the northern edge of the proposed project area. The black-backed woodpecker occurrence is approximately 1 mile from the project area's southernmost boundary.

Field biologists did not observe any federal- or state-listed threatened or endangered wildlife species within the survey area. A state candidate species, the white-headed woodpecker (*Picoides albolarvatus*), was observed in the northwest portion of the survey area. Biologists observed both male and female woodpeckers close to the main access road. The male was observed foraging in a stand of adult ponderosa pine, while the female was located excavating a nest in a snag approximately 10 feet from the road.

It is unlikely that any black-backed woodpeckers will be affected by project development because activities relating to this project will not involve the documented area. Black-backed woodpeckers require habitat with stands of mature conifers that have experienced a burn event within the last 5 years. No stands of burned, mature conifer trees exist in the project area. In addition, the proposed project is unlikely to affect any mountain quail or northern goshawk habitat, as no activities related to this project will occur near the PHS listing.

Mammals – deer, bear, elk, beaver, other

The PHS database was queried for elk and mule deer habitat regions. Priority habitats for these large mammals do not occur within the proposed project area. According to the PHS database, the closest elk wintering habitat is across the Teanaway River, approximately 0.8 to 1.5 miles from the proposed project area.

During the course of field surveys, a small herd of roughly six elk cows and two mule deer with fawns was identified in the northwest portion of the proposed project area. This area is used as a calving and fawning area during spring and summer. During fall, the herds travel east to the PHS regions located along the Teanaway River.

TSR will propose both onsite mitigation in accordance with WDFW guidelines to avoid and minimize impacts to wildlife habitat. Payment in lieu will be implemented to offset additional impacts to potential wildlife habitat. Please see Attachment H-Wildlife Mitigation Plan for detailed information about mitigation for impacts to wildlife habitat.

A study of cougars conducted by WDFW biologists from 2001 to 2007 estimates the total population density at 4.97 cougars per 100 square kilometers in the area surrounding the Teanaway River, with 1.50 adult males and 1.15 adult females per 100 square kilometers respectively (Cooley et al., 2009a). The remaining estimate consists of juveniles (younger than 24 months) and kittens. The population is composed primarily of older animals, indicating the population is stable. Cooley et al. (2009a) determined the mean age of adult cougars in the area surrounding the Teanaway River based on 65 known specimens. The mean age of males was 60 months (5 years), while the mean age of females was 69 months (5.4 years). A separate study found the average annual survival rate was 0.71 percent for adults (Cooley et al., 2009b), with approximately 1.12 kittens maturing per female each year (Cooley et al., 2009b).

Based on the available data, it is unlikely that any grizzly bears occur within the proposed project area. Currently, bears are only known to occur in one 100-mile area in the Okanogan

Highlands. No evidence of the sight being used by grizzly bear was observed during 2009 field surveys. In addition, there are no occurrences listed in the WDFW or USFWS databases, verified or unverified, of bears in the surrounding region.

Fish – bass, salmon, trout, herring, shellfish, other

The project area contains several ephemeral streams. Project construction will not disturb vegetation within these waterbodies. Although the project area contains no fish-bearing streams, the construction contractor will implement BMPs adequate to protect fish habitat. Because no in-water work is anticipated as a project activity, TSR did not conduct any fish field surveys.

b. List any threatened or endangered species known to be on or near the site.

The survey team did not find any threatened or endangered species in or near the survey area.

Prior to field surveys, biologists searched the WDFW PHS and WDNR NHP databases for any documented occurrences of listed species within 3 miles of the project area. Agency data did not show any threatened or endangered species occurring within the project area. The PHS database documented occurrences of northern goshawk, black-backed woodpecker, northern spotted owl, and mountain quail occurring within 3 miles of the project area. Because of a lack of suitable habitat, it is unlikely that any of these species occur within the project area. Moreover, the survey team did not observe these species in the survey area.

c. Is the site part of a migration route? If so, explain.

Because of this seasonal migration, portions of the project area may be used as a migratory corridor for large, migrating ungulates. However, this route was not identified during the 2009 field survey effort. Portions of the project area include an upland ponderosa pine forest stand, which may provide habitat for several species of wildlife. During spring, elk and mule deer typically use this type of habitat as a calving and fawning ground.

The PHS data identified regions of elk and mule deer habitat across the Teanaway River, north of the proposed project area. The nearest known PHS regions occur between 0.8 and 1.5 miles from the proposed project area

TSR has considered impacts to potential elk movements and migration during the design of the proposed project layout. TSR proposes onsite mitigation to preserve potential migration corridors and elk habitat in the northeast and southwest portion of the project area. In addition, micrositing of solar arrays will result in a wide access corridor between solar arrays to allow for elk movement between these areas. Please see Attachment H-Wildlife Mitigation Plan for detailed information about mitigation for impacts to wildlife habitat. No fencing will occur along the property boundary. Such fencing is not required to be installed, per the National Electrical Code (NEC).

Decommissioning

In the event TSR decides to terminate operation of the Project, the Project will be decommissioned and the site will be restored. TSR's decommissioning and restoration obligations are set forth in the CUP, Attachment E, and are summarized below.

Subject to a County-approved decommissioning plan, decommissioning the Project shall involve removal of the project's components, including the solar panels, panel trackers, anchors, supports and mounts, inverter buildings, electrical conductors, substation, and O&M building, and any foundations or permanently fixed anchors to a depth of 3 feet below grade; the re-grading of any areas significantly impacted by the removal of any components; and removal of project maintenance roads and overhead cables (except for any roads, buildings, and/or power cables that project area landowners wish to retain) (all of which shall comprise "decommissioning").

Following decommissioning, the project site shall be restored in accordance with a County-approved plan. The project restoration procedures will be based on site-specific requirements and forest management techniques commonly employed at the time the area is to be reclaimed, and will include regrading, adding topsoil, and replanting of all disturbed areas with an approved seed mixture (all of which shall comprise "restoration"). Decommissioned roads will be reclaimed or left in place. In sum, restoration of the project site shall be to a reasonable approximation of its original condition prior to construction allowing for any permanent improvements chosen by the underlying landowners to be left on site. Accordingly, there will be no additional adverse impacts to wildlife or wildlife habitat are anticipated as a result of project decommissioning and site restoration. No threatened or endangered species are present onsite, and thus no listed species will be affected. Temporary impacts in the form of increased noise levels and human activity may occur during project decommissioning; however, these are expected to be temporary in nature and will not result in permanent impacts to wildlife. Please see project Description for more information about decommissioning and restoration.

Energy and Natural Resources

- a. *What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.*

Minimal amounts of energy will be used to meet the completed project's energy needs; the completed project will produce electricity. A minimal amount of energy will be used to heat and light the O&M facility; however, this energy will be derived from the solar energy facility.

- b. *Would your project affect the potential use of solar energy by adjacent properties?*

The Project will not affect the potential use of solar energy by adjacent properties. Any shadows from transmission line-structures would have minimal, if any, effect on adjacent properties. The shadows from the solar facility components and other related appurtenant improvements will not interfere with the potential use of solar energy by adjacent properties.

- c. *What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts:*

Minimal amounts of energy will be used to meet the completed project's energy needs. No energy conservation features are included in the plans of this proposal.

Decommissioning

In the event TSR decides to terminate operation of the Project, the Project will be decommissioned and the site will be restored. TSR's decommissioning and restoration obligations are set forth in the CUP, Attachment E, and are summarized below.

Subject to a County-approved decommissioning plan, decommissioning the Project shall involve removal of the project's components, including the solar panels, panel trackers, anchors, supports and mounts, inverter buildings, electrical conductors, substation, and O&M building, and any foundations or permanently fixed anchors to a depth of 3 feet below grade; the re-grading of any areas significantly impacted by the removal of any components; and removal of project maintenance roads and overhead cables (except for any roads, buildings, and/or power cables that project area landowners wish to retain) (all of which shall comprise "decommissioning").

Following decommissioning, the project site shall be restored in accordance with a County-approved plan. The project restoration procedures will be based on site-specific requirements and forest management techniques commonly employed at the time the area is to be reclaimed, and will include regrading, adding topsoil, and replanting of all disturbed areas with an approved seed mixture (all of which shall comprise "restoration"). Decommissioned roads will be reclaimed or left in place. In sum, restoration of the project site shall be to a reasonable approximation of its original condition prior to construction allowing for any permanent improvements chosen by the underlying landowners to be left on site. Accordingly, there will be no additional adverse impacts to energy or natural resources are anticipated as a result of project decommissioning and site restoration. The decommissioning effort will not require additional energy consumption and will not affect the potential solar energy use of adjacent properties. Accordingly, no significant unavoidable adverse environmental impacts from construction, operation, decommissioning, or restoration of the proposed project are expected. Please see the project Description for more information about decommissioning and restoration.

Environmental Health

- a. *Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal?*

Once the project is completed, there will be minimal exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste. In addition, a letter from REC Solar (see Appendix G to Attachment H) states, "the modules are silicon based and do not contain hazardous materials such as cadmium which is used in some other types of solar modules. The modules do contain a small amount of lead solder which is fully encapsulated. Even in the event of damage to the modules, there is no potential for the lead to be released into the environment." At the end of this 25-year life cycle, the solar modules will be recycled by the manufacturer.

During construction, the construction contractor may use small amounts of lubricants and solvents and will follow appropriate measures to prevent spills and contamination. Except for fuel and oil used in construction equipment, the construction contractor will use no combustible materials. During construction activities, the potential for fires and accidents may exist. However, the construction contractor will construct the project in accordance

with applicable federal, state, and County regulations that pertain to fire prevention, presuppression, and suppression. In addition, a letter from REC Solar (see Appendix G to Attachment H) states, "the photovoltaic modules, manufactured by REC Solar AS, which would be utilized on this project are constructed of glass, aluminum and silicon with PTE foil backsheet and EVA encapsulate. In addition, all other materials used on the solar arrays are steel, aluminum, and copper. As the primary materials are non-flammable we do not anticipate that modules would be considered a fire hazard during a forest fire."

1) *Describe special emergency services that might be required.*

This project does not require any special emergency services related to environmental health.

2) *Proposed measures to reduce or control environmental health hazards, if any:*

TSR will construct the project to comply with applicable federal, state, and industry standards that address environmental health standards, such as clearances, grounding, lightning protection, and fire protection.

During construction, the construction contractor will implement standard safety measures to reduce or control environmental health hazards. The construction contractor will employ the following BMPs to reduce or control the potential for environmental health hazards:

- Monitoring onsite vehicles for petroleum leaks; the construction contractor will clean up spills immediately upon recovery and report such spills to the appropriate agency
- Disposing of hazardous waste material generated by project construction and operation in a manner specified by local and state regulations or by the manufacturer
- Keeping cleanup materials readily available onsite, either at the equipment storage area or on the construction contractor's trucks

PV arrays will be set back 100 feet from the perimeter of the property to allow for proper firebreaks. In addition, spacing between PV arrays will be 10 feet, to provide for adequate maintenance and fire prevention space.

During operation, TSR will continue to implement applicable BMPs to reduce or control environmental health hazards.

b. *Noise*

1) *What types of noise exist in the area which may affect your project (e.g., traffic, equipment, operation, other)?*

The nature of the project is such that it is unaffected by noise.

2) *What types and levels of noise are associated with the project on a short-term or a long-term basis (e.g., traffic, equipment, operation, other)? Indicate what hours the noise would come from the site.*

During construction, the project will expose nearby residences to increased noise from construction equipment. Typical equipment the construction contractor is likely to use during construction includes pickup trucks, line trucks, graders and bulldozers, backhoes, boring equipment, tractor-trailers, cranes, drum pullers and tensioners, harrows, and

broadcast seeders. Construction equipment typically produces noise levels of 75 to 90 decibels on an A-weighted scale (dBA) at a distance of 50 feet from the construction activity. Noise levels from construction equipment will vary and will be temporary in nature. Construction will occur during daylight hours (7 a.m. to 7 p.m.) and is anticipated to last for several weeks at a given location for up to 9 months over a period of 2 to 3 years.

Sources of potential noise during construction include vehicular traffic noise and equipment noise such as chainsaws, rollers, bulldozers, pile drivers, and diesel engines. Sources of noise during operations include solar tracking devices, transformer and switchgear noise from substations, corona noise from transmission lines, vehicular traffic noise, and maintenance facility noise.

A detailed noise study was not conducted as part of the Teanaway Solar Reserve project. The closest inhabited structure is located 290 feet from project facilities.

A noise analysis performed for a proposed solar facility of a similar size (60 MW) in Sarnia, Ontario, indicated that the potential daytime and nighttime operational noise footprint of an approximately 60-MW solar project is not discernable at more than 100 feet from the project boundary. The noise sources for the project, the transformers and inverters, located in each PV block, will be at least 290 feet from the nearest noise receptors, including any residences.

The closest residence will be approximately 290 feet from the transmission line. There are two types of noise associated with transmission lines: corona noise and aeolian noise. The corona noise is breakdown of air into charged particles caused by the electrical field at the surface of conductors. In close proximity to the transmission line, such as at the edge of the ROW, noise levels are approximately 40 dBA to 50 dBA. A whisper is approximately 30 dBA and the ambient noise in a home is approximately 50 dBA.

Aeolian noise is the noise created from wind blowing from the transmission structures. This type of noise is usually infrequent and depends on wind velocity and direction (Aspen Environmental Group, 2009). Research by the Electric Power Research Institute has shown that the fair-weather aeolian noise from transmission lines to be generally indistinguishable from background noise at the edge of a ROW of 100 feet or more.

Per Kittitas County's Noise Ordinance (Chapter 9.45, Sections 9.45.010), "it is unlawful to create, or to allow property in one's possession or control to be used so as to create any loud, unpleasant, or raucous noise which unreasonably disturbs the peace, comfort, or repose of others" (Ord. 99-09, 1999; Ord. 95-14 § 1, 1995). In addition, noise disturbances referred to in KCC 9.45.010 may include, but are not limited to, continuous or repetitive sound from the following sources:

1. Operating motors, engines, motorcycles and snowmobiles in a capricious manner, to be plainly audible within any dwelling unit which is not the source or is generated within 200 feet of any dwelling unit
2. Playing amplified or otherwise loud music and voice amplification either live or recorded
3. Yelling or shouting at a continuous loud level of sound

4. Allowing domestic animals to bark, howl, or otherwise make noise either on private or commercial premises for extended periods of time
5. Use of noise-making fireworks except for duly authorized or approved public displays (Ord. 99-09, 1999; Ord. 95-14 § 2, 1995).

The project is expected to be well within the compliance standards of the Kittitas County Noise Ordinance.

3) *Proposed measures to reduce or control noise impacts:*

Noise levels during construction of the solar facility components and other related appurtenant improvements will depend on the specific construction methods used. Construction noise will be localized and temporary.

To minimize noise impacts, the construction contractor will limit construction activities to daylight hours (7 a.m. to 7 p.m.), and all equipment will have sound-control devices.

Decommissioning

In the event TSR decides to terminate operation of the project, the project will be decommissioned and the site will be restored. TSR's decommissioning and restoration obligations are set forth in the CUP, Attachment E, and are summarized below.

Subject to a County-approved decommissioning plan, decommissioning the project shall involve removal of the project's components, including the solar panels, panel trackers, anchors, supports and mounts, inverter buildings, electrical conductors, substation, and O&M building, and any foundations or permanently fixed anchors to a depth of 3 feet below grade; the re-grading of any areas significantly impacted by the removal of any components; and removal of project maintenance roads and overhead cables (except for any roads, buildings, and/or power cables that project Area landowners wish to retain) (all of which shall comprise "decommissioning").

Following decommissioning, the project site shall be restored in accordance with a County-approved plan. The project restoration procedures will be based on site-specific requirements and forest management techniques commonly employed at the time the area is to be reclaimed, and will include regrading, adding topsoil, and replanting of all disturbed areas with an approved seed mixture (all of which shall comprise "restoration"). Decommissioned roads will be reclaimed or left in place. In sum, restoration of the project site shall be to a reasonable approximation of its original condition prior to construction allowing for any permanent improvements chosen by the underlying landowners to be left on site. Accordingly, there will be no additional adverse impacts to environmental health are anticipated as a result of project decommissioning and site restoration. All waste will be disposed of by a local waste removal company to an offsite location. This will prevent any potential hazard of human exposure from oil, herbicides, or other routinely used solvents.

It is unlikely that emergency services will be necessary during the decommissioning and restoration effort; however, the Kittitas County Planning Department and Kittitas County Fire District 7 will be notified prior to the engaging in decommissioning and restoration.

Noise levels during decommissioning of the solar facility components and other related appurtenant improvements will be similar to construction levels. This noise will be localized and temporary. To minimize noise impacts, the decommissioning and site restoration efforts will be limited to daylight hours (7 a.m. to 7 p.m.), and all equipment will have sound-control devices. Accordingly, no significant unavoidable adverse environmental impacts from construction, operation, decommissioning, or restoration of the proposed project are expected. Please see the project Description for more information about decommissioning and restoration.

Land and Shoreline Use

a. What is the current use of the site and adjacent properties?

The site is currently zoned Forest and Range (F&R) (Figure 5). The site was most recently selectively logged in 2001–2002, and existing site vegetation consists of low grasses, shrubs, and plants with scattered 50- to 60-foot, 6- to 18-inch-diameter ponderosa pine (*Pinus ponderosa*) trees.

The adjacent properties are zoned as Commercial Forest (CF), Rural 3, and F&R (Figure 6).

b. Has the site been used for agriculture? If so, please describe.

No, the proposed project site has not been used for agriculture. The site is currently zoned F&R and was most recently logged in 2001–2002.

c. Describe any structures on the site.

No structures are currently present on the proposed project site. TSR selected the proposed project site to maximize significant insulation capacities and sunlight, optimize slopes for year-round energy production, provide adequate site accessibility, avoid environmentally sensitive areas, and minimize visibility from offsite locations.

d. Will any structures be demolished? If so, please describe.

TSR is not proposing to demolish any structures as part of this project.

d. What is the current zoning classification of the site?

The proposed project site is located within the F&R zone in Kittitas County.

e. What is the current comprehensive plan designation of the site?

The current comprehensive plan designation of the proposed project site is Rural.

f. What is the current shoreline master program designation of the site?

The proposed project will not be located within 200 feet of any rivers designated under the shoreline master program. The closest river with such a designation under Washington Administrative Code (WAC) 173-18-230 is the Teanaway River, which is located approximately 1.0 mile from the proposed project site (see Attachment J, Figure 8).

g. Has any part of the site been classified as an “environmentally sensitive” area? If so, please specify.

Section 17A.02.060 of the Kittitas County Code (KCC) designates the following habitats and ecosystems as critical areas consistent with state statute (RCW 36.70A.030[5]):

1. Wetlands;
2. Areas with a critical recharging effect on aquifers used for potable water;
3. Fish and wildlife habitat conservation areas;
4. Frequently flooded areas; and
5. Geologically hazardous areas.

The following subsections further define these designated “critical areas.” TSR will mitigate the critical areas that the project affects in accordance with the KCC, Critical Areas Ordinance (CAO), and federal and state requirements. The Critical Areas permit application is included as part of the Kittitas County conditional use permit.

Wetlands

CH2M HILL conducted a wetlands and other waters delineation in June and July 2009 for the proposed project.

The proposed project is located in the Teanaway River and Yakima River watersheds within the Yakima River basin and Upper Yakima subbasin. Tributaries within the project site flow into ponds, ditches, and vegetated swales. Water from these tributaries not used for irrigation practices eventually flows into the Yakima River with the exception of one unnamed tributary (S6), which flows directly into the Teanaway River. Wetlands within the project site are hydrologically connected to these tributaries.

Twelve wetlands were delineated (see Table 4). They total 0.97 acre within the survey area (see Attachment J, Figure 8). All of the wetlands were determined to be PEM (Cowardin) depressional (HGM) wetlands except wetland W12, which was determined to be a riverine (HGM) wetland. Table 4 lists the separate wetlands within the proposed project area. (See *Environmental Elements: Water a. Surface* in this checklist for more details.)

TABLE 4
Wetlands Summary Table

Wetland ID	Wetland Acreage	Cowardin Type	HGM Type	Wetland Adjacent to RPW	Wetland Adjacent to Non-RPW	USACE Jurisdiction	State Jurisdiction
W1	0.010	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W2	0.004	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W3	0.030	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W4	0.067	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W5	0.004	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES

TABLE 4
Wetlands Summary Table

Wetland ID	Wetland Acreage	Cowardin Type	HGM Type	Wetland Adjacent to RPW	Wetland Adjacent to Non-RPW	USACE Jurisdiction	State Jurisdiction
W6	0.253	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W7	0.231	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W8	0.027	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W9	0.013	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W10	0.019	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W11	0.006	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W12	0.312	PEM	Riverine	NO	YES	Potentially – if significant nexus to TNW	YES

The survey team delineated wetlands within the proposed project area in accordance with *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory, 1987) and *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (USACE, 2006), and distinguished buffers based on 17A.04.020 of the KCC. The *Wetland Delineation Report* (see Attachment B) provides a detailed analysis of the stream classifications for the streams/jurisdictional waters in the project area.

There will be no impacts to wetlands or waters in Washington from the construction of solar PV arrays, transformers, the O&M building, switchgear structures, or the powerline route to the grid.

TSR recognizes that there are three Category III wetlands greater than 10,000 square feet within the proposed project area. Wetlands W1, W3, W5, W6, and W7 will contain a buffer of 80 feet, which will not be impacted by any permanent or temporary structure and wetlands W2, W4, W8, W9, W10, and W11 will have a 25-foot buffer (see Attachment D, Figure 5) pursuant to Section 17A.04.020 of the KCC.

Wetland functional assessments showed moderate to high potential and opportunity to provide amphibian habitat and high potential and opportunity to provide invertebrate habitat. However, no evidence of amphibians or invertebrates (burrows, casings, shells, water, mating calls, etc.) were observed in wetlands W1-W11 on the surface or within the upper 20" of soil pits. Wetland W12 is the only wetland with likely habitat for invertebrates or amphibians. The eastern Washington wetland-rating system was not tested on wetlands less than 1/10 acre (only wetlands W6, W7, and W12 are greater than 0.10 acre in size); therefore, more focus was placed on field observations and best professional judgment to determine wetland functions. Most of the delineated wetlands were also sparsely vegetated

or dominated by non-native species (*Ventenata dubia*) providing poor habitat for aquatic wildlife. Based on WDFW functional assessment data and field observations, wetlands W1-W7 exhibit low habitat function due to an absence of invertebrates, amphibians, aquatic birds, aquatic mammals, and low to moderate native plant diversity. Buffers for these wetlands should therefore be between 25 and 75 feet. Based on WDFW functional assessment data and field observations, wetlands W8-W11 exhibit low habitat functions due to an absence of invertebrates, amphibians, aquatic birds, aquatic mammals, and little or no native plant diversity. Buffers for these wetlands should therefore be between 25 and 75 feet. Wetland W12 exhibits moderate to high habitat functions based on habitat suitability for a variety of aquatic species. Buffers for this wetland should be between 150 and 300 feet.

The proposed project also incorporates a 100-150 foot buffer around all potential wetlands within the project area where no permanent structures are proposed to further avoid and/or minimize impacts on wetland habitat. Wetland W12 has a 150-foot buffer with all proposed permanent structures sited 150-300 feet from the wetland.

TSR will revegetate temporarily disturbed areas with an appropriate seed mix consisting of native shrubs, forbs, and grasses developed using applicable state and federal guidelines and plant lists. Permanently disturbed areas will be maintained to prevent the occurrence of noxious weeds (see Attachment G.)

Critical Aquifer Recharge Areas

Section 17A.02.020 of the KCC defines areas with a critical recharging effect on aquifers used for potable water as “*areas where an aquifer that is a source of drinking water is vulnerable to contamination that would affect the potability of the water (WAC 365-190-030[2]).*”

This project will not have an impact on critical aquifer recharge areas (see Attachment J, Figure 8). Per Section 17A.08.010 of the KCC, no critical aquifer recharge areas have been identified by the County. All nearby wells have been identified (see Attachment J, Figure 8) and will be avoided. No hazardous materials that may contaminate the ground or surface water will be utilized or stored on site. The solar modules are silicon based and do not contain hazardous materials such as cadmium which is used in some other types of solar modules. The modules do contain a small amount of lead solder that is fully encapsulated. Even in the event of damage to the modules, there is no potential for the lead to be released into the environment.

During construction, the construction contractor may use small amounts of lubricants and solvents and will follow appropriate measures to prevent spills and contamination.

Fish and Wildlife Habitat Conservation Areas

Section 17A.02.090 of the KCC defines fish and wildlife habitat conservation areas as follows:

1. *Those lands in Kittitas County owned or leased by the Washington State Department of Fish and Wildlife;*
2. *Those lands donated to or purchased by Kittitas County for corridors pursuant to RCW 36.07A.160;*
3. *Wetlands;*
4. *Big game winter range;*
5. *Riparian habitat;*

6. *Habitats for species of local importance.*

There are no lands owned or leased by WDFW within the project area. Also, there are no lands purchased by Kittitas County pursuant to RCW 36.017A.160, which requires the County to designate “open space corridors within and between urban growth areas.” Because no such corridors are located in the project area, they are not affected by the proposed project.

The project area contains wetlands. However, impacts to wetlands will be avoided. All category-specific buffers will be observed and BMPs will be in place to avoid impacts to wetlands and riparian habitat, where practicable. Please see the Wetlands section directly above and Waters section for a more detailed discussion of these areas.

There are no areas of important wildlife habitat within the project area. This includes big game winter habitat and habitats for species of local importance. The project will not affect any listed WDFW Priority Habitat or habitats listed under the WDNR NHP database. The nearest PHS habitat is between 0.8 and 1.5 miles from the site.

The Animals section Attachment H, *Wildlife Mitigation Plan* in this checklist discusses detailed wildlife, habitat, and proposed mitigation measures.

Frequently Flooded Areas

Section 17A.02.140 of the KCC defines areas of special flood hazard as “*the one-hundred year floodplain, which are lands subject to a one percent or greater chance of flooding in any given year as designated by the Federal Emergency Management Federal Insurance Rate Map for Kittitas County.*”

The project area does not contain or affect any 100-year floodplains according to the Federal Emergency Management Agency floodplain areas (see Attachment J, Figure 9). The nearest 100-year floodplain is adjacent to the Teanaway River and is approximately 450 feet from the project area.

Geologically Hazardous Areas

Section 17A.02.150 of the KCC defines geologically hazardous areas as “*areas that because of their susceptibility to erosion, sliding, earthquake, or other geological events, are not suitable to the siting of major commercial, residential or industrial development consistent with public health or safety concerns without proper engineering consideration and design. The term commercial shall not be construed to include natural resource activities.*”

The proposed project is not “commercial, residential, or industrial development” as defined by the KCC. TSR will select the placement and locations of the facility components to minimize susceptibility to erosion, sliding, earthquakes, and other geological events, consistent with proper engineering consideration and design.

Based literature review, soil data, site geologic reconnaissance, and published geologic information, the project can be designed, constructed, and operated safely to minimize or avoid adverse geologic and soil impacts. No direct impacts from geologic hazards such as landslides or earthquakes are anticipated from design, construction, and operation of the project. The potential for soil erosion during and after project construction and operation will be minimized by adherence to an erosion control plan, BMPs, and the mitigation

measures. Site grading, roads, and stable cut slopes will be incorporated into final design to minimize or avoid potential impacts that could endanger the project components.

No areas of slopes steeper than 33 percent were observed during on-site field work (November 2009). Slopes of this steepness are primarily present along the edges of the Teanaway River valley, outside the project boundaries. No roads, structures, or other facilities would be constructed on slopes steeper than 33 percent. Therefore, it is not anticipated that slopes will pose a potential hazard nor interfere with the performance of new roads or structures.

Potential geological hazards and soil limitations are discussed in further detail in the Earth section of this checklist and Attachment J, Figure 10, Designated Critical Areas: Erosion-Prone Soils and Geologic Hazards. Soil data, geologic features, site photos, and an in-depth discussion of geology and soils are presented in detail in Attachment D.

h. How many people would reside or work in the completed project?

The project will not result directly in any people residing in the project area.

i. How many people would the completed project displace?

The project will not result in the displacement of any people.

j. Please list proposed measures to avoid or reduce displacement impacts:

The project will not create displacement impacts.

k. List proposed measures to ensure the proposal is compatible with existing and projected land uses and plans:

The proposed project is compatible with the existing and projected land uses and plans with the approvals and permits described in the following subsections. This includes compatibility with the *Kittitas County Comprehensive Plan* (Kittitas County, 2006), and the Kittitas County Code.

TSR will submit all necessary applications for local land use approvals and permits in Washington to ensure that the project is compatible with existing and projected land uses and plans. These land use approvals and permits include those described below.

Forest Practices Act Permit

The FPA permit will be obtained through WDNR. Trees will be removed from the site only as necessary to install facilities. Trees will be left onsite wherever practicable.

Conditional Use Permits

TSR will submit a conditional use permit (CUP) application to Kittitas County consistent with the comprehensive plans and zoning ordinances for both jurisdictions.

The project is defined as a "*Major alternative energy facility*" in KCC Section 17.61.010(9) and may be authorized in the F-R zoning district through approval of a CUP per KCC Section 17.61.020(4).

Kittitas County has indicated that the size and complexity of the project generate the need for a Development Agreement (DA) between TSR and the County. A Draft DA is provided as Attachment E to the CUP. The DA will condition and govern the CUP.

Critical Areas Permit

The proposed project site includes wetlands, which are critical areas as defined in Section 17A.02.060 of KCC and are described in more detail in item (g). Therefore, TSR has applied for a Critical Areas Permit as part of the Kittitas County CUP.

Decommissioning

In the event TSR decides to terminate operation of the project, the project will be decommissioned and the site will be restored. TSR's decommissioning and restoration obligations are set forth in the CUP, Attachment E, and are summarized below.

Subject to a County-approved decommissioning plan, decommissioning the project shall involve removal of the project's components, including the solar panels, panel trackers, anchors, supports and mounts, inverter buildings, electrical conductors, substation, and O&M building, and any foundations or permanently fixed anchors to a depth of 3 feet below grade; the re-grading of any areas significantly impacted by the removal of any components; and removal of project maintenance roads and overhead cables (except for any roads, buildings, and/or power cables that project Area landowners wish to retain) (all of which shall comprise "decommissioning").

Following decommissioning, the project site shall be restored in accordance with a County-approved plan. The project restoration procedures will be based on site-specific requirements and forest management techniques commonly employed at the time the area is to be reclaimed, and will include regrading, adding topsoil, and replanting of all disturbed areas with an approved seed mixture (all of which shall comprise "restoration"). Decommissioned roads will be reclaimed or left in place. In sum, restoration of the project site shall be to a reasonable approximation of its original condition prior to construction allowing for any permanent improvements chosen by the underlying landowners to be left on site. Accordingly, there will be no additional adverse impacts to land use, shoreline areas, or critical areas are anticipated as a result of project decommissioning and site restoration. All wetlands and streams will be avoided during decommissioning. The Applicant will adhere to the construction buffers of 150 feet for each wetland and 20 feet for each stream.

Critical aquifer recharge areas will not be affected, as all water required for decommissioning and site restoration will be arranged for delivery to the active decommissioning site using water trucks from a source with an existing water right. The Applicant will neither withdraw groundwater nor discharge to groundwater during project operations.

No construction will take place in a fish and wildlife habitat conservation area or in a floodplain, thus the decommissioning and site restoration efforts will avoid these areas as well.

BMPs will be utilized to ensure no water or wind erosion associated with the removal of the project's components and site restoration. Geologically hazardous areas will be avoided to

further reduce potential impacts. Accordingly, no significant unavoidable adverse environmental impacts from construction, operation, decommissioning, or restoration of the proposed project are expected. Please see the project Description for more information about decommissioning and restoration.

Housing

a. *Approximately how many units would be provided? Indicate whether it is high, middle, or low-income housing.*

The proposed project involves the construction and operation of the Teanaway Solar Reserve on private land in an unincorporated area of Kittitas County, and does not include the development of any new housing units.

The direct average employment in during each of the 7- to 9-month construction periods is estimated at 450 workers (see Attachment N *Economic Impact Analysis for the Teanaway Solar Reserve, Kittitas County, Washington*). TSR is committed to utilizing a local workforce and thus, the number of construction workers expected to be transient to Kittitas County will be small enough that adequate temporary housing provided by hotels and motels is available to meet project needs. No housing units will be developed as part of the proposed project.

According to the 2005–2007 American Community Survey 3-Year Estimates, Kittitas County has 9,180 estimated housing units, including 5,464 owner-occupied units and 2,729 renter-occupied units (U.S. Census Bureau, 2009). The vacancy rate is estimated to be 8.8 percent.

According to the Cle Elum Roslyn Chamber of Commerce (2009), approximately 20 hotels and motels are available in the Cle Elum Roslyn area.

For a review of the 14 closest hotels and motels, see Table 5. TSR spoke with employees at each hotel and motel listed in Table 5 (Dinges, 2010). During the summer months, when construction will occur, the number of vacant rooms ranges from 102 to 417 rooms. This will provide enough temporary housing for many of the estimated 450 workers.

TABLE 5
Hotel and Motel Vacancy Rates near the Proposed Project Site

Hotel Name	Address	Contact Number	Room Rate ⁽¹⁾	Vacancy Rate*	Total Rooms	Rooms Available	Distance to project (miles)
Best Western Snow Cap Lodge	809 W Davis St Cle Elum, WA	(509) 674-0200	\$89	50-30%	50	15-25	8
Stewart Lodge	805 West 1st Street, Cle Elum, WA	(509) 674-4548	\$74 - \$84	0-100%	37	up to 37	8
Cascade Mountain Inn	906 East 1st Street, Cle Elum, WA	(877) 747-8713	\$79 - \$109	0 - 50%	43	up to 22	6
Timber Lodge Inn-Motel	301 West 1st Street, Cle Elum, WA	(509) 674-5966	\$47 - \$66	25%	35	9	8
Chalet Motel	800 East 1st Street, Cle Elum, WA	(509) 674-5434	\$65 - \$75	25%	11	3	8
Aster Inn	521 East 1st Street, Cle Elum, WA	(509) 674-2551	\$45 - \$55	25 - 90%	10	up to 9	8

TABLE 5
Hotel and Motel Vacancy Rates near the Proposed Project Site

Hotel Name	Address	Contact Number	Room Rate ⁽¹⁾	Vacancy Rate*	Total Rooms	Rooms Available	Distance to project (miles)
Cle Elum Traveler's Inn	1001 East 1st Street, Cle Elum, WA	(877) 747-8713	\$68 - \$72	0 - 50%	33	up to 17	6
Holiday Inn Express	1620 S Canyon Rd. Ellensburg, WA	(509) 962-9400	\$129 - \$159	0 - 70%	66	up to 46	24
Comfort Inn	1722 Canyon Rd, Ellensburg, WA	(509) 925-7037	\$93 - \$110	30 - 55%	52	16-29	24
I-90 Inn Motel	1390 North Dolarway Road, Ellensburg, WA	(509) 925-9844	\$63 - \$68	20 - 25%	70	14-18	22
Inn at Goose Creek	1720 Canyon Rd, Ellensburg, WA	(800) 533-0822	\$100 - \$150	20 - 30%	10	3	24
Hampton Inn	2705 Triple L Loop, Ellensburg, WA	(509) 933-1600	\$109 - \$200	25 - 75%	80	20-60	22
Best Western	211 W. Umptanum Rd, Ellensburg, WA	(509) 925-4244	\$89 - \$219	0 - 75%	55	up to 41	24
Quality Inn	1700 Canyon Rd, Ellensburg, WA	(509) 925-9800	\$70 - \$140	20 - 95%	105	up to 100	24
				TOTAL	657	102-417	

b. *Approximately how many units, if any, would be eliminated? Indicate whether it is high, middle, or low-income housing.*

The proposed project will not eliminate any housing units in Washington.

c. *List proposed measures to reduce or control housing impacts.*

No housing impacts will occur as a result of the proposed project.

Decommissioning

In the event TSR decides to terminate operation of the project, the project will be decommissioned and the site will be restored. TSR's decommissioning and restoration obligations are set forth in the CUP, Attachment E, and are summarized below.

Subject to a County-approved decommissioning plan, decommissioning the project shall involve removal of the project's components, including the solar panels, panel trackers, anchors, supports and mounts, inverter buildings, electrical conductors, substation, and O&M building, and any foundations or permanently fixed anchors to a depth of 3 feet below grade; the re-grading of any areas significantly impacted by the removal of any components; and removal of project maintenance roads and overhead cables (except for any roads, buildings, and/or power cables that project Area landowners wish to retain) (all of which shall comprise "decommissioning").

Following decommissioning, the project site shall be restored in accordance with a County-approved plan. The project restoration procedures will be based on site-specific requirements and forest management techniques commonly employed at the time the area is to be reclaimed, and will include regrading, adding topsoil, and replanting of all disturbed areas with an approved seed mixture (all of which shall comprise “restoration”). Decommissioned roads will be reclaimed or left in place. In sum, restoration of the project site shall be to a reasonable approximation of its original condition prior to construction allowing for any permanent improvements chosen by the underlying landowners to be left on site. Accordingly, there will be no need for housing units to be developed as part of the decommissioning and site restoration phases of the project. The number of decommissioning and restoration workers expected to be transient to Kittitas County will be small enough that adequate temporary housing provided by hotels and motels is available to meet project needs. Accordingly, no significant unavoidable adverse impacts from construction, operation, decommissioning, or restoration of the proposed project are expected. Please see project Description for more information about decommissioning and restoration.

Aesthetics

a. What is the tallest height of any proposed structure(s), not including antennas? What is proposed as the principal exterior building materials?

The tallest structures associated with the proposed project will be structures associated with the proposed powerline route to interconnect with the grid. The three structures of the transmission line would need to be a height of approximately 150 feet. An A-frame dead-end structure at the project substation that the transmission line would connect to would be 120-feet high. The length of the transmission line between the substation and the BPA transmission line will be approximately 3,000 feet long. A geographic information system (GIS)-based zone of potential visual influence assessment was conducted for the project (see Attachment L). It indicated that the proposed project transmission line would be similar in terms of potential visibility as the portion of the existing BPA transmission line that passes south of the project site. This project transmission line will be constructed in the portion of the project site with the lowest elevation which will help reduce its visibility.

Within the project area, the tallest structures, other than those associated with the transmission line, will be components associated with the O&M building. The O&M building will be approximately 24 feet in height.

b. What views in the immediate vicinity would be altered or obstructed?

Nine GIS-based visibility assessments were conducted to determine the potential visibility of the project components (see Attachment L, *Teaaway Solar Reserve Potential Visual Impact Assessment*). The visibility assessments, along with the rest of Attachment L, were developed to provide background documentation for the conclusions discussed below. Attachment L was updated after County review of the original submittal. In order to better assist the County in evaluating potential visual impacts associated with the proposed project.

The assessment indicates that because the proposed site is located on a sloping “bench,” above Cle Elum and the Teaaway Valley, it would not be visible from many important nearby viewing locations within the immediate vicinity (considered to be within one-mile of

the project boundary). These locations include parts of the Teanaway Valley (from north to east to south around the project site); U.S. 97 (a state-designated Scenic and Recreational Highway); and the City of Cle Elum.

There are residences within 1 mile of the project site, but due to existing trees and topography (the residences would look uphill at the site) views of the project from most residences within these areas will be very limited. Attachment L includes conceptual illustrations from residential areas looking towards the project that depict how the viewed landscape would likely change. The main change will be that trees within the project site that form part of the forested backdrop of views from some nearby residences and roads will be removed; in some locations (such as from residences on the bench south of the project site) this will change the appearance of the tree-lined backdrop. Some of these residences will have obstructed views (between trees) of some of the panels and possibly other project components. Impacts to the viewed landscape from these locations are considered to range from minor to low.

In addition to the "immediate vicinity," the project site is also visible from some residences farther than 1 mile away. Among the closest residences beyond 1 mile away are those found southeast of the site on the northwest-facing slopes of Lookout Mountain. Several residences are located between 1 and 2 miles from the project site at elevations that are higher than, or similar to, the project site. Views from these locations look down upon or are even with parts of the project site. However, based on several site visits and discussions with one resident in the area (personal communication between M. Greenig [CH2M HILL] and Tom Lambert, property owner, July 26, 2009), many, if not most, of the residences on the northwest-facing slopes of Lookout Mountain that have views toward the project site have their views obscured, or at least partially screened, by trees.

Conceptual illustrations in Attachment L from two areas on the slopes of Lookout Mountain depict how the viewed landscape will likely change with the project. The project will alter the viewed landscape in that dark solar modules will be visible in areas that now have the appearance having been selectively harvested for timber. Most of the remaining or replanted trees at the project site that are visible from these two locations will be removed for the project and replaced with a series of parallel solar module rows. New trees will be planted at visually strategic locations around the perimeter of the site to screen views or help "soften" views of the project. Although views of Mt. Stewart and other peaks that are visible from these two locations will not be blocked or obscured by the project, the presence of the project will alter the appearance of the viewed landscape. The viewed landscape seen from the pasture above the residence used to depict impacts in Attachment L will change enough to be considered a moderately negative impact. The appearance of the landscape seen from Ridgewater Drive will change enough to be considered a negative impact, but not enough to be considered a moderate impact the drivers who briefly see it. The negative impact of the project on drivers traveling on Ridgewater Drive is considered to be low.

The site is also potentially visible within the 1- to 2-mile distance zone from part of the Teanaway Valley north of the project site. From some locations, people looking south toward the project site may notice changes in the tree line along the ridge near the north end of the project, although most trees north of the project site will remain in place. If necessary, trees can be planted along selected parts of the north edge of the project area to reestablish the forested ridgeline as well as screen potential views of the site from the part of the valley

from which is potentially visible. Impacts to the viewed landscape from the projects to this part of the Teanaway Valley are considered to range from negligible to low.

The project site is also potentially visible from areas beyond 2 miles away. It will be seen from some residential areas on hillsides south of I-90. The distance between these areas and the closest part of the project site varies from approximately 3.5 to 7 miles. Conceptual depictions of how the project will change existing views toward the project site from two locations in the 3.5- to 4-mile range areas are provided in Attachment L. These conceptual illustrations show that parts of the project will be visible as low-lying darker areas on the slopes of the ridge the project will be sited on, but that the project would not block or obscure views of the mountains behind it. Impacts to the viewed landscape from areas south of I-90 from which the project site could be seen are considered to range from minor to low.

The closest part of I-90 (a National Scenic Byway) to the project site is approximately 3 miles away. Because the part of I-90 from which the project will be visible is laid out in a generally southeast-to-northwest direction, drivers likely will not notice the project in their peripheral vision as they drive I-90 with their attention on the freeway ahead of them. Passengers looking at the landscape may notice the project site as a darker area on the ridgeline for brief periods of time as they traverse I-90. However, because of the project site's distance from I-90 and the gentle slope of the terrain on which much of it will be located, the project will not block or obscure views of mountains to the north. It will cause little alteration to landscape viewed from these areas, and its impact when viewed from those segments of I-90 from which will be visible will range from minor to low.

The project site will be most visible in terms of contrasting with its adjoining landscape during the construction phase of the project. The site's color contrast will be greatest after site clearing and before the solar modules have been installed. This will occur because the color of the disturbed earth will contrast with nearby vegetation. After the dark solar modules have been installed and the vegetation underneath them has become established, the visibility of the project site, particularly from areas south of I-90 will greatly decrease.

c. Proposed measures to reduce or control aesthetic impacts:

The tallest and potentially most visible project components (the transmission structures) will be treated at the factory to create a dulled finish that will reduce light reflection from the structures. In addition, nonspecular (nonreflecting) material will be used for the conductors. Nonspecular conductors and insulators made of materials that do not reflect light will also be used for the proposed substation. As with the transmission structures, the metal frames for the solar modules will be treated at the factory to create a dull finish that will reduce reflection. The solar modules themselves require no measures to reduce or control light or glare impacts. Lighting specified for the substation and inverters will be the minimum required to meet safety and security standards. Light fixtures will be hooded to eliminate any potential for glare effects and to prevent light from spilling off the site or up into the sky. In addition, the fixtures will have sensors and switches to permit the lighting to be turned off at times when it is not required. The finish of the inverters will be dull so as not to reflect glare.

These measures will limit the reflectivity of the project components and greatly reduce or eliminate the potential for the proposed project to be a source of daytime glare or create nighttime lighting impacts.

Decommissioning

In the event TSR decides to terminate operation of the project, the project will be decommissioned and the site will be restored. TSR's decommissioning and restoration obligations are set forth in the CUP, Attachment E, and are summarized below.

Subject to a County-approved decommissioning plan, decommissioning the project shall involve removal of the project's components, including the solar panels, panel trackers, anchors, supports and mounts, inverter buildings, electrical conductors, substation, and O&M building, and any foundations or permanently fixed anchors to a depth of 3 feet below grade; the re-grading of any areas significantly impacted by the removal of any components; and removal of project maintenance roads and overhead cables (except for any roads, buildings, and/or power cables that project Area landowners wish to retain) (all of which shall comprise "decommissioning").

Following decommissioning, the project site shall be restored in accordance with a County-approved plan. The project restoration procedures will be based on site-specific requirements and forest management techniques commonly employed at the time the area is to be reclaimed, and will include regrading, adding topsoil, and replanting of all disturbed areas with an approved seed mixture (all of which shall comprise "restoration"). Decommissioned roads will be reclaimed or left in place. In sum, restoration of the project site shall be to a reasonable approximation of its original condition prior to construction allowing for any permanent improvements chosen by the underlying landowners to be left on site. Accordingly, there will be no additional adverse aesthetic impacts are anticipated as a result of project decommissioning and site restoration. For several years after decommissioning, site disturbance would likely be visible upon close examination; however, replanting and restoration efforts will take place as part of the decommissioning efforts and the natural vegetation will be restored to pre-construction conditions. Accordingly, no significant unavoidable adverse impacts from construction, operation, decommissioning, or restoration of the proposed project are expected. Please see the project Description for more information about decommissioning and restoration.

Light and Glare

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

The proposed solar modules are monochromatic with a dull finish, which minimizes the production of glare. Additionally, the photovoltaic modules proposed are designed (and have antireflective coatings) to absorb and capture sunlight rather than reflect it. Design features such as textured glass further reduce reflectivity. Other project components such as the substation, transmission line, and inverter buildings could potentially create glare, but the measures described in item (d) below explain how that potential has been addressed. Lights associated with the substation and inverter buildings will potentially be seen from some areas for irregular periods of time. Item (d) below explains how that potential has been addressed. During construction, onsite and offsite staging areas will have temporary lights that will be used at times. Because most of the project will occur during daylight hours, use

of the lights will be limited. During the construction period, construction lights might be noticed by observers from various vantage points, but would likely not be noticed by nearby residences south of the project site due to topography and screening by trees.

b. Could light or glare from the finished project be a safety hazard or interfere with views?

No. See previous item (a).

c. What existing off-site sources of light or glare may affect your proposal?

None. There are very few residences and buildings near the project site and none within the site. Some lighting from residences may be seen below the project site, and some light or glare from vehicles traveling on roads near the project site (but rarely through the project site due to locked gates blocking public access) may be seen from some viewing areas. These offsite sources of light or glare will not affect the proposed project.

d. Proposed measures to reduce or control light and glare impacts:

The tallest and potentially most visible project components (the three transmission structures) will be galvanized and treated at the factory to create a dulled and darkened finish that will reduce light reflection from the structures. In addition, nonspecular (nonreflecting) material will be used for the conductors. Nonspecular conductors and insulators made of materials that do not reflect light will also be used for the proposed substation. As with the transmission structures, the metal frames for the solar modules will be galvanized and treated at the factory to create a dull finish that will reduce reflection. The solar modules themselves require no measures to reduce or control light or glare impacts. Lighting specified for the substation and inverted buildings will be the minimum required to meet safety and security standards. All light fixtures will be hooded to eliminate any potential for glare effects and to prevent light from spilling off the site or up into the sky. In addition, the fixtures will have sensors and switches to permit the lighting to be turned off at times when it is not required. The finish of the inverter buildings' walls and roofs will be dull so as not to reflect glare.

These measures will limit the reflectivity of the project components and greatly reduce or eliminate the potential for the proposed project to be a source of daytime glare or create nighttime lighting impacts.

Decommissioning

In the event TSR decides to terminate operation of the project, the project will be decommissioned and the site will be restored. TSR's decommissioning and restoration obligations are set forth in the CUP, Attachment E, and are summarized below.

Subject to a County-approved decommissioning plan, decommissioning the project shall involve removal of the project's components, including the solar panels, panel trackers, anchors, supports and mounts, inverter buildings, electrical conductors, substation, and O&M building, and any foundations or permanently fixed anchors to a depth of 3 feet below grade; the re-grading of any areas significantly impacted by the removal of any components; and removal of project maintenance roads and overhead cables (except for any roads, buildings, and/or power cables that project Area landowners wish to retain) (all of which shall comprise "decommissioning").

Following decommissioning, the project site shall be restored in accordance with a County-approved plan. The project restoration procedures will be based on site-specific requirements and forest management techniques commonly employed at the time the area is to be reclaimed, and will include regrading, adding topsoil, and replanting of all disturbed areas with an approved seed mixture (all of which shall comprise “restoration”). Decommissioned roads will be reclaimed or left in place. In sum, restoration of the project site shall be to a reasonable approximation of its original condition prior to construction allowing for any permanent improvements chosen by the underlying landowners to be left on site. Accordingly, there will be no additional adverse impacts due to light and glare are anticipated as a result of project decommissioning and site restoration. Since all above ground facilities will be removed entirely there will be no possibilities for glare. The restored area will not contain any lighting. Accordingly, no significant unavoidable adverse impacts from construction, operation, decommissioning, or restoration of the proposed project are expected. Please see the project Description for more information about decommissioning and restoration.

Recreation

a. *What designated and informal recreational opportunities are in the immediate vicinity?*

The proposed project site and immediate vicinity do not contain any designated or informal recreational opportunities. The proposed project site traditionally has been used as commercial forest, and public access has been prohibited.

Although some hunting or hiking occurs on private land near the proposed project site, there are no designated parks, wildlife refuges, or recreational areas in the immediate vicinity, according to data provided by *National Atlas of the United States* (U.S. Department of the Interior, 2007). The proposed project is not visible from the Indian John Hill rest stop and may be minimally visible from the summit. Three lakes occur approximately 2 miles from the proposed project area (Table 6). No impacts to the lakes are anticipated.

TABLE 6
Potential Locations for Recreational Opportunities Near the Proposed Project Area

Name	Distance to Proposed project Area
Big Lake	1.95 miles
Cabin Lake	2.16 miles
Little Lake	2.42 miles

Source: U.S. Department of the Interior, 2007.

The majority of the land near the proposed project area is privately owned. Bird watching and hunting are the only types of recreational opportunity to exist on these private lands. There are no known planned future recreational sites or opportunities in or near the proposed project area.

b. *Would the project displace any existing recreational uses? If so, please describe.*

The project may minimally affect the existing hunting uses. Public access of the primary access point is already restricted by the subject landowners and will continue to be restricted in accordance with easement agreements. TSR does not have the authority to grant

permission to third party recreationists, including hunters and campers, to access the proposed project area, but may grant permission to such parties on a case-by-case basis provided such parties secure written permission from all of the applicable landowners along Loping Lane.

Public recreation, such as orienteering, has been allowed on the site by the landowner on a case-by-case basis. TSR is willing to work with local landowners who have used the property for recreation in the past. The proposed project will be built on private land, which will be leased to TSR.

Historically, the landowner has allowed responsible uses of the land by anyone lawfully accessing the site; however, the use of motorized vehicles has been prohibited on the property. In addition, the road to the proposed project site traditionally has been gated to prevent access. TSR does not intend to change these policies. Responsible access through the proposed project site will be allowed subject to conflicting requirements beyond TSR's control (such as insurance or fire protection), provided that individuals do not interfere with the construction, operation, or maintenance of the project. Gating will continue to regulate motorized vehicles, but a fence restricting access is not proposed.

c. Proposed measures to reduce or control impacts on recreation, including recreational opportunities to be provided by the project or applicant, if any:

Because no significant impacts on important recreational opportunities will occur, TSR does not propose any measures to avoid, reduce, or otherwise mitigate project impacts. TSR will reduce potential impacts on unimportant recreational opportunities through measures already in use to reduce other project impacts. These measures may include the use of existing roads. Also, because there will be no significant impacts on important recreational resources, no monitoring program is proposed.

Decommissioning

In the event TSR decides to terminate operation of the project, the project will be decommissioned and the site will be restored. TSR's decommissioning and restoration obligations are set forth in the CUP, Attachment E, and are summarized below.

Subject to a County-approved decommissioning plan, decommissioning the project shall involve removal of the project's components, including the solar panels, panel trackers, anchors, supports and mounts, inverter buildings, electrical conductors, substation, and O&M building, and any foundations or permanently fixed anchors to a depth of 3 feet below grade; the re-grading of any areas significantly impacted by the removal of any components; and removal of project maintenance roads and overhead cables (except for any roads, buildings, and/or power cables that project Area landowners wish to retain) (all of which shall comprise "decommissioning").

Following decommissioning, the project site shall be restored in accordance with a County-approved plan. The project restoration procedures will be based on site-specific requirements and forest management techniques commonly employed at the time the area is to be reclaimed, and will include regrading, adding topsoil, and replanting of all disturbed areas with an approved seed mixture (all of which shall comprise "restoration"). Decommissioned roads will be reclaimed or left in place. In sum, restoration of the project

site shall be to a reasonable approximation of its original condition prior to construction allowing for any permanent improvements chosen by the underlying landowners to be left on site. Accordingly, there will be no additional adverse impacts to recreation are anticipated as a result of project decommissioning and site restoration since the proposed project site and immediate vicinity do not contain any designated or formal recreational opportunities. The proposed project site traditionally has been used as commercial forest, and public access has been prohibited. Historic recreations uses of the site will be permitted to the maximum extent practicable.. Accordingly, no significant unavoidable adverse environmental impacts from construction, operation, decommissioning, or restoration of the proposed project are expected. Please see the project Description for more information about decommissioning and restoration.

Historic and Cultural Resources

a. *Are there any places or objects on or near the site which are listed or proposed for national, state, or local preservation registers? If so, please describe.*

No places, objects, or sites located in the project area are listed or proposed for listing in the national, state, or local preservation registers. See Attachment C, *Cultural Resources Report* (restricted distribution), for a more complete analysis and field methodology. State law exempts cultural records from public disclosure pursuant to RCW 42.56.300. A copy of the *Cultural Resources Report* was sent to the Yakama Nation and the Washington State Department of Archaeology & Historic Preservation on September 1, 2009 for review. To date, no comments from the Yakama Nation have been received.

b. *Please describe any landmarks or evidence of historic, archaeological, scientific, or cultural importance known to be on or next to the site.*

The project site is located on privately owned industrial forestlands. No landmarks or other evidence of historic, archaeological, scientific, or cultural importance are known to be on or adjacent to the site.

c. *Proposed measures to reduce or control impacts, if any:*

Archaeological surveys did not identify any cultural sites in the project area. Should previously unidentified sites be discovered during the course of construction, TSR will halt work in that area until a qualified archaeologist can assess the site and determine whether protective measures should be implemented. See Attachment C, *Cultural Resources Report* (restricted distribution), for a more detailed description of measures to reduce or control impacts.

Decommissioning

In the event TSR decides to terminate operation of the project, the project will be decommissioned and the site will be restored. TSR's decommissioning and restoration obligations are set forth in the CUP, Attachment E, and are summarized below.

Subject to a County-approved decommissioning plan, decommissioning the project shall involve removal of the project's components, including the solar panels, panel trackers, anchors, supports and mounts, inverter buildings, electrical conductors, substation, and O&M building, and any foundations or permanently fixed anchors to a depth of 3 feet

below grade; the re-grading of any areas significantly impacted by the removal of any components; and removal of project maintenance roads and overhead cables (except for any roads, buildings, and/or power cables that project Area landowners wish to retain) (all of which shall comprise “decommissioning”).

Following decommissioning, the project site shall be restored in accordance with a County-approved plan. The project restoration procedures will be based on site-specific requirements and forest management techniques commonly employed at the time the area is to be reclaimed, and will include regrading, adding topsoil, and replanting of all disturbed areas with an approved seed mixture (all of which shall comprise “restoration”). Decommissioned roads will be reclaimed or left in place. In sum, restoration of the project site shall be to a reasonable approximation of its original condition prior to construction allowing for any permanent improvements chosen by the underlying landowners to be left on site. Accordingly, there will be no additional adverse impacts historical and cultural resources are anticipated as a result of project decommissioning and site restoration. As summarized in the above section and the Cultural Resources Report (see Attachment C-*restricted distribution*) no places, objects, or sites located in the project area are listed or proposed for listing in the national, state, or local preservation registers. Decommissioning efforts will not take place outside of previously surveyed areas. Accordingly, no significant unavoidable adverse impacts from construction, operation, decommissioning, or restoration of the proposed project are expected. Please see the project Description for more information about decommissioning and restoration.

Transportation

- a. *Identify the public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any.*

Figure 3, *Site Access Map*, shows the local streets and major state highways serving the proposed project. The construction contractor will access the project site primarily from I-90 eastbound to State Route (SR) 970 northbound to Red Bridge Road, which is a local County roadway. From Red Bridge Road, project traffic likely will take Wiehl Road northbound for approximately 0.2 mile to Loping Lane, where traffic will turn left and continue westbound on Loping Lane to the project site, as shown in Attachment J, Figure 3. Loping Lane is a private roadway and Wiehl Road is a public roadway, but neither road is maintained by Kittitas County.

From the main proposed project access off Loping Lane, proposed project traffic may use private and County roads to access the project site. Use of these roads will depend on weather conditions and on load and size restrictions. Most of these other access routes are privately owned. Table 7 describes the roads that will directly access the project corridor or provide a critical regional transportation link to the project corridor.

TABLE 7
Key Roads Providing Access to the Proposed Project Area

Facility	Description
I-90	Interstate 90 within the vicinity of the proposed project is classified as a rural interstate roadway with rolling terrain, according to the Washington State Department of Transportation (WSDOT) road classification system. This roadway has two lanes in each direction, and has a posted speed limit of 70 miles per hour (mph) outside city limits. Interstate 90 is anticipated to be the major haul route from Seattle, Washington.
US 970	US 970 begins in Cle Elum, Washington, where the speed limit is posted at 55 mph inside city limits. It continues eastbound and then northbound as a two-lane road with a posted speed limit of 60 mph. This facility is classified as a rural principal arterial with level terrain, according to the WSDOT road classification system. This rural principal arterial would provide the main access between the interstate and local County roadways serving the proposed project area.
Red Bridge Road	Red Bridge Road (also known as Masterson Road) is a paved two-lane road with a posted speed limit of 25 mph. It is classified as a rural local access road by Kittitas County. This roadway, south of the intersection with Wiehl Road, will serve as the main connection between the state highway facility and private access roads. Construction-related traffic, especially truck traffic, will not be permitted to access the site by using Red Bridge Road north of the intersection with Wiehl Road..
Wiehl Road	Wiehl Road is an unpaved, two-lane, privately maintained road without a posted speed limit. It is within a public right-of-way but is not maintained by Kittitas County. This rural privately maintained roadway likely experiences very little daily traffic, and likely will be able to provide access to the project site without affecting existing traffic operations.
Loping Lane	Loping Lane is an unpaved, two-lane private road without a posted speed limit. It is a private roadway, and is not maintained by Kittitas County. This rural private roadway likely experiences very little daily traffic, and likely will be able to provide access to the project site without affecting existing traffic operations.

To evaluate the possible impacts resulting from construction traffic associated with the proposed powerline route to the grid, the analysts obtained traffic volumes for state highways that are part of the expected construction transportation routes. The study team consulted the WSDOT and Kittitas County for traffic volumes and roadway characteristics.

Table 8 shows the average daily traffic (ADT) volumes between 2005 and 2008, the roadway functional classifications, the jurisdiction, and estimated truck percentages on state-maintained roadways in the project area. These volumes are based on available traffic data in *Annual Traffic Report*, published by WSDOT in 2008; the report provides annual traffic volumes for at least the last 4 years.

TABLE 8
Average Daily Traffic (ADT) Volumes, Roadway Functional Classification, and Estimated Percentage of Trucks

Roadway	State/ Jurisdiction	Functional Classification	2005 ADT	2006 ADT	2007 ADT	2008 ADT	Estimated Truck %
I-90 (MP 82.70) ^a	Washington State Dept of Transportation	Rural Interstate	27,000	27,000	28,000	27,000	23
I-90 (MP 84.61) ^a	Washington State Dept of Transportation	Rural Interstate	24,000	25,000	27,000	25,000	N/A

TABLE 8
Average Daily Traffic (ADT) Volumes, Roadway Functional Classification, and Estimated Percentage of Trucks

Roadway	State/ Jurisdiction	Functional Classification	2005 ADT	2006 ADT	2007 ADT	2008 ADT	Estimated Truck %
SR 970 (MP 2.69 west of SR 10)	Washington State Dept of Transportation	Rural Principal Arterial	5,600	5,800	5,800	5,400	N/A
SR 970 (MP 2.69 east of SR 10)	Washington State Dept of Transportation	Rural Principal Arterial	4,700	4,900	4,800	4,500	N/A
Red Bridge Road ^b	Kittitas County	Rural Local Access	260	230	250	200	N/A
Wiehl Road	Private	N/A	N/A	N/A	N/A	N/A	N/A
Loping Lane	Private	N/A	N/A	N/A	N/A	N/A	N/A

^a WSDOT, 2008.

^b Wollman, 2009.

N/A = Information not available.

Traffic data along Red Bridge Road were provided by Kittitas County. No traffic data are available for Wiehl Road or Loping Lane because they are privately owned, and they are not monitored or maintained by the County.

The project will be served internally by a network of existing and new maintenance roads. The existing maintenance roads, along with Wiehl Road and Loping Lane, generally consist of gravel and dirt and will be improved pursuant to County requirements.

Loping Lane is subject to several road use and cost-sharing agreements, and TSR will be subject to those agreements. Additionally, TSR is responsible for any improvements to these roads, and will first submit a plan detailing any such improvement for review and approval by the Kittitas County Public Works Department. These roads typically do not have posted speed limits, and ADT volumes are likely not available for these locations.

Transport of major equipment and materials to the site for construction likely will span 7 to 9 months for each of the two or three construction seasons. Truck deliveries are anticipated to occur between 7 a.m. and 7 p.m. on weekdays. The average daily truck volume will be approximately 100 trips per day (50 trucks with one inbound trip and one outbound trip). No more than 50 vehicles are expected to either enter or leave the site during the peak hour of construction.

Assuming construction is completed over a period of two years, the daily truck volume will be approximately 34 trips per day (17 trucks with one inbound trip and one outbound trip).

Construction worker traffic is also expected during the construction seasons. The expected peak workforce could include up to 450 construction workers during the peak months of construction each year. Assuming 30 percent of construction workers carpool to the site each day and 70 percent are bused in via project-provided transportation, approximately 75 worker vehicles (or 150 worker trips) can be expected to enter the project site in the morning and leave the site during the evening peak hour. During construction with an average workforce, worker trips would be approximately half that during the peak.

Note: Quantities for water are still being determined and are not included in the above estimate..

There is one permanent load restriction on I-90 between Seattle and the project site. This restriction prohibits loads taller than 16 feet 2 inches high from entering the snow shed near Hyak (MP 54-62 on westbound I-90). This restriction is not anticipated to affect truck- and construction-related traffic because any project-related trucks will be empty (no loads) heading westbound. Construction vehicles are expected to be of legal size and legal weight for Washington highways; therefore, no special permitting for transport of materials and equipment will be necessary.

There are no permanent restrictions on SR 970 in the vicinity of the project site.

b. Is the site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?

The project site is not currently served by public transit.

The nearest public transportation system is in Ellensburg, Washington. Central Transit is a general public transportation system that operates a fixed route serving mainly Central Washington University. It includes bus stops, operates on a schedule, and does not require advance reservations. It is operated by HopeSource. (Source: *Kittitas County Long Range Transportation Plan, 2008*)

c. How many parking spaces would the completed project have?

TSR anticipates 20 permanent parking stalls with the completion of this project. These parking stalls will be reserved for vehicles related to project maintenance.

d. Will the proposal require new roads or streets, or improvements to existing roads or streets, not including driveways? If so, please describe and indicate whether they are public or private.

TSR and the construction contractor will use existing roads as much as possible. Because project-generated and local traffic volumes are fairly low, TSR does not anticipate requiring any improvements to existing paved roads or streets accessing the project.

TSR and the construction contractor will also use unimproved, unpaved, private roadways to access the project site. Based on current conditions, these roadways will need improvements (such as paving, gravel surfacing, and/or widening) to transport large or heavy equipment and materials to the site during construction.

Wiehl Road and Loping Lane are privately maintained roadways that could be improved with pavement. The paved area would likely be at least 24 feet wide to allow vehicles in both directions to pass safely at the same time, per the Kittitas County Road Standards for rural, low-volume, low-speed roads. Culverts or drainage ditches could be constructed along the roadway to drain any potential runoff into a detention pond or catchment area, where it would be slowly released back into the ground. The design of these culverts or catchment areas would be developed during the engineering stage of the project and would follow requirements as specified in the Washington State Ecology Manual for Eastern Washington.

An alternative to paving is using layers of crushed stone or gravel to level and stabilize the roadway. The gravel layer would likely need to be between 8 and 21 inches deep, depending on the topography of the existing road. The size of the gravel and the density of the layers would need to be determined during the engineering stage of the project. Although gravel roads would allow some drainage to occur from the roadway surface, drainage ditches or culverts would likely still be necessary to prevent water from collecting on the shoulders.

Whether paving or graveling, roadway widening may be necessary to improve access roads. Widening of these roads may require clearing or grading of the earth slopes on either side of the travel path, which may affect erosion. In order to prevent erosion, retaining walls could be implemented to stabilize the adjacent slope and channel runoff away from the roadway to a catchment or detention pond area.

In addition, as previously discussed, TSR will coordinate any improvements to these roads with the Kittitas County Public Works Department to ensure compliance with County requirements. The County road standards suggest asphalt concrete pavement for roads with grades exceeding 10 percent. Because Wiehl Road (between Red Bridge and Loping Lane) is fairly steep, paving would likely be recommended. Loping Lane would need to be surveyed prior to any improvements.

The number of new access roads will be kept to a minimum to avoid disrupting existing land use.

e. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, please describe.

TSR does not anticipate that the proposed project will use rail, water, or air transportation.

f. How many vehicular trips per day would be generated by the completed project? Indicate when peak traffic volumes would occur.

Once the project has been completed, there will be virtually no traffic (less than five trips per day) for operations and maintenance. Given the low traffic volumes within the project area, these minor added trips will not cause traffic impacts during project operations.

Traffic impacts during decommissioning are expected to be similar to those described for construction. If some of the access roads constructed or improved as part of the project remain in place, there would be fewer trips associated with workforce, materials, and equipment during decommissioning, and there would likely be fewer traffic impacts than expected during construction. Truck trips are anticipated to occur between 7 a.m. and 7 p.m. on weekdays. Workforce trips during decommissioning are expected to increase compared to workforce trips during project operation, but no significant unavoidable adverse impacts from decommissioning or restoration of the proposed Project are expected.

Mitigation at the time of decommissioning would be implemented and would likely be similar to that recommended for construction.

g. Proposed measures to reduce or control transportation impacts, if any:

Because project transportation impacts are limited, TSR will not pursue specific permanent measures to reduce traffic impacts on local residents during the construction process.

In general, temporary measures could be taken to manage changes in traffic patterns:

- Provide proper advance road signage and warnings of “Equipment on Road,” “Truck Access,” or “Road Crossings.”
- Encourage carpooling for the construction workforce to reduce traffic volume.
- Employ flagpersons as necessary to direct traffic if equipment is exiting or entering public roads to minimize risk of accidents.

Advance warning signage could be placed along the access route to alert motorists to delivery vehicles entering or exiting SR 970 or Red Bridge Road. Flagpersons may also be used to facilitate these turning vehicles, or to monitor traffic so that motorists are not in conflict with construction vehicles.

Decommissioning

In the event TSR decides to terminate operation of the project, the project will be decommissioned and the site will be restored. TSR’s decommissioning and restoration obligations are set forth in the CUP, Attachment E, and are summarized below.

Subject to a County-approved decommissioning plan, decommissioning the project shall involve removal of the project’s components, including the solar panels, panel trackers, anchors, supports and mounts, inverter buildings, electrical conductors, substation, and O&M building, and any foundations or permanently fixed anchors to a depth of 3 feet below grade; the re-grading of any areas significantly impacted by the removal of any components; and removal of project maintenance roads and overhead cables (except for any roads, buildings, and/or power cables that project Area landowners wish to retain) (all of which shall comprise “decommissioning”).

Following decommissioning, the project site shall be restored in accordance with a County-approved plan. The project restoration procedures will be based on site-specific requirements and forest management techniques commonly employed at the time the area is to be reclaimed, and will include regrading, adding topsoil, and replanting of all disturbed areas with an approved seed mixture (all of which shall comprise “restoration”). Decommissioned roads will be reclaimed or left in place. In sum, restoration of the project site shall be to a reasonable approximation of its original condition prior to construction allowing for any permanent improvements chosen by the underlying landowners to be left on site. Accordingly, traffic impacts during decommissioning are expected to be similar to those described for construction. If some of the access roads constructed or improved as part of the project remain in place, there would be fewer trips associated with workforce, materials, and equipment during decommissioning, and there would likely be fewer traffic impacts than expected during construction. Truck trips are anticipated to occur between 7 a.m. and 7 p.m. on weekdays. Workforce trips during decommissioning are expected to increase compared to workforce trips during project operation, but no significant unavoidable adverse impacts from decommissioning or restoration of the proposed project are expected.

Mitigation at the time of decommissioning would be implemented and would likely be similar to that recommended for construction. Please see the project Description for more information about decommissioning and restoration.

Public Services

- a. *Would the project result in an increased need for public services (e.g., fire protection, police protection, health care, schools, other)? If so, please describe.*

The proposed project area is currently subject to the fire-suppression protection services of WDNR. TSR is currently negotiating a fire protection agreement with Kittitas County Fire District #7 (see Attachment M) to ensure that suitable fire suppression protection services are in place during the construction and ongoing operations of the project.

TSR will create and maintain a firebreak of no less than 100 feet between all outer edges of the project site and adjacent property lines. Trees located in this firebreak will be limbed up to 12 feet. Small shrubs and herbs less than three feet in height will be left in place where possible to reduce the potential stormwater runoff.

Police protection of the proposed project area is provided by the County Sheriff's Office. The construction contractor will notify the fire protection and police services of staging and active construction locations so these services can respond efficiently to emergencies, should any arise. During the operational phase, TSR will contact fire protection and police services in the event of an emergency.

TSR does not anticipate that health care and school needs will increase during construction or operation of the proposed project.

- b. *Proposed measures to reduce or control direct impacts on public services, if any.*

TSR does not propose any measures to reduce or control direct impacts on public services.

Decommissioning

In the event TSR decides to terminate operation of the project, the project will be decommissioned and the site will be restored. TSR's decommissioning and restoration obligations are set forth in the CUP, Attachment E, and are summarized below.

Subject to a County-approved decommissioning plan, decommissioning the project shall involve removal of the project's components, including the solar panels, panel trackers, anchors, supports and mounts, inverter buildings, electrical conductors, substation, and O&M building, and any foundations or permanently fixed anchors to a depth of 3 feet below grade; the re-grading of any areas significantly impacted by the removal of any components; and removal of project maintenance roads and overhead cables (except for any roads, buildings, and/or power cables that project Area landowners wish to retain) (all of which shall comprise "decommissioning").

Following decommissioning, the project site shall be restored in accordance with a County-approved plan. The project restoration procedures will be based on site-specific requirements and forest management techniques commonly employed at the time the area is to be reclaimed, and will include regrading, adding topsoil, and replanting of all disturbed areas with an approved seed mixture (all of which shall comprise "restoration"). Decommissioned roads will be reclaimed or left in place. In sum, restoration of the project site shall be to a reasonable approximation of its original condition prior to construction allowing for any permanent improvements chosen by the underlying landowners to be left on site. Accordingly, there will be no additional need for public services are anticipated as a

result of project decommissioning and site restoration. It is unlikely that emergency services will be necessary during the decommissioning and restoration effort; however, the Kittitas County Planning Department, the County Sheriff's Office, and Kittitas County Fire District 7 will be notified prior to the engaging in decommissioning. The Applicant does not anticipate that health care and school needs will increase during the decommissioning of the proposed project. Accordingly, no significant unavoidable adverse impacts from construction, operation, decommissioning, or restoration of the proposed project are expected. Please see the project Description for more information about decommissioning and restoration.

Utilities

- a. *Circle the utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other.*

The proposed project will include electricity, telephone, and data service for the O&M facility.

- b. *Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.*

TSR does not anticipate any utility use during construction. The construction contractor will provide mobile utilities such as portable toilets, cellular telephones, and water trucks. During operation, electricity generated from the solar arrays will be utilized for the O&M building.

Telephone and data lines will be installed during construction for operational uses at the O&M building. These lines will be used for general telephone, internet, and SCADA information reporting. TSR will use a local service provider if possible for telephone and data lines. If no local service provider exists, TSR will contract with Quest Communications International, Inc.

TSR will remove refuse from the proposed project site.

Decommissioning

In the event TSR decides to terminate operation of the project, the project will be decommissioned and the site will be restored. TSR's decommissioning and restoration obligations are set forth in the CUP, Attachment E, and are summarized below.

Subject to a County-approved decommissioning plan, decommissioning the project shall involve removal of the project's components, including the solar panels, panel trackers, anchors, supports and mounts, inverter buildings, electrical conductors, substation, and O&M building, and any foundations or permanently fixed anchors to a depth of 3 feet below grade; the re-grading of any areas significantly impacted by the removal of any components; and removal of project maintenance roads and overhead cables (except for any roads, buildings, and/or power cables that project Area landowners wish to retain) (all of which shall comprise "decommissioning").

Following decommissioning, the project site shall be restored in accordance with a County-approved plan. The project restoration procedures will be based on site-specific

requirements and forest management techniques commonly employed at the time the area is to be reclaimed, and will include regrading, adding topsoil, and replanting of all disturbed areas with an approved seed mixture (all of which shall comprise "restoration"). Decommissioned roads will be reclaimed or left in place. In sum, restoration of the project site shall be to a reasonable approximation of its original condition prior to construction allowing for any permanent improvements chosen by the underlying landowners to be left on site. Accordingly, there will be no need for any utilities are anticipated as a result of project decommissioning and site restoration. Accordingly, no significant unavoidable adverse impacts from construction, operation, decommissioning, or restoration of the proposed project are expected. Please see the project Description for more information about decommissioning and restoration.

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Signature

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature:



A handwritten signature in blue ink, appearing to read "Shunt" followed by a stylized flourish, is written over a horizontal line.

Date Submitted: February 22, 2010

ATTACHMENT A

Sensitive Species Report

Report

Sensitive Species Surveys for the Teanaway Solar Reserve Kittitas County, Washington

Prepared for
Teanaway Solar Reserve, LLC

February 2010

Prepared by
CH2MHILL



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1.0 Introduction

CH2M HILL conducted rare plant and wildlife surveys in June and July 2009 for the proposed Teanaway Solar Reserve (TSR) project. The proposed project is located on private land in an unincorporated area of Kittitas County, Washington. The purpose of the surveys was to identify potential populations of special status species and to determine whether proposed project activities will affect these populations.

This report provides a brief overview of the project, describes the methodology followed to conduct the surveys, presents survey results and conclusions, and offers recommendations for the future, including proposed measures for avoiding or minimizing impacts.

2.0 Project Description

2.1 Site Location

The proposed project site is located approximately 4 miles northeast of Cle Elum, Washington, in Township 20N, Range 16E, within Sections 22, 23, and 27 (see Figure 1 in Appendix A for map of site location). The site is located on the eastern slopes of the Cascade Mountains on Cle Elum Ridge, which runs generally from east to west at elevations ranging from approximately 2,200 to 2,600 feet. The Teanaway River is approximately 1 mile to the northeast of Cle Elum Ridge. The site is accessed from Highway 970 by way of County roads such as Red Bridge Road, private roads such as Loping Lane, and Wiehl Road, which is a dedicated public road that is maintained privately and not by the County.

The proposed project area consists of 982 acres. Based on site surveys, the project will utilize approximately 477 acres within the proposed project area. The remaining acres are currently undeveloped open space, but may accommodate some future expansion of the project after appropriate surveys are conducted to address any environmental concerns and compliance with any underlying federal, state, or local permitting requirements.

2.2 Purpose and Need

The purpose of the proposed project is to generate up to 75 direct current megawatts (MWdc) of photovoltaic (PV) solar energy for distribution to utilities and communities seeking to optimize their renewable and sustainable energy sources. The project was conceived by Teanaway Solar Reserve, LLC in response to the growing need for sustainable energy sources and the State of Washington's Renewable Electricity Standard, Revised Code of Washington (RCW) Title 19, mandate that by the year 2020, the state's largest electric utilities meet 15 percent of their retail electric load with renewable electricity (for example, wind and solar energy). The standard first takes effect in 2012 with a requirement of 3 percent through 2015, then 9 percent from 2016 through 2019 and 15 percent thereafter.

2.3 Key Components

The proposed project will consist of the following key components:

- Solar modules
- Field inverters

- Field transformers
- Electrical conductors
- Electrical substation and switchyard
- Operations and maintenance (O&M) building and supervisory control and data acquisition (SCADA) system
- Overhead interconnection transmission line
- Access and maintenance roads

Key components are summarized below.

2.3.1 Solar Modules

Solar modules in a metal frame on supporting mounting structures will be used. The solar modules are manufactured offsite and will be delivered to the site by truck in wooden crates or cardboard boxes. The solar modules are mounted in a fashion that orients the modules toward the sun.

2.3.2 Field Inverters

Up to 80 power inverters will be needed for the project. The inverters can be placed outdoors or they can be placed in enclosures.

2.3.3 Field Transformers

Up to 80 power transformers will be required for the solar field arrays. The transformers are contained within prefabricated cabinets and will rest on concrete pads.

2.3.4 Electrical Conductors

Underground 34.5-kV electrical conductors will be installed in trenches along improved maintenance roads onsite at depths of 36 inches or greater. Conductors will be direct-burial or placed in a polyvinyl chloride (PVC) conduit.

2.3.5 Electrical Substation and Switchyard

TSR proposes to construct, in compliance with design and installation requirements from Bonneville Power Administration (BPA), an electrical substation that will interconnect the solar field with the existing 345-kV BPA transmission line. It has yet to be determined if certain elements of the line and substation will be owned and constructed by BPA, but for purpose of environmental review and this permit application, all elements of the line and the substation (up to the point of interconnection with BPA's existing transmission line) are proposed as part of the project.

The substation will be located in the southern part of the project site, to minimize the size of the associated transmission line. The substation will require a level, fenced area of approximately 6 acres. The 6-acre area will be graveled with no vegetation. The substation will contain a small control house, transformer(s), circuit breakers and switches, steel support structures, an A-frame dead-end tower structure, and overhead electrical bus work. The control house will be up to 16 feet high, 60 feet long, and 30 feet wide. The dead-end tower structure will be up to 120 feet high. Transformers and oil-filled equipment will be underlain with appropriate containment structures. The appearance of the substation will be similar to that of many other substations throughout the Pacific Northwest.

2.3.6 O&M Building and SCADA System

A storage and operations and maintenance (O&M) building will store spare parts (e.g., modules and fuses), testing equipment, and cleaning equipment. The building will be of cinderblock construction or pre-engineered with an overall footprint of approximately 1,000 square feet and will be located within the 6 acre fenced substation area. A supervisory control and data acquisition (SCADA) system will be installed within the substation boundary to collect operating and performance data from the TSR facilities, and provide remote operation of the solar panels

2.3.7 Overhead Interconnection Transmission Line

A new 345-kV transmission line is required to connect the new substation to the existing BPA line. The substation will be located in the southern part of the project site, to minimize the size of the associated transmission line. A new BPA tower is required to replace the existing tower in the BPA easement (as noted in the site plan). The replacement tower would reroute the three existing 345-kV power lines via an existing 200-foot-wide right-of-way (ROW) within the leasehold through the substation and back to the replacement BPA tower.

2.3.8 Access and Maintenance Roads

The site will be accessed via Kittitas County and private roads that interconnect with Highway 970. The major County access road is Red Bridge Road. Loping Lane is a private road and Wiehl Road is a privately maintained public road; TSR has easement rights over both roads.

3.0 Sensitive Species Surveys

CH2M HILL biologists conducted surveys of a total of 580 acres, of which 477 acres are included in the proposed project area, for rare plant and wildlife species in June and early July of 2009. Figure 2 (Appendix A) shows the sensitive species survey area within the 982-acre proposed project area.

A species was considered to be rare if it met one or more of the following listing criteria:

- Federally listed as threatened or endangered (*Endangered Species Act of 1973* [16 U.S.C. 1531-1544, 87 Stat. 884])
- State listed as threatened or endangered (State of Washington *Endangered, Threatened, and Candidate Species Classification* WAC 232-12-297)

Target species included all plant and wildlife taxa listed by the U.S. Fish and Wildlife Service (USFWS) or the state of Washington as *Endangered* or *Threatened* and potentially occurring in Kittitas County, Washington. A species was determined to have potential to occur in the survey area if its known or expected geographic range includes the survey area or the vicinity of the survey area, and if its known or expected habitat is represented within or adjacent to the survey area.

3.1 Rare Plant Survey

The purpose of the rare plant survey was to locate all populations of special status plants within the survey area, to precisely record and map their locations using geographic positioning system (GPS) technology with submeter accuracy, and to determine the size and phenology of each rare plant population and its microhabitat characteristics.

3.1.1 Methods

Office Review. The office review consisted of compiling a list of special-status plant species potentially occurring within the survey area, and reviewing topography and soils maps, recent aerial photography, and information on habitat requirements for any of the potentially occurring species.

Sources consulted included the following:

- *List of Known Occurrences of Rare Plants in Washington: Kittitas County* (Washington Natural Heritage Information System [WNHIS], February 2009)
- *State of Washington Priority Habitats and Species (PHS) List* (Washington Department of Fish and Wildlife [WDFW], 2008)
- *Federally Listed, Proposed, Candidate Species and Species of Concern Under the Jurisdiction of the Fish and Wildlife Service Which May Occur Within Kittitas County, Washington* (USFWS, July 24, 2008) (provided in Appendix B)
- *Topographic Map of the Teanaway, Washington Quadrangle* (United States Geological Service [USGS], 1985 Provisional Edition)
- *Soil Survey, Kittitas County Area, Washington* (NRCS Soils Survey, 2009)
- *Field Guide to Selected Rare Plants of Washington* (Washington Natural Heritage Program, 2009) (provided in Appendix C)

Field Investigation. Surveys were floristic in nature and were conducted according to the U.S. Bureau of Land Management Survey Protocols for Survey and Manage Strategy 2 Vascular Plants (Whiteaker et al., 1998).

Two survey methods were used. An Intuitive Controlled Survey was conducted throughout the survey area, and a Complete Survey was conducted in areas of high potential habitat within the survey area. Protocol for these methods is described below.

Intuitive Controlled Survey

An intuitive controlled survey was conducted throughout the survey area. The surveyor traversed the survey area to see a representative cross-section of all the major habitats and topographic features, looking for the target species while en route between different areas. When the surveyor arrived at an area of high potential (defined in the prefield review or encountered during the field visit), a complete survey for the target species was conducted.

Complete Survey

A complete survey was conducted in areas within the survey area where the most suitable habitat was located. These surveys are defined as a 100 percent visual exam of the survey area.

Lists of all vascular plant taxa encountered within each survey area were recorded in the field. Nearly all plant species found in the survey areas were identified to the level needed to determine whether they qualify as special status plants. Collections were made of specimens that could not be identified readily in the field. Final determinations were made by keying specimens using standard references such as *Vascular Plants of the Pacific Northwest: Parts 1 through 5* (Hitchcock et al., 1955–1969). Plant identification was also aided by current taxonomic guides and other standard references, including the following:

- *Flora of the Pacific Northwest* (Hitchcock and Cronquist, 1973)
- *Manual of Grasses of the United States* (Hitchcock, 1971)
- *Field Guide to Selected Rare Plants of Washington* (Washington Natural Heritage Program, 2008)
- *WTU Image Collection: Plants of Washington, Lichens of Washington* (University of Washington Herbarium, Burke Museum of Natural History and Culture, 2009)

3.1.2 Results

Office Review. Twelve plant species listed by federal or state agencies as threatened or endangered were identified as potentially occurring in the vicinity of the survey area. Of those species, six were determined to potentially occur within the survey area based on evaluation of habitat requirements, elevation, and records of known occurrence. A complete list of potentially occurring plant species, including habitat requirements and bloom times, is presented in Table 1.

TABLE 1
Threatened or Endangered Plant Species That May Occur in the Vicinity of the Proposed Project Area

Scientific Name	Common Name	Federal Status*	State Status*	Habitat Preference	Potential to Occur
Plants					
<i>Astragalus arrectus</i>	Palouse milk-vetch	--	LT	Open ponderosa pine/Douglas fir forests in grassy or shrub dominated openings	May occur. Historical in Kittitas County. Several species of <i>Astragalus</i> identified during site visit.
<i>Carex macrochaeta</i>	Large-awn sedge	--	LT	Moist or wet, open places, frequently found near the coast, but occurs inland as well. Grows in seepage areas, around waterfalls, in wet meadows, and along streams and lakes.	May occur. Only five known extant populations, but like many sedges, it may be underreported.

TABLE 1
Threatened or Endangered Plant Species That May Occur in the Vicinity of the Proposed Project Area

Scientific Name	Common Name	Federal Status*	State Status*	Habitat Preference	Potential to Occur
<i>Delphinium viridescens</i>	Wenatchee larkspur	SoC	LT	Seasonally wet openings, moist meadows, moist microsites in open coniferous forests springs, seeps, riparian areas.	May occur. Known range is very small, but southern extent of know range is less than 15 miles north of proposed project area.
<i>Ophioglossum pusillum</i>	Adder's-tongue	--	LT	Wet meadows, grassy swales, moist woods, mud creeks.	May occur. Historical in Kittitas County. Few extant populations left in range, however potential habitat is present.
<i>Sidalcea oregana var. calva</i>	Wenatchee Mountain checker-mallow	LE	LE	Moist meadows that have surface water or are saturated in the upper portions of the soil profile into early summer. Taxon also occurs in open ponderosa pine/Douglas fir forests and along edges of shrub thickets.	May occur. Range covers roughly 30 square miles of habitat S/SE of Leavenworth, Washington.
<i>Spirathes diuvialis</i>	Ute's ladies tresses	LE	LE	Broad low-elevation intermontane valley plains, with deltaic meandered wetland complexes; restricted to calcareous, temporarily inundated wet meadow zones and segments of channels and swales where there is stable subsurface moisture and relatively low vegetation cover. There are four 4 known sites in WA. One is in a periodically flooded alkaline flat (moist meadow) adjacent to a ponderosa pine/Douglas-fir woodlands and sagebrush steppe with big sagebrush, bitterbrush, and rabbitbrush. The other three sites are adjacent to the Columbia River on stabilized gravel bars that are moist throughout the growing season.	Not likely to occur. Occurs between 720 and 1,500 feet elevation. Project area is between 2,100 and 2,800 feet elevation.

* Status Codes:

LE = Listed Endangered (Federal or State)

LT = Listed Threatened (Federal or State)

SoC = Species of Concern (Federal)

FC = Federal Candidate for Listing (Federal)

SC = Washington State Candidate for Listing (State)

Sources: USFWS, 2009; WDFW, 2009; WDNR, 2009.

Field Investigation. CH2M HILL botanists conducted field surveys for rare plant species and potential rare plant habitat on June 16 through 19 and July 9, 2009. This range of survey dates was selected to encompass all or a portion of the blooming times of the special status

plants potentially occurring within the project area. Approximately 580 acres were evaluated for the potential presence of rare plant species.

Plant Species Observed

The field survey identified a total of 81 species: 3 trees, 7 shrubs, 12 graminoids, and 56 forbs, and 3 herbaceous species. No special status plant species were found within the survey area. Table 2 presents a complete list of all plant species identified during the course of the field surveys. Appendix D contains photos of typical habitat types that occur in the survey area.

TABLE 2
Plant Species Observed During Field Surveys

Family	Scientific Name	Common Name	Native	Non-native	Form
Alismataceae	<i>Alisma plantago-aquatica</i>	European water plantain		X	forb
Apiaceae	<i>Ligusticum grayii</i>	Gray's lovage	X		forb
	<i>Lomatium nudicaule</i>	bare-stem desert parsley	X		forb
	<i>Lomatium triternatum</i>	nine-leaf desert parsley	X		forb
	<i>Oenanthe sarmentosa</i>	Pacific water -parsley	X		forb
Asteraceae	<i>Achillea millefolium</i>	wooly yarrow	X		forb
	<i>Anaphalis margaritacea</i>	pearly-everlasting	X		forb
	<i>Arnica sororia</i>	foothills arnica	X		forb
	<i>Balsamorhiza sagittata</i>	arrow-leaf balsamroot	X		forb
	<i>Chondrilla juncea</i>	rush skeletonweed		X	forb
	<i>Chrysanthemum leucanthemum</i>	ox-eye daisy		X	forb
	<i>Cirsium vulgare</i>	bull thistle		X	forb
	<i>Crepis occidentalis</i>	western hawksbeard	X		forb
	<i>Crepis setosa</i>	rough hawksbeard		X	forb
	<i>Eriophyllum lanatum</i>	wooly sunflower	X		forb
	<i>Gnaphalium palustre</i>	marsh cudweed	X		forb
	<i>Hieracium scouleri</i>	wooly-weed	X		forb
	<i>Madia glomerata</i>	mountain tarweed	X		forb
	<i>Madia gracilis</i>	slender tarweed	X		forb
	<i>Madia minima</i>	small-headed tarweed	X		forb
	<i>Senecio sylvaticus</i>	wood groundsel	X		forb

TABLE 2
Plant Species Observed During Field Surveys

Family	Scientific Name	Common Name	Native	Non-native	Form
	<i>Symphyotrichum spathulatum</i>	western mountain aster	X		forb
	<i>Tragopogon dubius</i>	yellow salsify		X	forb
	<i>Wyethia amplexifolia</i>	narrow-leaf wyethia	X		forb
Berberidaceae					
	<i>Berberis repens</i>	creeping Oregon grape	X		shrub
Boraginaceae					
	<i>Lithospermum ruderale</i>	Columbia puccoon	X		forb
	<i>Myosotis laxa</i>	small-flowered forget-me-not	X		forb
	<i>Plagiobothrys scouleri</i>	Scouler's popcorn-flower	X		forb
Caprifoliaceae					
	<i>Symphoricarpos albus</i>	snowberry	X		shrub
Caryophyllaceae					
	<i>Agrostemma githago</i>	common corncockle		X	forb
	<i>Symphoricarpos oreophilis</i>	mountain snowberry	X		shrub
Convolvulaceae					
	<i>Convolvulus arvensis</i>	field Morning-glory		X	forb
Cyperaceae					
	<i>Carex hoodii</i>	Hood's sedge	X		graminoid
	<i>Carex pachystachya</i>	thick-headed sedge	X		graminoid
	<i>Carex utriculata</i>	inflated sedge	X		graminoid
	<i>Scirpus microcarpus</i>	small-fruited bulrush	X		forb
Fabaceae					
	<i>Cytisus scoparius</i>	Scotch broom		X	shrub
	<i>Lathyrus japonicus</i>	pinewoods peavine	X		forb
	<i>Lupinus polyphyllus</i>	large-leaf lupine	X		forb
	<i>Lupinus sericeus</i>	silky lupine	X		forb
	<i>Vicia americana</i>	American purple vetch	X		forb
Gentianaceae					
	<i>Centaurium erythraea</i>	centaury		X	forb
Juncaceae					

TABLE 2
Plant Species Observed During Field Surveys

Family	Scientific Name	Common Name	Native	Non-native	Form
Lamiaceae	<i>Juncus parryi</i>	Parry's rush	X		graminoid
	<i>Prunella vulgaris</i>	self-heal		X	forb
Liliaceae	<i>Camassia quamash</i>	common camas	X		forb
	<i>Veratrum insolitum</i>	Siskiyou false-hellebore	X		forb
	<i>Zigadenus venenosus</i>	death camas	X		forb
Malvaceae	<i>Sidalcea oregana var. procera</i>	Oregon checkmallow	X		forb
Pinaceae	<i>Pinus ponderosa</i>	ponderosa pine	X		tree
	<i>Pseudotsuga menziesii</i>	Douglas-fir	X		tree
Plantaginaceae	<i>Plantago major</i>	common plantain	X		forb
Poaceae	<i>Agropyron smithii</i>	western wheatgrass	X		graminoid
	<i>Agropyron spicatum</i>	bluebunch wheatgrass	X		forb
	<i>Agrostis longiligula</i>	Pacific bentgrass	X		graminoid
	<i>Agrostis scabra</i>	rough bentgrass	X		graminoid
	<i>Danthonia spicata</i>	poverty oatgrass	X		graminoid
	<i>Elymus elymoides</i>	squirreltail			graminoid
	<i>Elymus glaucus</i>	blue wild-rye	X		graminoid
	<i>Festuca idahoensis</i>	Idaho fescue	X		graminoid
	<i>Phleum pratense</i>	common timothy		X	graminoid
	<i>Poa bulbosa</i>	bulbous bluegrass		X	graminoid
Polemoniaceae	<i>Collomia grandiflora</i>	large flowered collomia	X		forb
	<i>Navarretia breweri</i>	Brewer's navarretia	X		forb
	<i>Navarretia intertexta</i>	needle-leaf navarretia	X		forb
Polygonaceae	<i>Eriogonum umbellatum</i>	sulfur buckwheat	X		forb

TABLE 2
Plant Species Observed During Field Surveys

Family	Scientific Name	Common Name	Native	Non-native	Form
	<i>Polygonum polygaloides</i> <i>spp.confertiti</i>	close-flowered knotweed	X		forb
	<i>Rumex acetosella</i>	sheep sorrel		X	forb
Ranunculaceae					
	<i>Ranunculus acris</i>	tall ranunculus		X	forb
Rosaceae					
	<i>Fragaria virginiana</i>	wild strawberry	X		forb
	<i>Potentilla drummondii</i>	Drummonds cinquefoil	X		forb
	<i>Rosa woodsii</i>	Wood's rose	X		shrub
	<i>Spiraea betulifolia</i>	white spiraea	X		shrub
Rubiaceae					
	<i>Galium boreale</i>	northern bedstraw	X		forb
Salicaceae					
	<i>Populus tremuloides</i>	quaking aspen	X		tree
	<i>Salix scouleriana</i>	Scouler's willow	X		shrub
Scrophulariaceae					
	<i>Castilleja hispida</i>	harsh paintbrush	X		forb
	<i>Castilleja tenuis</i>	hairy Indian paintbrush	X		forb
	<i>Delphinium nuttallianum</i>	upland larkspur	X		forb
	<i>Penstemon procerus</i>	small flowered penstemon			forb
	<i>Verbascum thapsus</i>	wooly mullein	X		forb
Valerianaceae					
	<i>Plectritis macrocera</i>	white plectritis	X		forb

3.2 Wildlife Survey

3.2.1 Methods

Office Review. The office review consisted of compiling a list of special status wildlife species potentially occurring within the proposed survey area. The office review included review of state and federal rare species lists, recent aerial photography, and information on habitat requirements for any of the potentially occurring species.

Sources consulted included the following:

- *Species of Concern in Washington State* (WDFW June 2009)
- *State of Washington Priority Habitats and Species (PHS) List* (WDFW, 2008)
- *Federally Listed, Proposed, Candidate Species and Species of Concern Under the Jurisdiction of the Fish and Wildlife Service Which May Occur Within Kittitas County, Washington.* (USFWS, July 24, 2008) (provided in Appendix B).

Field Investigation. CH2M HILL biologists conducted reconnaissance-level field surveys on June 16 through 19 and July 9, 2009. A reconnaissance-level survey identifies all habitats within the survey area to determine whether there is onsite habitat with the potential to support a listed species. Recommendations are made for further protocol-level surveys for individual species if suitable habitat has been identified. Protocol-level surveys are intensive surveys with specific requirements according to the particular individual wildlife species.

Approximately 580 acres were evaluated for the potential presence of wildlife species.

3.2.2 Results

Office Review. A review of the *Species of Concern in Washington State* and the *State of Washington Priority Habitats and Species (PHS) List* resulted in four wildlife species which have the potential to occur in the vicinity of the proposed survey area. Table 3 summarizes WDFW PHS species, their habitat requirements, and likelihood of occurring in the survey area.

The database includes occurrences of both black-backed woodpecker and mountain quail approximately 1.0 mile from the project boundary. In addition, several occurrences of northern goshawk are documented approximately 1.5 to 1.8 miles from the northern edge of the survey area. The PHS database also includes elk and mule deer habitat regions approximately 0.8 to 1.5 miles from the proposed project area. While neither species is listed, these PHS listed habitats likely provide important winter habitat for elk and mule deer.

TABLE 3
Species Listed in the WDFW PHS Database that May Occur in the Vicinity of the Proposed Project Area

Scientific Name	Common Name	Federal Status	State Status	Preferred Habitat	Potential to Occur	Notes
Birds						
<i>Picoides arcticus</i>	Black-backed woodpecker	--	SC	Mature coniferous forests that have been burned within 5 years	Unlikely	
<i>Accipiter gentilis</i>	Northern goshawk	SoC	SC	Mature coniferous forests. Often found on moderate slopes at mid to high elevations. Also found along forest edges and occasionally in mixed coniferous/deciduous forests.	May Occur	

TABLE 3
Species Listed in the WDFW PHS Database that May Occur in the Vicinity of the Proposed Project Area

Scientific Name	Common Name	Federal Status	State Status	Preferred Habitat	Potential to Occur	Notes
<i>Oreortyx pictus</i>	Mountain quail	--	--	Requires dense thicket cover with accessible openings on slopes on mountains and foothills. Often associated with thickets in burned or cut areas. Require a reliable source of water during the summer.	Unlikely	Species of Local Significance

Mammals

<i>Cervus Canadensis nelsoni</i>	Elk	--	--	Productive grasslands, meadows, or clear cuts, interspersed with closed-canopy forests. Year round range varies from 2,500 to 10,000 acres, and usually includes distinct summering and wintering grounds.	Documented	
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Source: WDFW, 2009.

A review of Appendix B resulted in two wildlife species which have the potential to occur in the vicinity of the survey area. Table 4 summarizes the species, their habitat requirements, and the likelihood of occurrence in the survey area.

TABLE 4
USFWS Listed Threatened or Endangered Wildlife Species That May Occur in the Vicinity of the Proposed Project Area

Scientific Name	Common Name	Federal Status*	State Status*	Habitat Preference	Potential to Occur
<i>Martes pennanti</i>	Fisher	C	LE	Mature, closed-canopy coniferous forests with some deciduous trees present, primarily along riparian corridors.	Unlikely. Rare in Washington State.
<i>Canis lupus</i>	Gray wolf	LE	LE	Dense, unfragmented coniferous forests.	Unlikely. Only one wolf known to occur in Washington State, in southeast Washington.

* Status Codes:

LE = Listed Endangered (Federal or Washington status)

LT = Listed Threatened (Federal or Washington status)

SoC = USFWS Species of Concern

C=Federal Candidate for Listing

SC = Washington State Candidate for Listing

Source: USFWS, 2009.

Field Investigation. Results indicated a total of five natural habitat types within the survey area. Most of these can be named by using the Chappel et al. (2001) system of vegetation classification. Survey area natural vegetation types are as follows:

- Ponderosa Pine Forest and Woodlands
- Open Water – Lakes, Rivers, and Streams
- Herbaceous Wetlands
- Riparian
- Upland Aspen Forest

These habitat types are illustrated on Figure 3 (Appendix A) and described below. Appendix D contains photos of typical habitat types that occur in the survey area.

Ponderosa Pine Forest and Woodlands

The Ponderosa Pine Forest and Woodland habitat (Appendix D: Photo 1) within the survey area is the most abundant of the five habitat types. The survey area has been actively managed as commercial timberlands for the past 100 years. The area was last logged in 2001-2002, leaving relatively few trees per acre and open stands of predominantly ponderosa pine (*Pinus ponderosa*) trees with Douglas-fir (*Pseudotsuga menzeisii*) present as a subdominant species. Stands typically consist of an overstory of 50-year-old ponderosa pine trees with an understory of mid-successional trees and saplings. There is a mixed herbaceous understory comprised of several co-dominants. Species include arrowleaf balsamroot (*Balsamorhiza sagittata*), yarrow (*Achillea millefolium*), bulbous bluegrass (*Poa bulbosa*), ventenata (*Ventenata dubia*), and several species of fescue (*Festuca* spp.), wheatgrass (*Agropyron* spp.), and lupine (*Lupinus* spp.). Populations of Oregon checker-mallow (*Sidalcea oregana* var. *procera*) and sticky purple geranium (*Geranium viscosissimum*) were also observed.

Open Water—Lakes, Rivers, and Streams

Several intermittent streams and one artificially ponded area (Appendix D: Photo 2) are found within or crossing the survey area. All of the streams were dry at the time of the field visits and all were vegetated to varying extents. Typical vegetation within most channels includes herbaceous grass and forb species, including Brewer's navarretia (*Navarretia brewerii*), poverty oatgrass (*Danthonia spicata*), and small tarweed (*Madia exigua*). Other channels were dominated by dense shrub and herb species including wild rose (*Rosa woodsii*), snowberry (*Symphoricarpos albus*), cinquefoil (*Potentilla* spp.), and Oregon checkermallow (*Sidalcea oregana* var. *procera*).

Herbaceous Wetlands

Herbaceous Wetland habitats within the survey area consist of depressional wetlands dominated by herbaceous vegetation (Appendix D: Photo 3). Exposed soils were cracked, evidence of altering drying and wetting periods (Appendix D: Photo 3). These systems are not hydrologically connected to any stream or drainage ditch. Water arrives as either snowmelt or precipitation. These wetlands support hydrophytic herbaceous vegetation, and met the criteria for hydric soils and wetland hydrology. Common plant species within these wetlands were creeping spikerush and ventenata.

Riparian

The Riparian habitat (Appendix D: Photo 4) is found adjacent to some of the intermittent stream channels in the survey area. It generally consists of a dense shrub layer immediately

adjacent to the stream gradually transitioning to ponderosa pine forest. Typical species include oceanspray (*Holodiscus discolor*), mountain spiraea (*Spiraea betulifolia*), Oregon checkermallow (*Sidalcea oregana* var. *procera*), Wood’s rose (*Rosa woodsii*), and ponderosa pine.

Upland Aspen Forest

A small patch of aspen (*Populus tremuloides*) forest occurs along a drainage and around an artificially impounded pond in the southwestern portion of the survey area (Appendix D: Photo 5). Associated species include ponderosa pine, snowberry, and wild rose.

Species Observed. Wildlife observed during the field survey consisted of 10 bird and 2 mammal species. Evidence of wildlife (e.g., scat, burrows) observed in the survey area indicate the presence of rodents and coyote (*Canis latrans*).

Table 5 presents the list of all wildlife species observed during the field surveys.

TABLE 5
Wildlife Species Observed, June-July 2009 Field Investigation

Common Name	Scientific Name
Red-tailed hawk	<i>Buteo jamaicensis</i>
Stellar’s jay	<i>Cyanocitta stelleri</i>
Common raven	<i>Corvus corax</i>
White-headed woodpecker	<i>Picoides albolarvatus</i>
Hairy woodpecker	<i>Picoides villosus</i>
Northern flicker	<i>Colaptes auratus</i>
White-crowned sparrow	<i>Zonotrichia albicollis</i>
Chipping sparrow	<i>Spizella passerina</i>
Western tanager	<i>Piranga ludoviciana</i>
Western wood peewee	<i>Contopus sordidulus</i>
Mule deer	<i>Odocoileus hemiones</i>
Rocky Mountain Elk	<i>Cervus canadensis nelsoni</i>

No state or federally listed threatened or endangered wildlife species were observed within the survey area. A state candidate species, the white-headed woodpecker, was observed in the northwest portion of the survey area. Both male and female woodpeckers were observed close to the main access road. The male was observed foraging in a stand of adult ponderosa pine, while the female was located excavating a nest in a snag approximately 10 feet from the road.

4.0 Conclusions and Recommendations

CH2M HILL biologists conducted surveys for rare plant and wildlife species throughout the survey area. The purpose of the surveys was to identify potential populations of special status species and to determine whether proposed project activities will affect these populations.

4.1 Conclusions

The surveys identified 81 plant species, 12 wildlife species, and 5 habitat types. No state or federally listed endangered or threatened species were observed in the survey area during field surveys. The following conclusions were derived:

- Three habitat types in the survey area, Upland Aspen, Riparian, and Herbaceous Wetlands, are considered Washington Priority Habitats (Aspen Stands, Riparian, and Freshwater Wetlands). Impacts to these habitats from construction and operation of the project will not occur as facilities were micro-sited to avoid these areas.
- Back-backed woodpeckers are unlikely to be impacted by the development of this project, as activities relating to this project will not involve the documented area. Black-backed woodpeckers require habitat that includes stands of mature conifers that have experienced a burn event within the last 5 years. No stands of burned, mature conifer trees exist in the survey area. In addition, the proposed project is unlikely to impact any mountain quail or northern goshawk habitat, as no activities related to this project will occur near the PHS listing.
- Both the mule deer and elk PHS regions are located outside the proposed project area, and will not be impacted by project activities
- Potential suitable habitat for several listed species does occur within the Ponderosa Pine Forest and Woodland habitat. However, habitats within the survey area have been disturbed and fragmented by commercial forest practices and by residential development in the surrounding area. State or federal resource agencies may require additional surveys to determine if any rare plants or listed wildlife species occur in the survey area.
- The proposed project is not expected to result in any significant impacts to special status species. However, potentially suitable habitat may be temporarily and permanently impacted. Temporary impacts may occur in conjunction with the placement and use of heavy equipment during project construction. Permanent impacts will occur due to habitat alteration and tree removal. Removal of trees for project placement will disturb and fragment the existing forested habitat.

4.2 Recommendations

4.2.1 Best Management Practices (BMPs)

Best management practices (BMPs) will be implemented during construction to avoid and reduce temporary and permanent impacts to the extent practicable. In the event that a state

or federally listed threatened or endangered plant or wildlife species is observed during project development, work will be halted immediately and a qualified biologist notified.

BMPS will be implemented wherever surface disturbances occur. These measures include, but are not limited to, the following:

- Protect trees, shrubbery, and other vegetation not designated for removal from damage caused by the project construction.
- Seed areas of temporary soil disturbance with the specified temporary seed mix.
- Install filter bags, sediment fences, sediment filter fabric traps, and graveled construction accesses as necessary for erosion control.
- Cover stockpiles with impervious materials when unattended or during rainfall.
- Locate construction staging areas for storage, maintenance, and fueling of construction equipment minimum of 150 feet from creeks or wetlands. Show staging areas on the construction plans.
- Prevent petroleum products and other harmful material from entering wetland or waterways.
- Upon completion of construction, seed or plant all areas temporarily disturbed by construction activities with native plants.

4.2.2 Mitigation

All recommended surveys have been completed. It is still possible that individuals or populations of rare plant species may be encountered in the course of project construction. In the event of such a discovery, a qualified botanist will be retained to verify identity of the plant(s) and make recommendations for addressing the situation. All efforts will be made to avoid disturbance to such species. If disturbance cannot be avoided, efforts will be employed to minimize disturbance to the maximum extent practicable. If such efforts are not possible, mitigation for impacts to the plant(s) will be required. Mitigation measures will be specific to each plant species.

Possible avoidance and mitigation measures may include the following:

- Implement micrositeing: slight relocations of project facilities to avoid rare plant populations.
- Remove and conserve plants; replant following construction.
- Replant areas temporarily disturbed by construction activities with seed obtained from a qualified cultivator of rare plants.
- Mitigate by seeding an approved offsite area with the same species.
 - Mitigation will require approval of the agencies, as well as monitoring for a defined period of time.

5.0 References

5.1 Cited in Text

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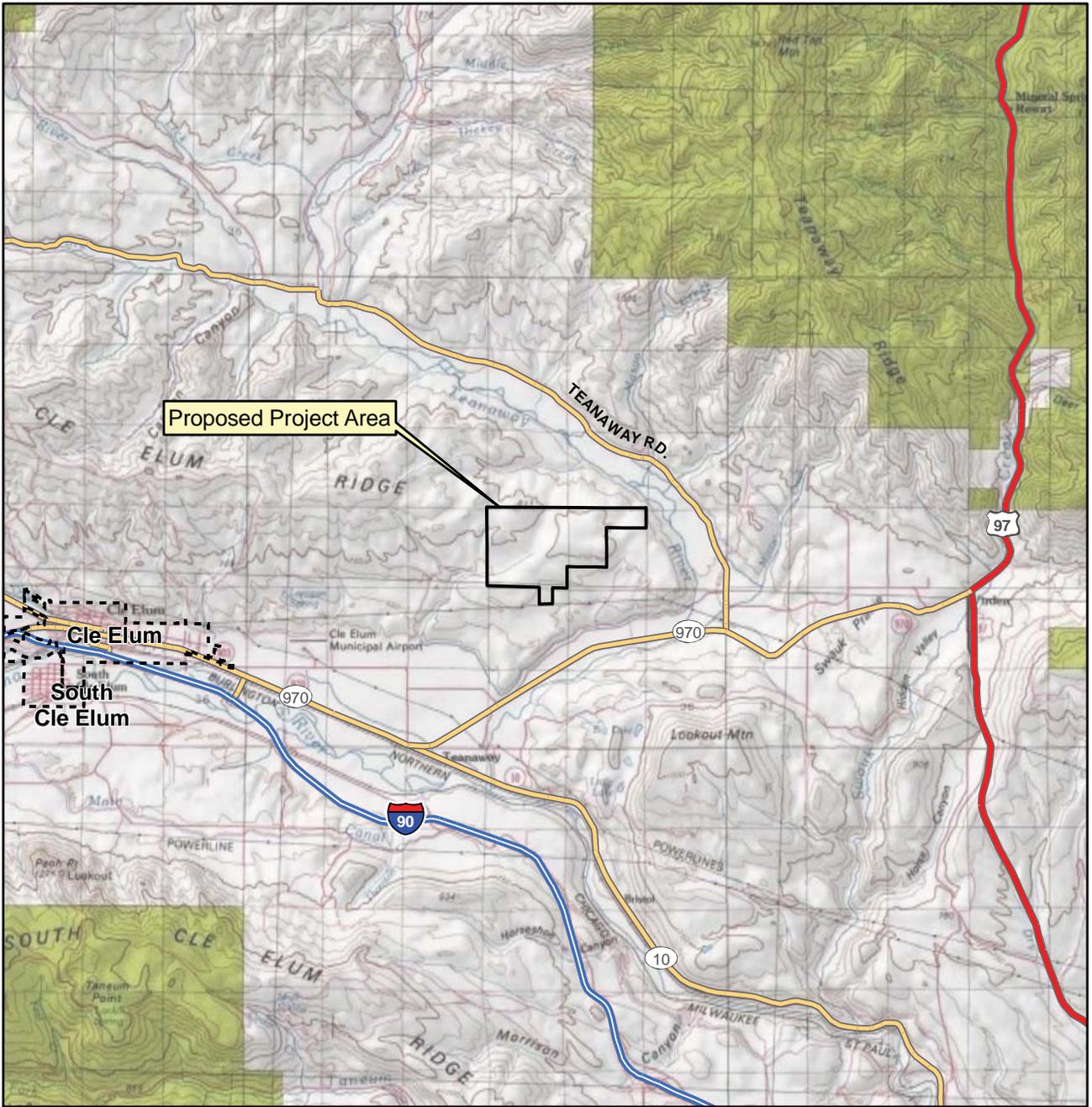
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APPENDIX A
Figures



VICINITY MAP

LEGEND

-  Proposed Project Area
-  City Boundary
-  Interstate
-  Highway
-  Major Road

Note:
1. USGS 100K Quadrangle: Wenatchee.

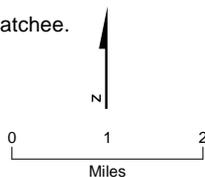
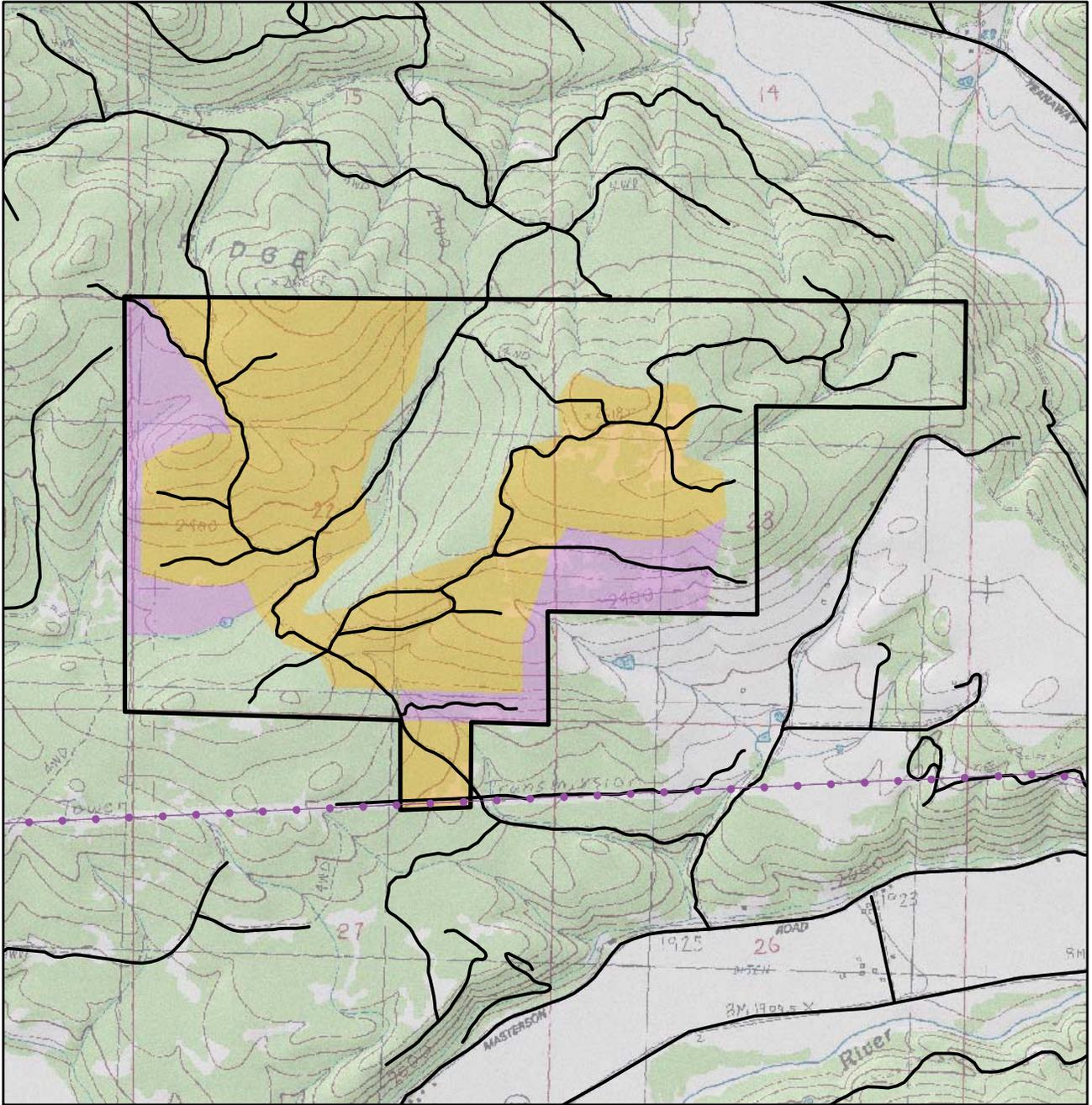


FIGURE 1
Vicinity Map

Sensitive Species Surveys Report
Teanaway Solar Reserve
Kittitas County, Washington



VICINITY MAP

LEGEND

-  Proposed Project Area
-  July 2009 Survey Area
-  June 2009 Survey Area
-  Existing BPA Transmission Line
-  Existing Road

Note:
1. USGS 24K Quadrangle: Teanaway.

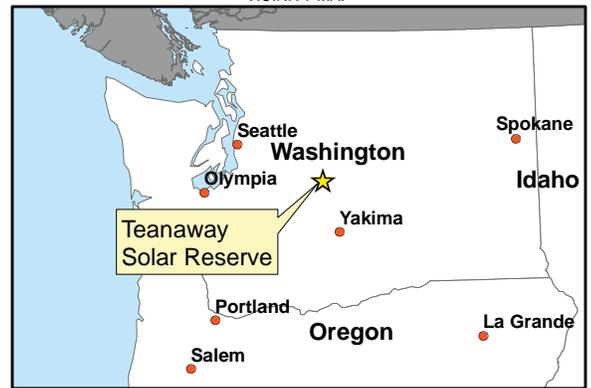
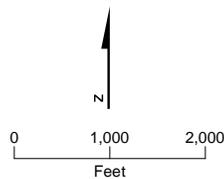
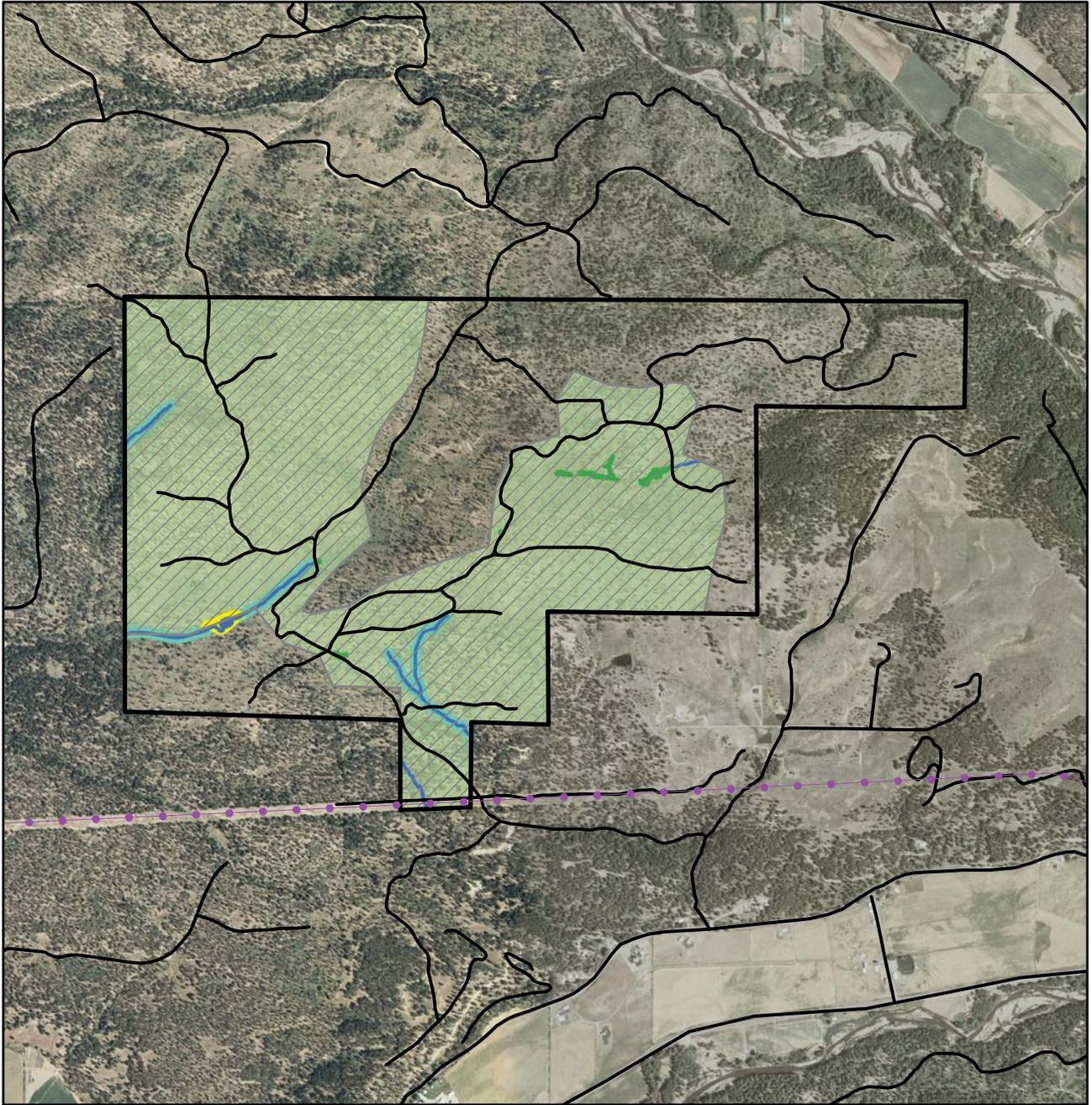


FIGURE 2
Survey Area Map

Sensitive Species Surveys Report
Teanaway Solar Reserve
Kittitas County, Washington





VICINITY MAP

LEGEND

- | | | | |
|--|--------------------------------|--|-------------------------------------|
| | Proposed Project Area | | Habitat |
| | Biological Survey Area | | Open Water |
| | Existing BPA Transmission Line | | Ponderosa Pine Forest and Woodlands |
| | Existing Road | | Riparian |
| | | | Upland Aspen |

Note:
1. Aerial Imagery: 2006 1m NAIP.

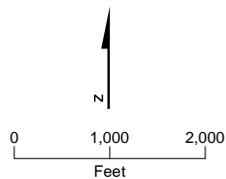


FIGURE 3
Habitat Types

Sensitive Species Surveys Report
Teanaway Solar Reserve
Kittitas County, Washington

APPENDIX B
**U.S. Fish and Wildlife Service
Species List**

KITTITAS COUNTY
Updated 7/24/2008

LISTED

Endangered

Gray wolf (*Canis lupus*)

Threatened

Bull trout (*Salvelinus confluentus*) – Columbia River distinct population segment

Grizzly bear (*Ursus arctos horribilis*)

Canada lynx (*Lynx canadensis*)

Marbled murrelet (*Brachyramphus marmoratus*)

Northern spotted owl (*Strix occidentalis caurina*)

Spiranthes diluvialis (Ute ladies'-tresses), plant

Designated

Critical habitat for the northern spotted owl

Critical habitat for the Columbia River distinct population segment of the bull trout

CANDIDATE

Fisher (*Martes pennanti*) - West Coast distinct population segment

Greater sage grouse (*Centrocercus urophasianus*) – Columbia Basin distinct population segment

Yellow-billed cuckoo (*Coccyzus americanus*)

SPECIES OF CONCERN

Animals

Bald eagle (*Haliaeetus leucocephalus*) (delisted, monitor status)

Black swift (*Cypseloides niger*)

Burrowing owl (*Athene cunicularia*)

Ferruginous hawk (*Buteo regalis*)

Larch Mountain salamander (*Plethodon larselli*)

Loggerhead shrike (*Lanius ludovicianus*)

Long-eared myotis (*Myotis evotis*)

Northern goshawk (*Accipiter gentilis*)

Olive-sided flycatcher (*Contopus cooperi*)

Pacific lamprey (*Lampetra tridentata*)

Pallid Townsend's big-eared bat (*Corynorhinus townsendii pallescens*)

Peregrine falcon (*Falco peregrinus*) (Delisted, monitor status)

Pygmy whitefish (*Prosopium coulteri*)
Redband trout (*Oncorhynchus mykiss*)
River lamprey (*Lampetra ayresi*)
Sagebrush lizard (*Sceloporus graciosus*)
Sharptail snake (*Contia tenuis*)
Townsend's ground squirrel (*Spermophilus townsendii*)
Western brook lamprey (*Lampetra richardsoni*)
Western gray squirrel (*Sciurus griseus griseus*)
Westslope cutthroat trout (*Oncorhynchus clarki lewisi*)
Wolverine (*Gulo gulo*)

Vascular Plants

Astragalus columbianus (Columbia milk-vetch)
Cypripedium fasciculatum (Clustered lady's-slipper)
Delphinium viridescens (Wenatchee larkspur)
Lomatium tuberosum (Hoover's desert-parsley)
Phacelia minutissima (Least phacelia)
Pinus albicaulis (Whitebark pine)
Silene seelyi (Seely's silene)
Tauschia hooveri (Hoover's tauschia)

Mosses

Orthotrichum praemorsum

APPENDIX C

**Washington Natural Heritage Program
Species List**



[Return to Washington
Natural Heritage Program](#)

**Washington
Natural
Heritage
Program**

Reference Desk

Reference Desk	Location Search	Rare Plants	Rare Animals	Communities
GIS	Field Guides	Publications	Natural Heritage Plan	

**Washington Natural Heritage Information System
List of Known Occurrences of Rare Plants in Washington
February 2009
Kittitas County**

A key to status fields appears below. If a scientific name is underlined you may click on it to go to a field guide page (pdf format, average size 300 kb) for that taxon.

Scientific Name	Common Name	State Status	Federal Status	Historic Record
Agoseris elata	tall agoseris	S		
Anemone patens var. multifida	pasqueflower	T		
Anthoxanthum hirtum	common northern sweet grass	R1		H
Astragalus arrectus	Palouse milk-vetch	T		H
Astragalus columbianus	Columbia milk-vetch	S	SC	
Astragalus misellus var. pauper	Pauper milk-vetch	S		
Camissonia pygmaea	dwarf evening-primrose	S		
Camissonia scapoidea ssp. scapoidea	naked-stemmed evening-primrose	S		
Carex comosa	bristly sedge	S		H
Carex macrochaeta	large-awn sedge	T		H
Carex pauciflora	few-flowered sedge	S		
Carex scirpoidea ssp. scirpoidea	Canadian single-spike sedge	S		
Chaenactis thompsonii	Thompson's chaenactis	S		
Collomia macrocalyx	bristle-flowered collomia	S		
Cryptantha gracilis	narrow-stem cryptantha	S		
Cryptantha leucophaea	gray cryptantha	S	SC	
Cryptantha rostellata	beaked cryptantha	T		
Cryptantha scoparia	miner's candle	S		
Cypripedium fasciculatum	clustered lady's-slipper	S	SC	
Delphinium viridescens	Wenatchee larkspur	T	SC	
Eatonella nivea	white eatonella	T		
Erigeron basalticus	basalt daisy	T	SC	
Erigeron piperianus	Piper's daisy	S		H
Erigeron salishii	Salish fleabane	S		H
Gentiana douglasiana	swamp gentian	S		
Hackelia hispida var. disjuncta	sagebrush stickseed	S		H
Iliamna longisepala	longsepal globemallow	S		
Juncus howellii	Howell's rush	T		
Lomatium tuberosum	Hoover's desert-parsley	S	SC	

<u>Mimulus suksdorfii</u>	Suksdorf's monkey-flower	S	
<u>Minuartia nuttallii ssp. fragilis</u>	Nuttall's sandwort	T	
<u>Montia diffusa</u>	branching montia	S	H
<u>Nicotiana attenuata</u>	coyote tobacco	S	
<u>Oenothera caespitosa ssp. caespitosa</u>	caespitose evening-primrose	S	
<u>Ophioglossum pusillum</u>	Adder's-tongue	T	H
<u>Oxytropis campestris var. gracilis</u>	slender crazyweed	S	H
<u>Pediocactus nigrispinus</u>	snowball cactus	R1	
<u>Pellaea breweri</u>	Brewer's cliff-brake	S	
<u>Penstemon eriantherus var. whitedii</u>	fuzzytongue penstemon	S	
<u>Phacelia minutissima</u>	least phacelia	E	SC
<u>Pyrrocoma hirta var. sonchifolia</u>	sticky goldenweed	S	
<u>Sidalcea oregana var. calva</u>	Wenatchee Mountain checker-mallow	E	LE
<u>Silene seelyi</u>	Seely's silene	S	SC
<u>Spiranthes porrifolia</u>	western ladies-tresses	S	
<u>Subularia aquatica var. americana</u>	water awlwort	R1	
<u>Tauschia hooveri</u>	Hoover's tauschia	T	SC

Description of Codes

Historic Record:

H indicates most recent sighting in the county is before 1977.

State Status

State Status of plant species is determined by the Washington Natural Heritage Program. Factors considered include abundance, occurrence patterns, vulnerability, threats, existing protection, and taxonomic distinctness.

Values include:

E = Endangered. In danger of becoming extinct or extirpated from Washington.

T = Threatened. Likely to become Endangered in Washington.

S = Sensitive. Vulnerable or declining and could become Endangered or Threatened in the state.

X = Possibly extinct or Extirpated from Washington.

R1 = Review group 1. Of potential concern but needs more field work to assign another rank.

R2 = Review group 2. Of potential concern but with unresolved taxonomic questions.

Federal Status

Federal Status under the U.S. Endangered Species Act(USESA) as published in the Federal Register:

LE = Listed Endangered. In danger of extinction.

LT = Listed Threatened. Likely to become endangered.

PE = Proposed Endangered.

PT = Proposed Threatened.

C = Candidate species. Sufficient information exists to support listing as Endangered or Threatened.

SC = Species of Concern. An unofficial status, the species appears to be in jeopardy, but insufficient information to support listing.

APPENDIX D
Site Photographs



Photo 1: View of ponderosa pine forest and woodland in project area.



Photo 2: View of open water habitat in project area. Several intermittent streams present, as well.



Photo 3: View of herbaceous wetland in project area.



Photo 4: View of riparian habitat overhanging intermittent stream channel.



Photo 5: Upland aspen habitat south of artificially impounded pond. Aspen rings the pond in association with ponderosa pine and Douglas fir and continues for a short distance up the drainage.

ATTACHMENT B

Wetland Delineation Report

Report

Teanaway Solar Reserve Wetland Delineation Report Kittitas County, Washington

Prepared for
Teanaway Solar Reserve, LLC

February 2010

Prepared by
CH2MHILL



**Printed on
Recycled and
Recyclable
Paper**

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3.0 Site Alterations	2
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Figures (*Provided in Appendix A*)

- 1 Vicinity Map
- 2 Tax Lot Map
- 3 Soils Map
- 4 National Wetlands Inventory Map
- 5 Delineation Map – Overview
- 5a-5i Delineation Map – Detail

1.0 Introduction

CH2M HILL conducted a wetlands and other waters delineation in June and July 2009 for the proposed Teanaway Solar Reserve project (project), a solar facility on private land in an unincorporated area of Kittitas County, Washington. Twelve wetlands and six ephemeral streams were delineated.

The 982-acre proposed project area is located on the eastern slopes of the Cascade Mountains on Cle Elum Ridge (see Figure 1 in Appendix A). The solar facility and associated components will include solar panels, a substation on approximately 6 acres, and potentially a transmission line (up to 200-foot wide right-of-way required) to connect the substation to the existing Bonneville Power Administration (BPA) 345-kilovolt (kV) Rocky Reach-Maple Valley transmission line.

Subsequent sections of this report are organized as follows:

- 2.0—Landscape Setting and Land Use (Historical and Current)
- 3.0—Site Alterations
- 4.0—Precipitation Data and Analysis
- 5.0—Methods
- 6.0—Description of Wetlands and Other Waters
- 7.0—Mapping Method
- 8.0—Results and Conclusions
- 9.0—References

Report figures are presented in Appendix A. U.S. Army Corps of Engineers (USACE) wetland data forms are included in Appendix B. Site photographs are in Appendix C. Washington wetland rating forms and maps are in Appendix D. Washington State Department of Ecology function assessment forms are in Appendix E. Background information supporting these forms is available upon request.

2.0 Landscape Setting and Land Use (Historical and Current)

The proposed project site is located approximately 4 miles northeast of Cle Elum, Washington, in Township 20N, Range 16E, within Sections 22, 23, and 27 (see Figure 1 in Appendix A for the site location map). The site is located on the eastern slopes of the Cascade Mountains on Cle Elum Ridge, which runs generally from east to west at elevations ranging from approximately 2,200 to 2,600 feet. The Teanaway River is approximately 1 mile to the northeast of Cle Elum Ridge. The site is accessed from Highway 970 by way of County roads such as Red Bridge Road, private roads such as Loping Lane, and Wiehl Road, which is a dedicated public road that is maintained privately and not by the County.

The proposed project area consists of 982 acres. Based on site surveys, the project will utilize approximately 477 acres within the proposed project area. Solar arrays will be placed on approximately 399 acres. The remaining acres are currently undeveloped open space. Approximately 193 acres of the remaining open space will be preserved as part of the wildlife mitigation plan (see Attachment H, *Wildlife Mitigation Plan*). An open corridor will be maintained to allow for wildlife migration through the site.

Vegetation communities within the proposed project area are early to mid-successional ponderosa pine (*Pinus ponderosa*) forests and sloped hillside meadows where logging has

occurred more recently. Current and historical land uses in the vicinity of the project site are ranching and commercial tree farming.

The proposed project is located in the Teanaway River and Yakima River watersheds within the Yakima River basin and Upper Yakima subbasin. Tributaries within the project site flow into ponds, ditches, and vegetated swales. Water from these tributaries not used for irrigation practices may eventually flow into the Yakima River several miles to the south with the exception of one unnamed tributary (S6), which flows directly into the Teanaway River. Wetlands within the project site are hydrologically connected to these tributaries.

3.0 Site Alterations

Trees within the project site have been selectively harvested. The most recent harvest was in 2001 and 2002. An old earthen berm crosses stream S4 and has created or enlarged wetland W12 (see Section 6.0 for description of wetlands and other waters).

4.0 Precipitation Data and Analysis

Annual precipitation in the region averages approximately 23.07 inches of rain and 86.5 inches of snow for the water year (NRCS, 2002). Precipitation data were reviewed for the nearest weather station located approximately 5 miles west of the project site in Cle Elum, Washington. This weather station is approximately 400 feet lower in elevation than the project site. Precipitation for the water year beginning October 2008 through June 2009 was 18.35 inches (Table 1).

TABLE 1
 Monthly Precipitation Data (NRCS, 2002; KWACLEEL Weather Station, 2009)

	Actual Precipitation (in inches)	Normal Range* (in inches)	Outside Normal Range (in inches)
October 2008	1.36	0.72 - 2.14	
November 2008	5.96	2.61 - 4.61	+1.35
December 2008	1.48	3.05 - 5.27	-1.70
January 2009	4.36	2.31 - 4.60	
February 2009	0.52	1.52 - 3.04	-1.00
March 2009	2.48	1.12 - 1.99	+0.49
April 2009	0.83	0.79 - 1.38	
May 2009	1.08	0.57 - 1.12	
June 2009	0.28	0.57 - 1.16	-0.29
Total	18.35	13.26 – 25.31	

* "Normal Range" is the range within which precipitation for the given period has a 70 percent chance of occurring.

Table 2 presents the precipitation data for the 2-week period preceding the field investigation dates of June 9, 10, 16, and 17, 2009. Precipitation totaled 0.28 inch.

TABLE 2
Daily Precipitation Data (KWACLEEL3 Weather Station, 2009)

Date	Precipitation (in inches)
May 27, 2009	0.0
May 28, 2009	0.0
May 29, 2009	0.0
May 30, 2009	0.0
May 31, 2009	0.0
June 1, 2009	0.0
June 2, 2009	0.0
June 3, 2009	0.0
June 4, 2009	0.12
June 5, 2009	0.0
June 6, 2009	0.0
June 7, 2009	0.0
June 8, 2009	0.0
June 9, 2009	0.16
June 10, 2009	0.0
June 11, 2009	0.0
June 12, 2009	0.0
June 13, 2009	0.0
June 14, 2009	0.0
June 15, 2009	0.0
June 16, 2009	0.0
Total:	0.28

Table 3 presents the precipitation data for the 2-week period preceding the field investigation date of July 9, 2009. Precipitation totaled 0.0 inch.

TABLE 3
Daily Precipitation Data (KWACLEEL3 Weather Station, 2009)

Date	Precipitation (in inches)
June 27, 2009	0.0
June 27, 2009	0.0
June 28, 2009	0.0
June 29, 2009	0.0
June 30, 2009	0.0
July 1, 2009	0.0
July 2, 2009	0.0
July 3, 2009	0.0
July 4, 2009	0.0
July 5, 2009	0.0
July 6, 2009	0.0
July 7, 2009	0.0
July 8, 2009	0.0
July 9, 2009	0.0
Total:	0.0

Based on the above precipitation data, precipitation for the water year prior to the fieldwork was within the normal range. June precipitation was 0.29 inch below the normal range and there was no precipitation in July. However, the actual precipitation amounts were only slightly below the normal range and were unlikely to be significant enough to affect the observation and interpretation of wetland hydrological indicators or stream flow duration indicators at that time of year.

5.0 Methods

Before the field investigation began, the following information was reviewed:

- Watercourses mapped by the Washington State Department of Natural Resources (WADNR) (2006)
- U.S. Geological Survey (USGS) 24K topographic maps: Teanaway quadrangle
- National Wetland Inventory (NWI) 24K maps: Teanaway quadrangle
- Soil Survey Geographic Database of Kittitas County, Washington (2002) (see Figure 4 in Appendix A)
- Hydric Soils List of Kittitas County, Washington
- True color aerial photographs flown in various years

One NWI-mapped wetland is in the southwest corner of section 22. It is labeled as *palustrine emergent, semi-permanently flooded*. Five streams were mapped by WADNR. All five are classified as *non-fish, seasonal*. There are no mapped hydric soil units within the project site.

Fieldwork was conducted on June 9, 10, 16, and 17, and July 9, 2009. Potential waters and wetlands identified in the office review were field verified. Additional potential waters and wetlands were observed during fieldwork and were delineated.

In addition, all swale areas and land topography signatures that indicated water passage were walked during field visits. Areas identified as “wet meadows” by adjacent land owners were investigated. Areas identified in aerial photographs containing color signatures that suggest the presence of water were also investigated.

Data collection and analysis followed procedures in the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory, 1987) and the *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valley and Coast* (USACE, 2008). The routine onsite wetland determination method was used to observe vegetation, soils, and hydrological conditions at representative locations. Paired sample plots were used to document wetland and upland areas adjacent to wetland boundaries. The *National List of Plant Species that Occur in Wetlands: Northwest (Region 9)* (USFWS, 1988) and the 1993 supplement (USACE, 1993) were used to determine hydrophytic status of vegetation.

The widths of stream channels were estimated in the field (Ordinary High Water Mark to Ordinary High Water Mark [OHWM to OHWM]).

Wetlands were rated using the Department of Ecology’s *Wetland Rating System for Eastern Washington* (Hruby, 2004).

6.0 Description of Wetlands and Other Waters

Twelve wetlands and six ephemeral streams were delineated (see Figure 5 in Appendix A).

6.1 Wetlands

Twelve wetlands were delineated (see Table 4 in Section 9.2.3). They total 0.97 acre within the project site. All of the wetlands were determined to be palustrine emergent (PEM) (Cowardin). Eleven wetlands were depressional (HGM) wetlands. Wetland W12 was riverine (HGM).

Wetlands W1, W3, and W6 and wetlands W4, W5, and W7 formed two complexes in the northeast portion of the survey area. Wetlands W8, W9, and W11 were adjacent to road fill and were probably created or enlarged by the fill backing up water. W11 appeared to be an excavated roadside ditch and W8 was at the outlet of a culvert that carried water under the road from W11. Wetland W10 was created or enlarged by road fill across the headwaters of stream S4 that backs up water due to a perched culvert. Wetland W12, which corresponded to the NWI-mapped wetland, was created or enlarged by an old earthen berm across stream S4.

The hydrologic source of all wetlands within the project site is precipitation and snowmelt. No springs or seeps were observed. Washington soil surveys characterize soil units within the study area as moderately well drained with a water table depth of 39 and 51 inches. Inundation and saturation were only observed at wetland W12. Primary hydrologic indicators observed were predominantly surface soil cracks (B6); however, some wetlands had sparsely vegetated concave surface (B8), and algal mat or crust (B4) indicators. The secondary indicator of geomorphic

position (D2) was observed for all the wetlands. These indicators suggest that precipitation and snowmelt pond in depressional areas during the wet season and dry out during the summer.

Hydric soil indicators observed in soil pits included Depleted Matrix (F3) and Redox Dark Surface (F7). Soils were predominantly silt loams with some clay soils occurring below 6 inches. Most of the wetlands had a restrictive layer of rock and gravel, usually at about 12 inches.

Dominant wetland plants included *Ventenata dubia* (NOL), *Juncus parryi* (FAC), *Gnaphalium palustre* (FAC), and *Eleocharis palustris* (OBL). Other wetland plants included *Plagiobotrys scouleri* (FACW), *Carex feta* (FACW), *Potentilla gracilis* (FAC), *Camassia quamash* (FACW), and *Ranunculus acris* (FACW). Some wetlands were sparsely vegetated and contained little or no vegetation. The hydrophytic vegetation criterion was met for many of the wetlands through problematic vegetation procedures, because they were dominated by *Ventenata dubia*, an invasive annual species that presumably dominates depressional areas in dryer years or as the depressions dry out.

6.2 Other Waters

Six ephemeral streams were delineated within the project site (see Table 5 in Section 9.2.3). Indicators observed during site visits that suggest ephemeral water flow included moderately apparent bed and banks, scour marks, and cobble, gravel, and sand stream substrate. Abrupt headcuts and defined and continuous bed and banks were used to determine the extent of streams. No springs, seeps, or evidence of groundwater was observed along stream corridors indicating the source of hydrology is solely precipitation and snow melt. Lack of water-dependant organisms (fish, amphibians, macro invertebrates, streamer mosses) within stream corridors suggests that water does not persist in streams longer than the wet season.

7.0 Mapping Method

Wetland sample plot locations and wetland other waters boundaries were mapped within the project site using a hand-held Trimble GeoXT geographical positioning system (GPS) unit with sub-meter accuracy capability. Acreages of wetlands within the project site boundaries were calculated using geographical information system (GIS) software.

Estimated accuracy of mapped wetland boundaries and sample plot locations is +/- 3 feet.

8.0 Wetland Ratings

All of the wetlands rated as Category 3. Wetland rating forms and associated figures are provided in Appendix D.

9.0 Results and Conclusions

Twelve wetlands totaling 0.97 acre and six ephemeral streams were delineated in the project site. All of the waters and wetlands identified in this report are potentially subject to federal or state jurisdiction. Jurisdictional determinations, including the applicability of exemptions, are made on a case-by-case basis by the Washington State Department of Ecology (Ecology) and the USACE.

9.1 Waters of the State

“Surface waters of the state” include lakes, rivers, ponds, streams, inland waters, saltwaters, wetlands, and all other surface waters and water courses within the jurisdiction of the state of Washington (Washington Administrative Code 173-201A-020). All of the delineated streams and wetlands at the project site are naturally occurring features of the landscape and are likely waters of the state.

9.2 Waters of the United States

USACE asserts jurisdiction over the following waters:

- Traditional navigable waters (TNWs)
- Wetlands adjacent to TNWs
- Non-navigable tributaries of TNWs that are relatively permanent waters (RPWs) where the tributaries typically flow year-round or have continuous flow at least seasonally (i.e., typically 3 months)
- Wetlands that directly abut (i.e., have a continuous surface connection to) such tributaries (U.S. Environmental Protection Agency [EPA] and USACE, 2008)

USACE will decide jurisdiction over the following waters based on a fact-specific analysis to determine whether they have a significant nexus with a TNW:

- Non-navigable tributaries that are not relatively permanent
- Wetlands adjacent to non-navigable tributaries that are not relatively permanent
- Wetlands adjacent to but that do not directly abut a relatively permanent non-navigable tributary (EPA and USACE, 2008)

A “significant nexus” is determined through analysis of “the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical and biological integrity of downstream TNWs” (EPA and USACE, 2008).

USACE will decide jurisdiction over isolated (i.e., nonadjacent) wetlands and waters based on a fact-specific analysis to determine whether impacts to those wetlands or waters could affect interstate commerce.

9.2.1 Traditional Navigable Waters

There are no traditional navigable waters in the project site. The nearest TNW is the Yakima River (USACE Seattle District, 2008b, 2008c).

9.2.2 Relatively Permanent Waters and Abutting Wetlands

There are no RPWs in the project site.

9.2.3 Non-RPWs and Adjacent Wetlands

All of the non-RPWs (i.e., ephemeral streams) are natural tributaries to the Teanaway and Yakima rivers. The Teanaway River flows into the Yakima River, a TNW. These streams and their adjacent wetlands in the proposed project area potentially have a significant nexus to the Yakima River, which is the nearest downstream TNW, based on their contributions of water supply,

nutrients, and flood flow attenuation to the Yakima. They are all presumed to be jurisdictional until a final determination has been made by USACE.

Tables 4 and 5 provide a summary of potentially jurisdictional wetlands and waters within the project site boundaries.

TABLE 4
Wetlands Summary Table

Wetland ID	Wetland Acreage	Cowardin Type	HGM Type	Wetland Adjacent to RPW	Wetland Adjacent to Non-RPW	USACE Jurisdiction	State Jurisdiction
W1	0.010	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W2	0.004	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W3	0.030	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W4	0.067	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W5	0.004	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W6	0.253	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W7	0.231	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W8	0.027	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W9	0.013	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W10	0.019	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W11	0.006	PEM	Depressional	NO	YES	Potentially – if significant nexus to TNW	YES
W12	0.312	PEM	Riverine	NO	YES	Potentially – if significant nexus to TNW	YES

TABLE 5
Other Waters Summary Table

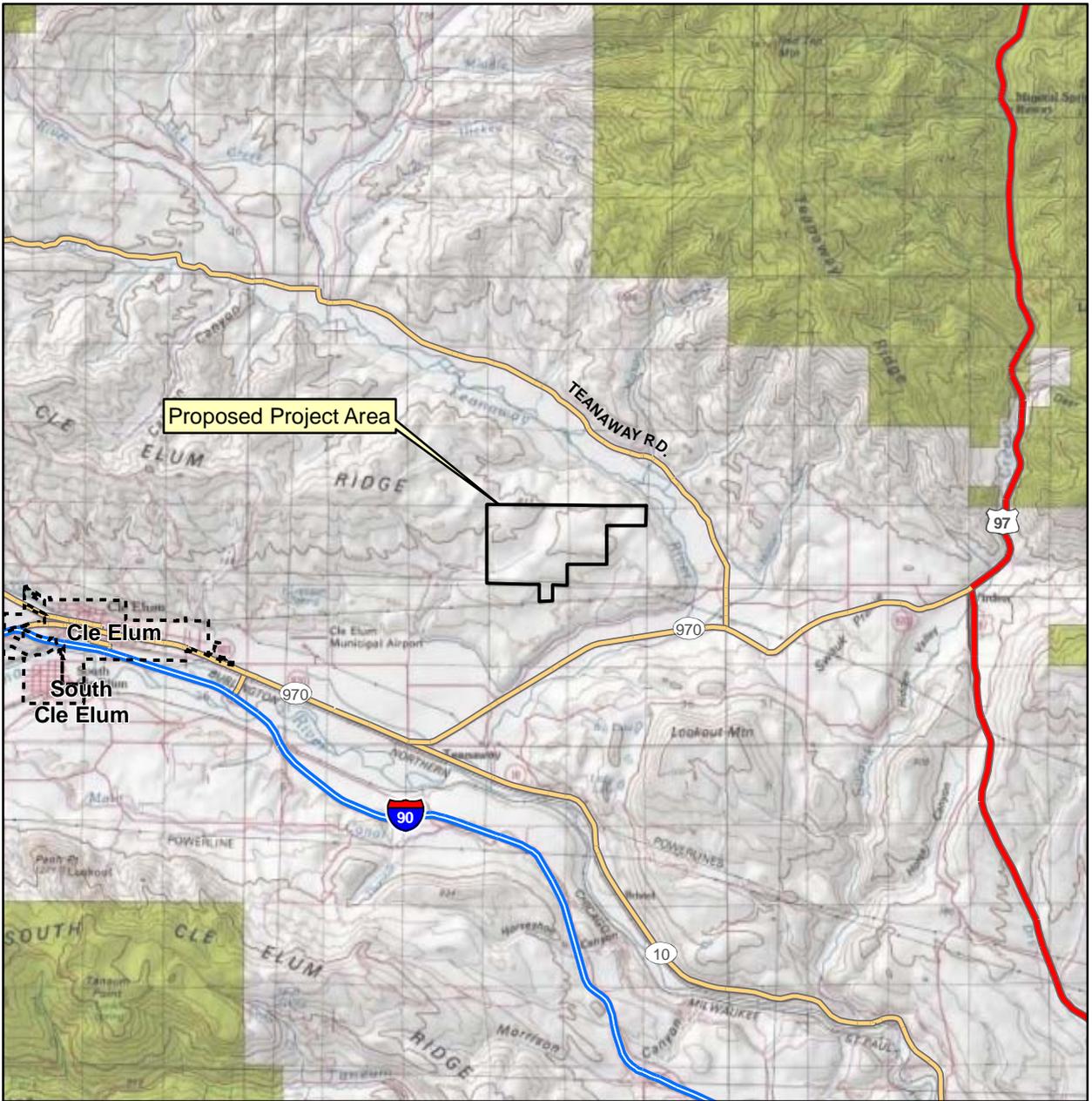
Water ID	Width (feet)	Flow Regime	Nearest TNW	Non RPW	RPW	USACE Jurisdiction	State Jurisdiction
S1	2-5	Ephemeral	Yakima River	YES	NO	Potentially – if has significant nexus to TNW	YES
S2	2-6	Ephemeral	Yakima River	YES	NO	Potentially – if has significant nexus to TNW	YES
S3	2-5	Ephemeral	Yakima River	YES	NO	Potentially – if has significant nexus to TNW	YES
S4	2-4	Ephemeral	Yakima River	YES	NO	Potentially – if has significant nexus to TNW	YES
S5	2-5	Ephemeral	Yakima River	YES	NO	Potentially – if has significant nexus to TNW	YES
S6	1-2	Ephemeral	Yakima River	YES	NO	Potentially – if has significant nexus to TNW	YES

10.0 References

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APPENDIX A
Figures



VICINITY MAP

LEGEND

-  Proposed Project Area
-  City Boundary
-  Interstate
-  Highway
-  Major Road

Note:

1. USGS 100K Quadrangle: Wenatchee.

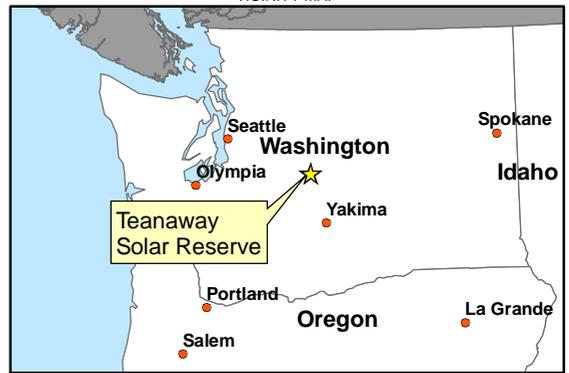
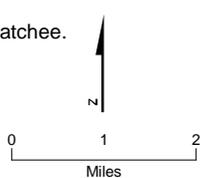
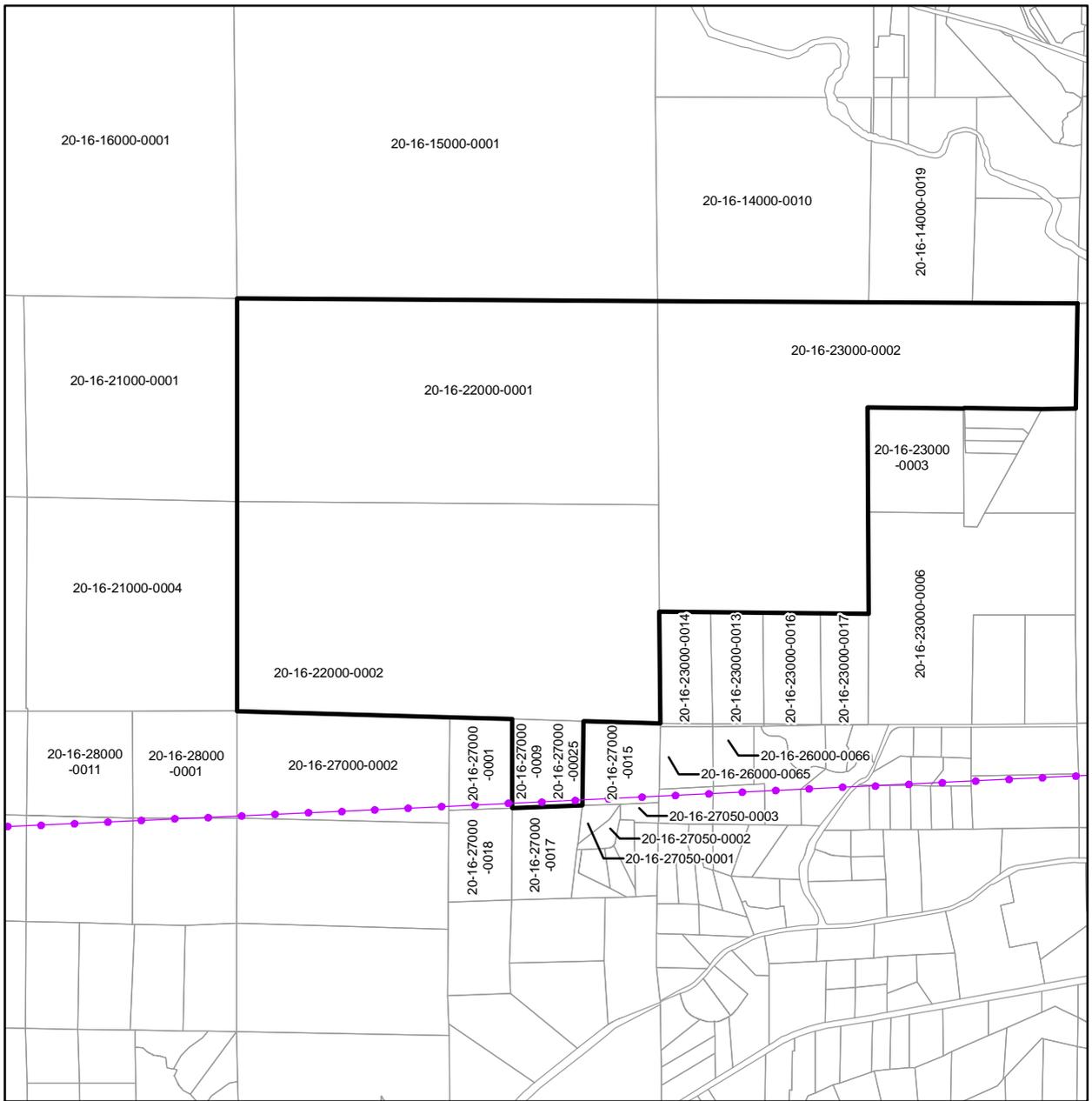


FIGURE 1
Vicinity Map

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



VICINITY MAP

LEGEND

-  Proposed Project Area
-  Existing BPA Transmission Line
-  Tax Lot Boundary

Note:
1. USGS 24K Quadrangle: Teanaway.

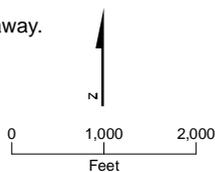
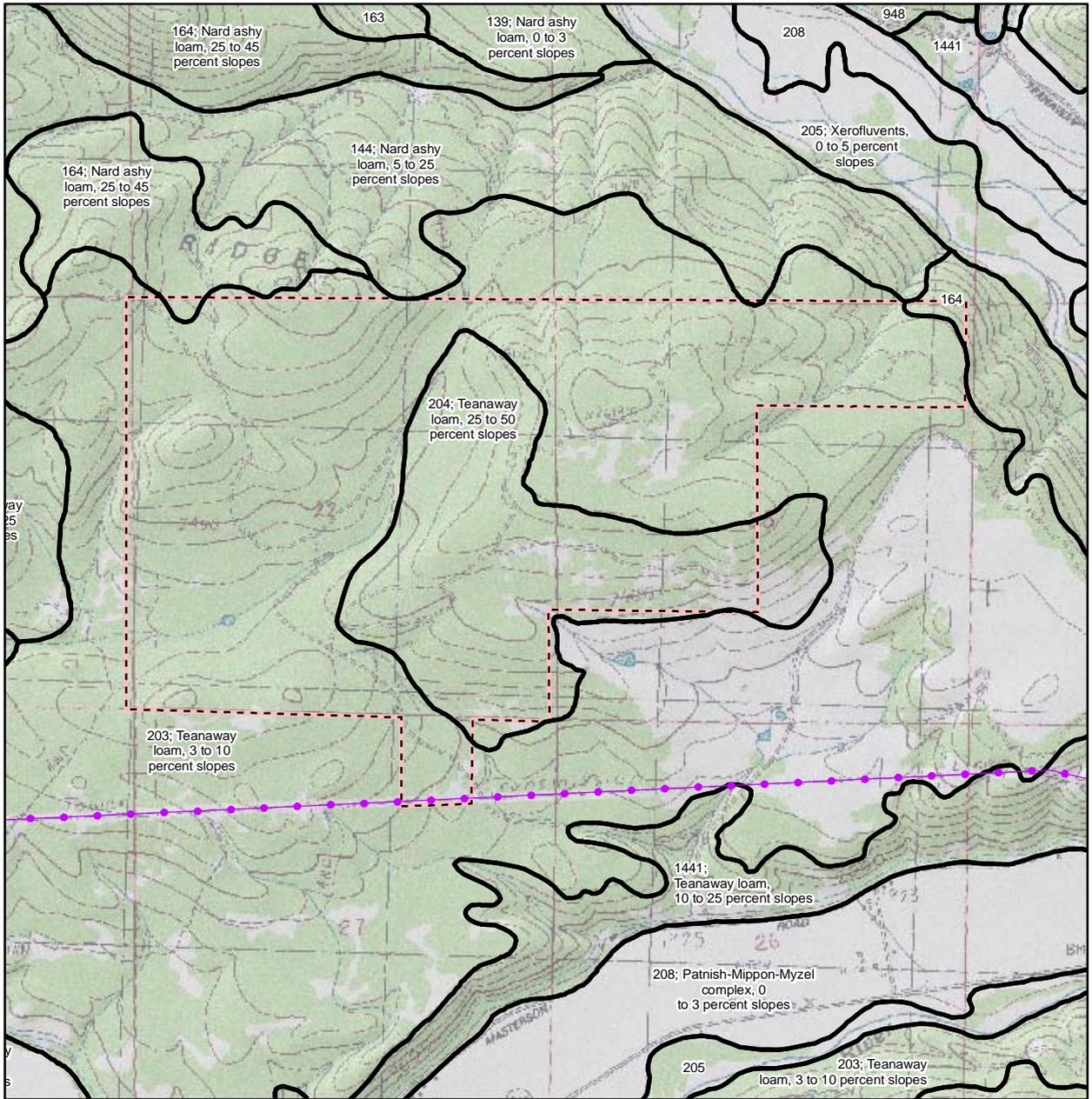


FIGURE 2
Tax Lot Map

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



VICINITY MAP

LEGEND

- Proposed Project Area
- Existing BPA Transmission Line
- Soil Unit

Notes:

1. USGS 24K Quadrangle: Teanaway.
2. Soils Data: Soil Survey Geographic (SSURGO) Database. MUSYM; MUNAME labeled.

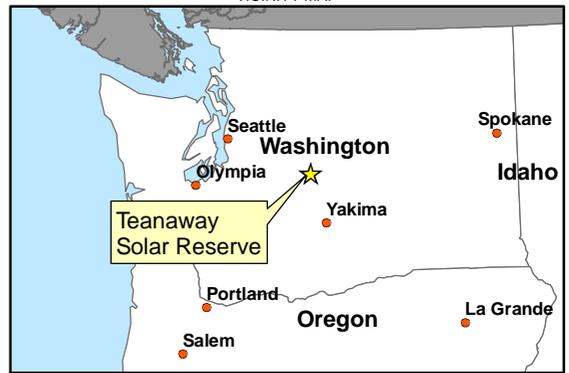
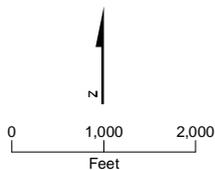
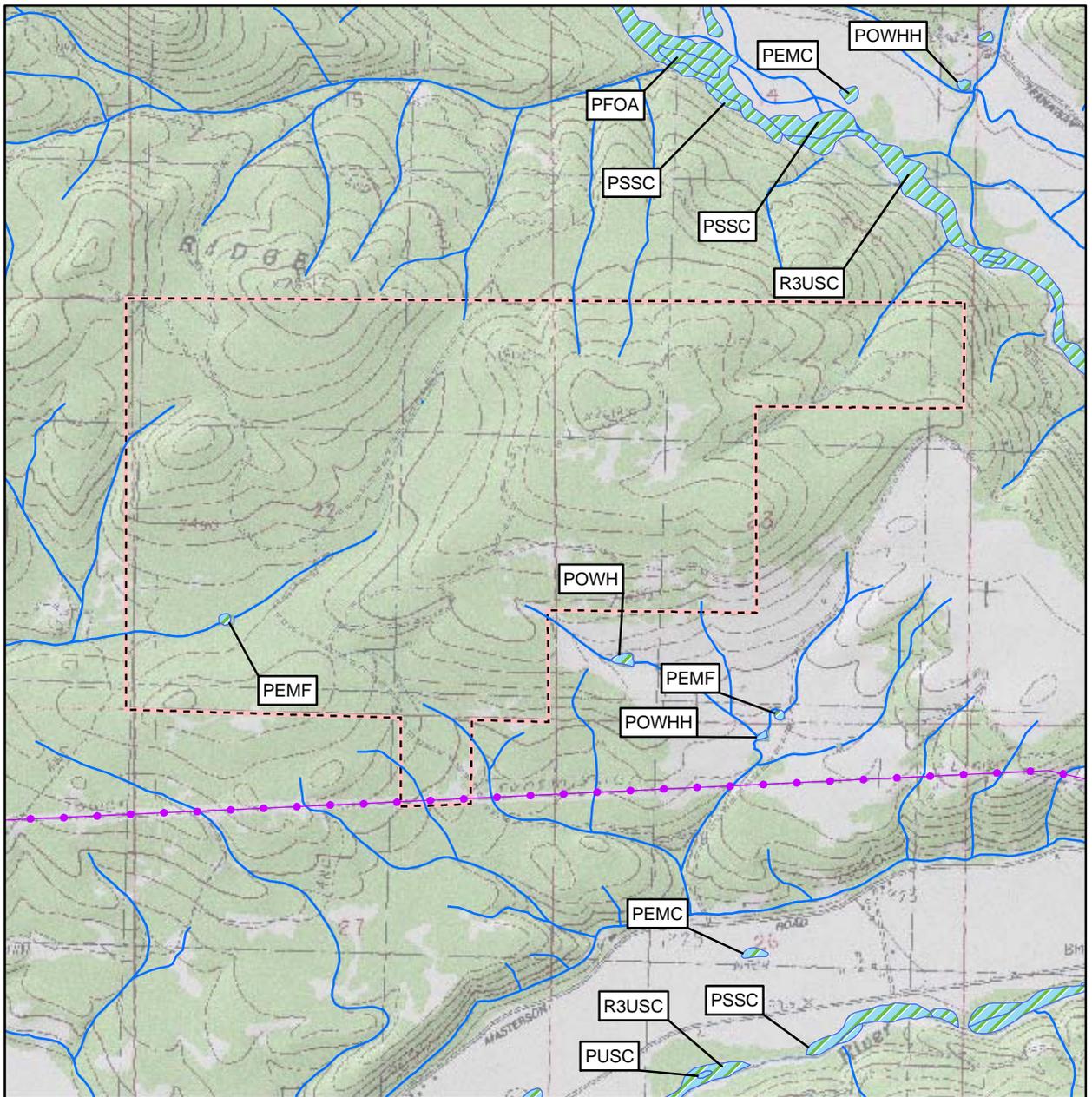


FIGURE 3
Soils Map

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



VICINITY MAP

LEGEND

-  Proposed Project Area
-  Existing BPA Transmission Line
-  Stream
-  NWI Wetland

Notes:

1. USGS 24K Quadrangle: Teanaway.
2. National Wetlands Inventory (NWI) Wetlands Data: United States Fish and Wildlife Service.
3. Stream Data: Washington Department of Natural Resources.

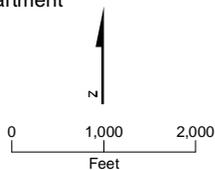
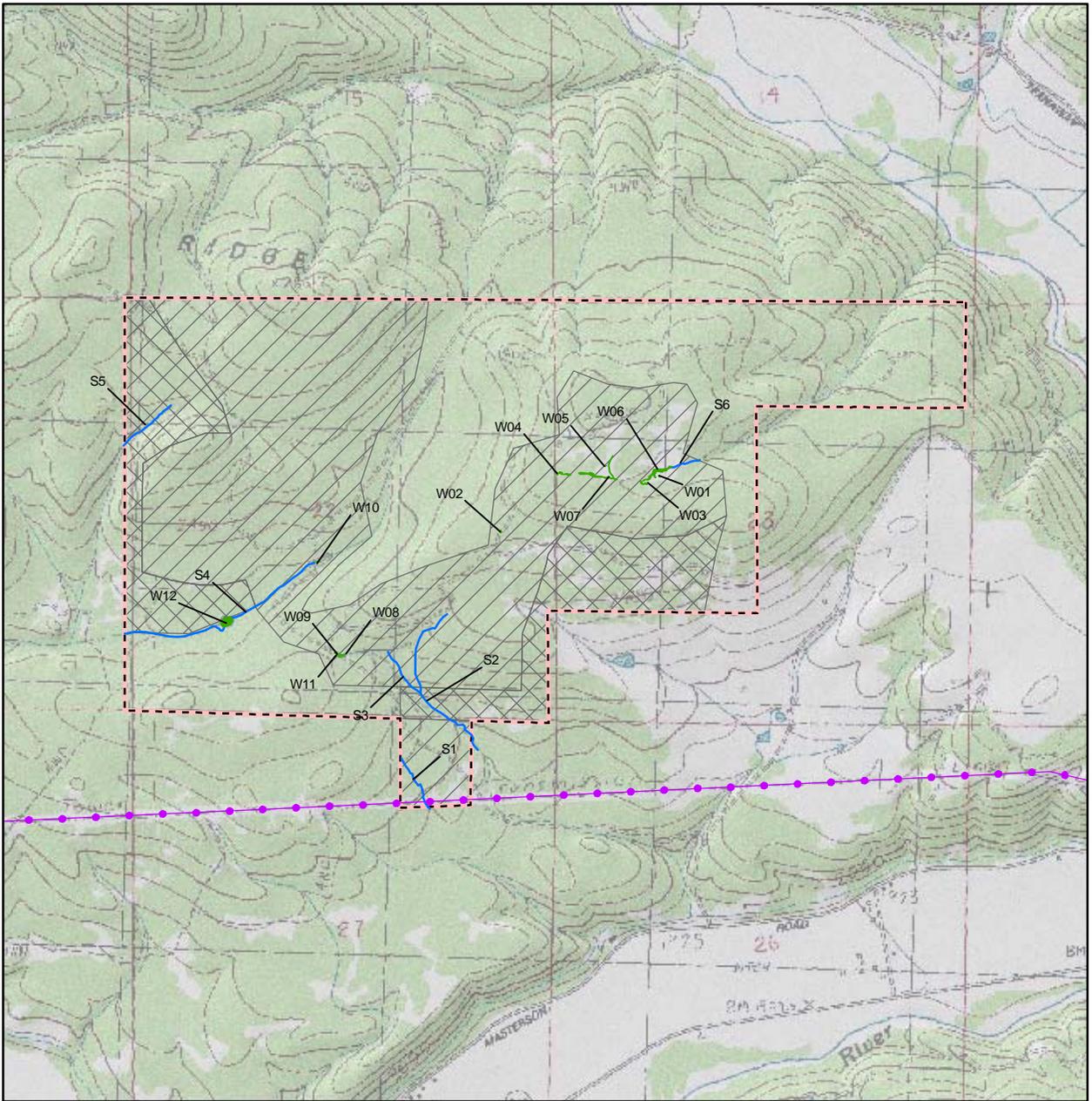


FIGURE 4
National Wetlands Inventory Map

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



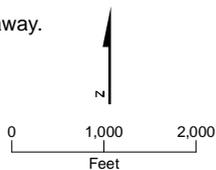
VICINITY MAP

LEGEND

-  Proposed Project Area
-  June 2009 Survey Area
-  July 2009 Survey Area
-  Existing BPA Transmission Line
-  Wetland
-  Stream

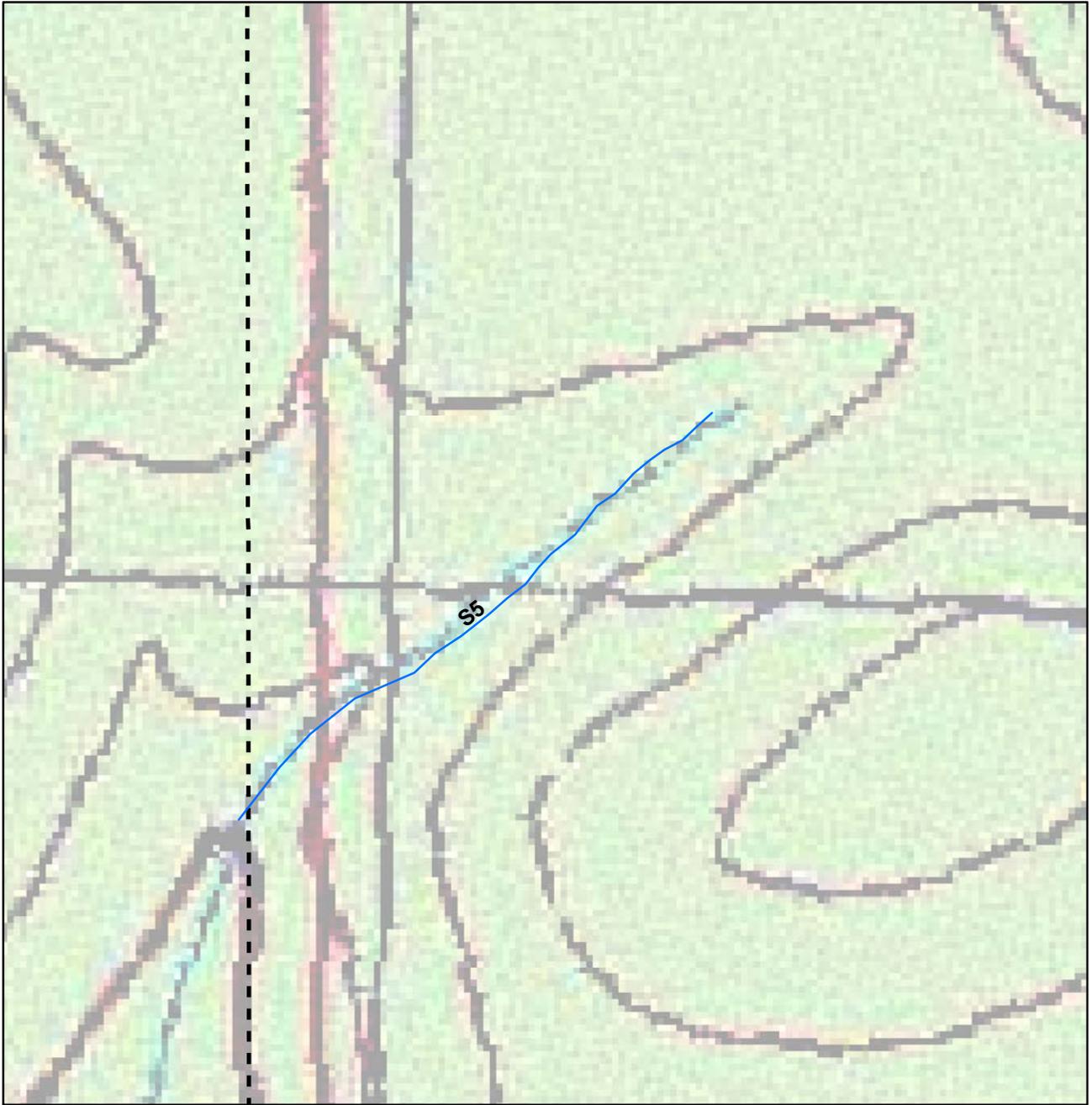
Note:

1. USGS 24K Quadrangle: Teanaway.



**FIGURE 5
Delineation Map-Overview**

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



VICINITY MAP

LEGEND

- Wetland Plot
- ~ Stream
- Wetland
- Wetland Survey Area

Note:

1. USGS 24K Quadrangle: Teanaway.

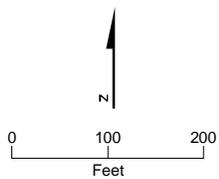
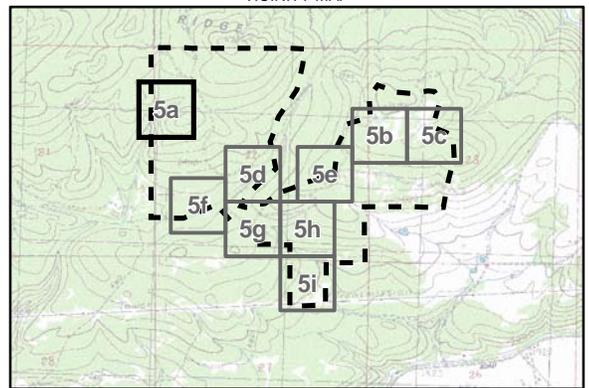
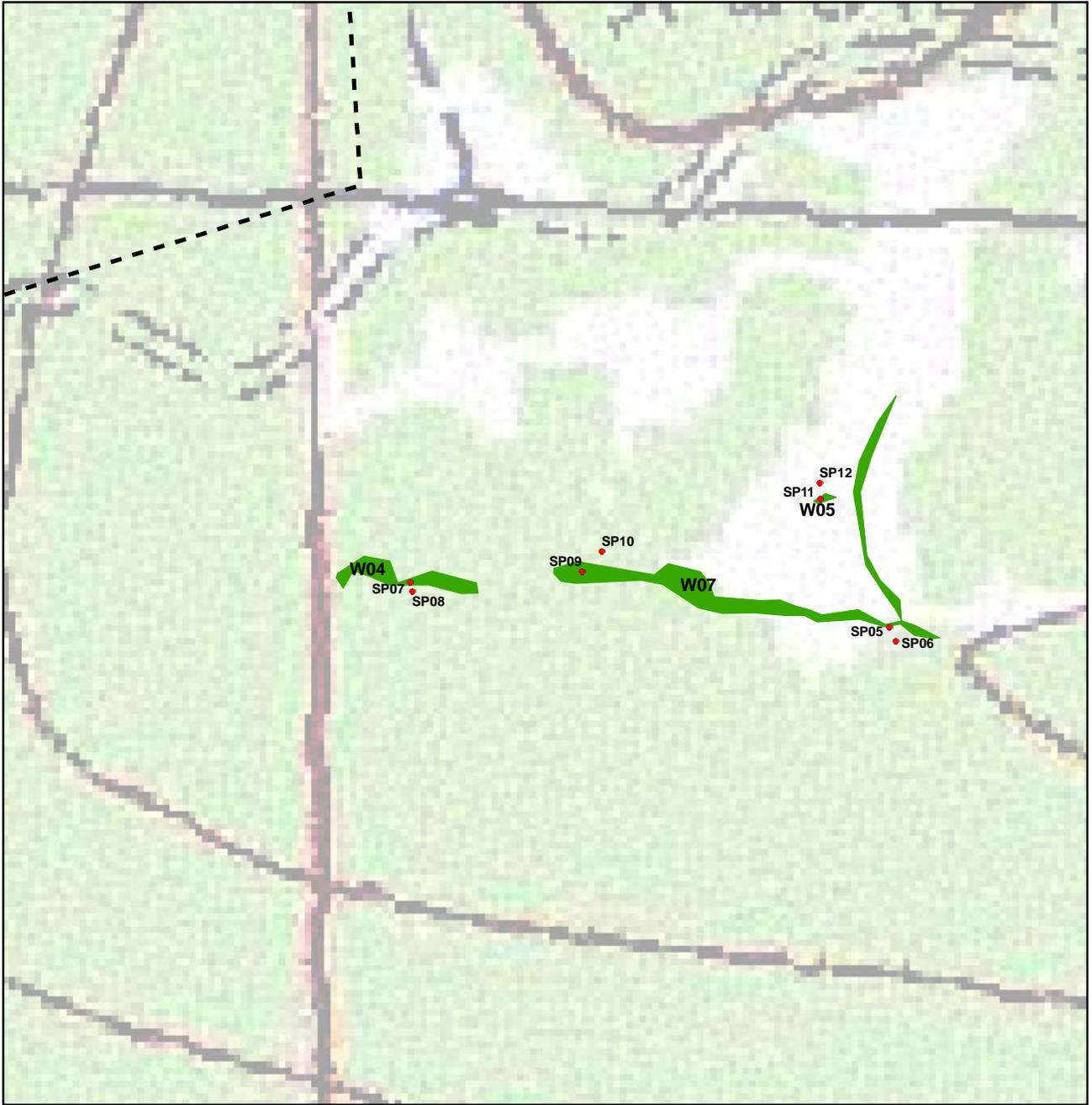


Figure 5a
Delineation Map-Detail

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington

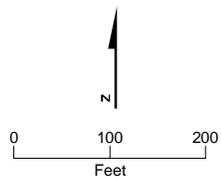


LEGEND

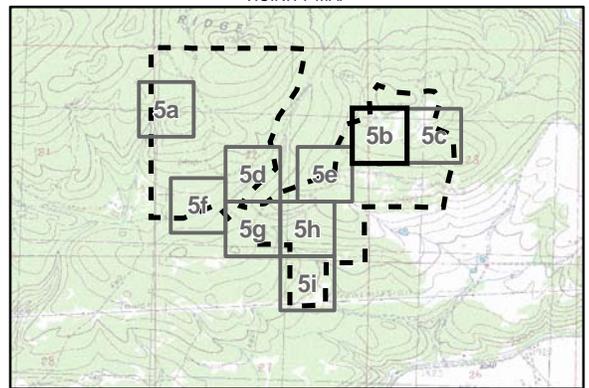
- Wetland Plot
- Stream
- Wetland
- Wetland Survey Area

Note:

1. USGS 24K Quadrangle: Teanaway.

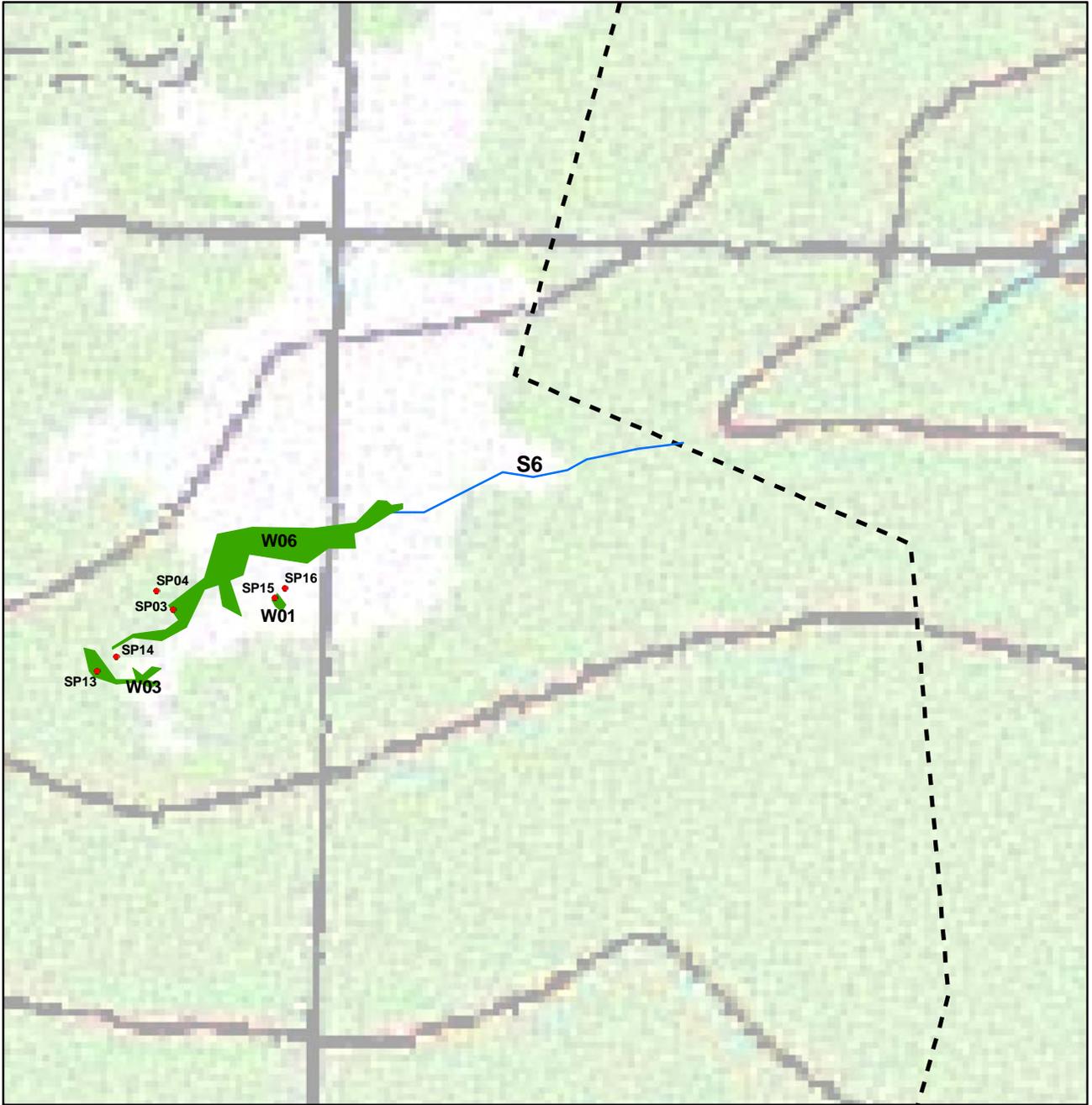


VICINITY MAP



**Figure 5b
Delineation Map-Detail**

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



VICINITY MAP

LEGEND

- Wetland Plot
- ~ Stream
- Wetland
- Wetland Survey Area

Note:

1. USGS 24K Quadrangle: Teanaway.

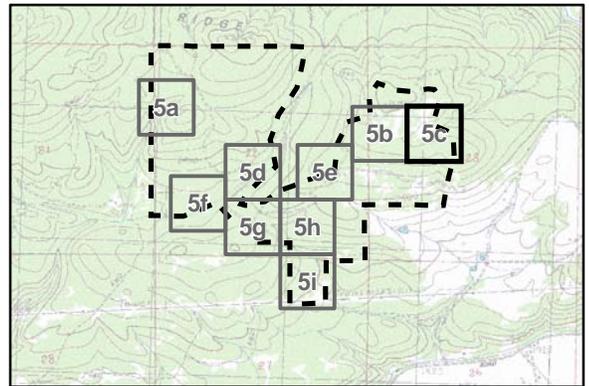
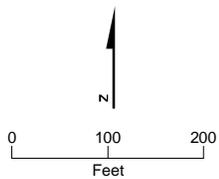
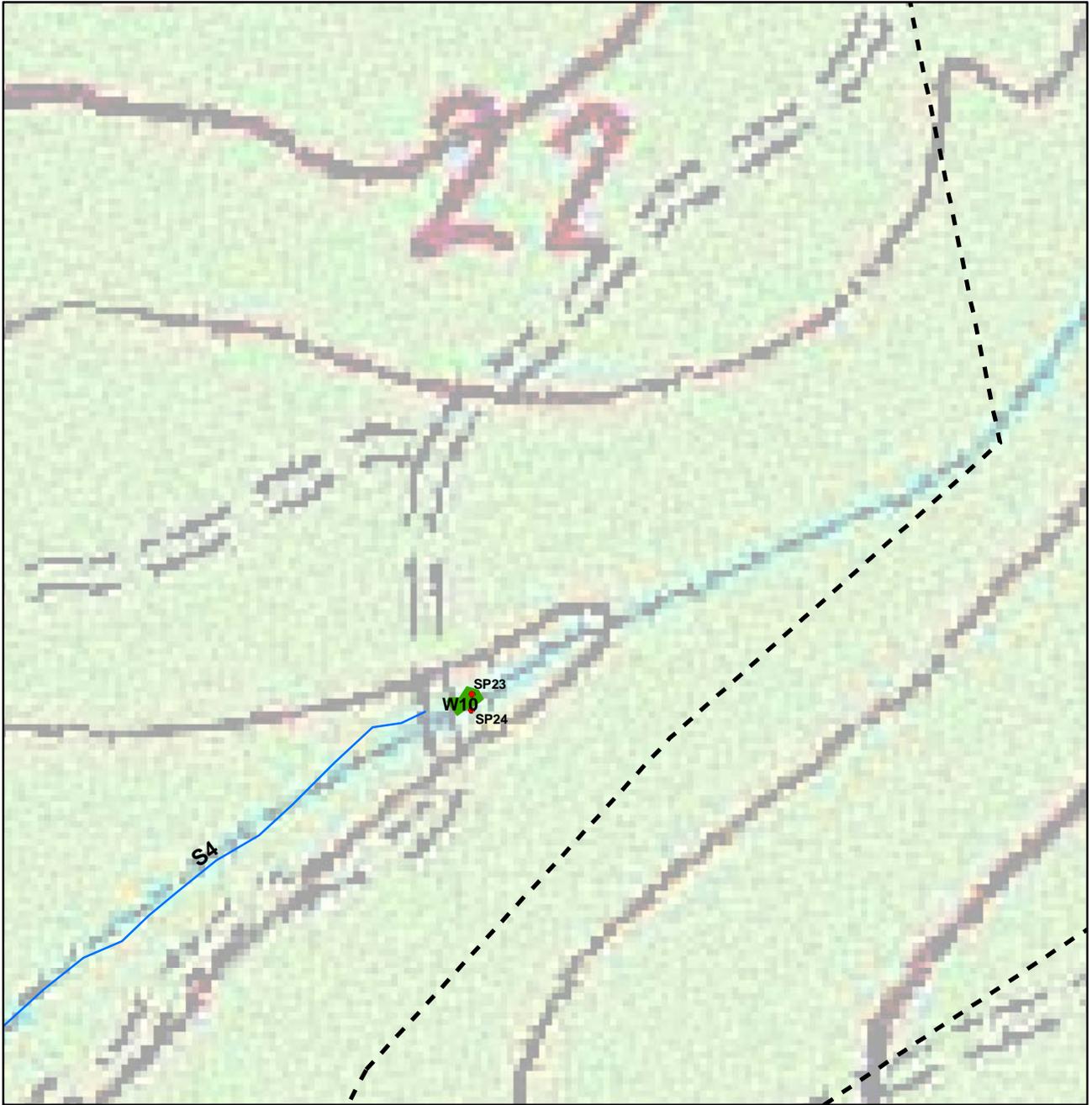


Figure 5c
Delineation Map-Detail

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



VICINITY MAP

LEGEND

- Wetland Plot
- ~ Stream
- Wetland
- Wetland Survey Area

Note:

1. USGS 24K Quadrangle: Teanaway.

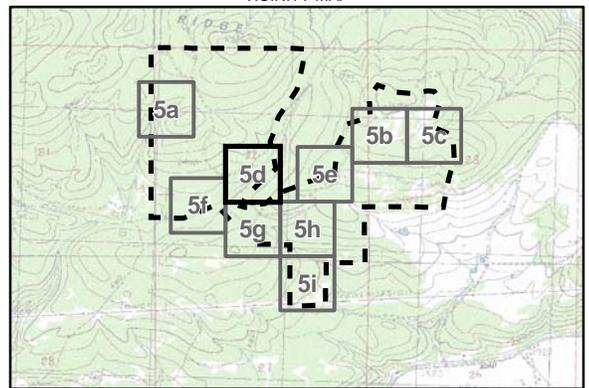
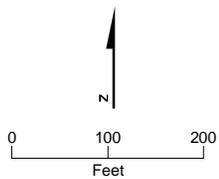
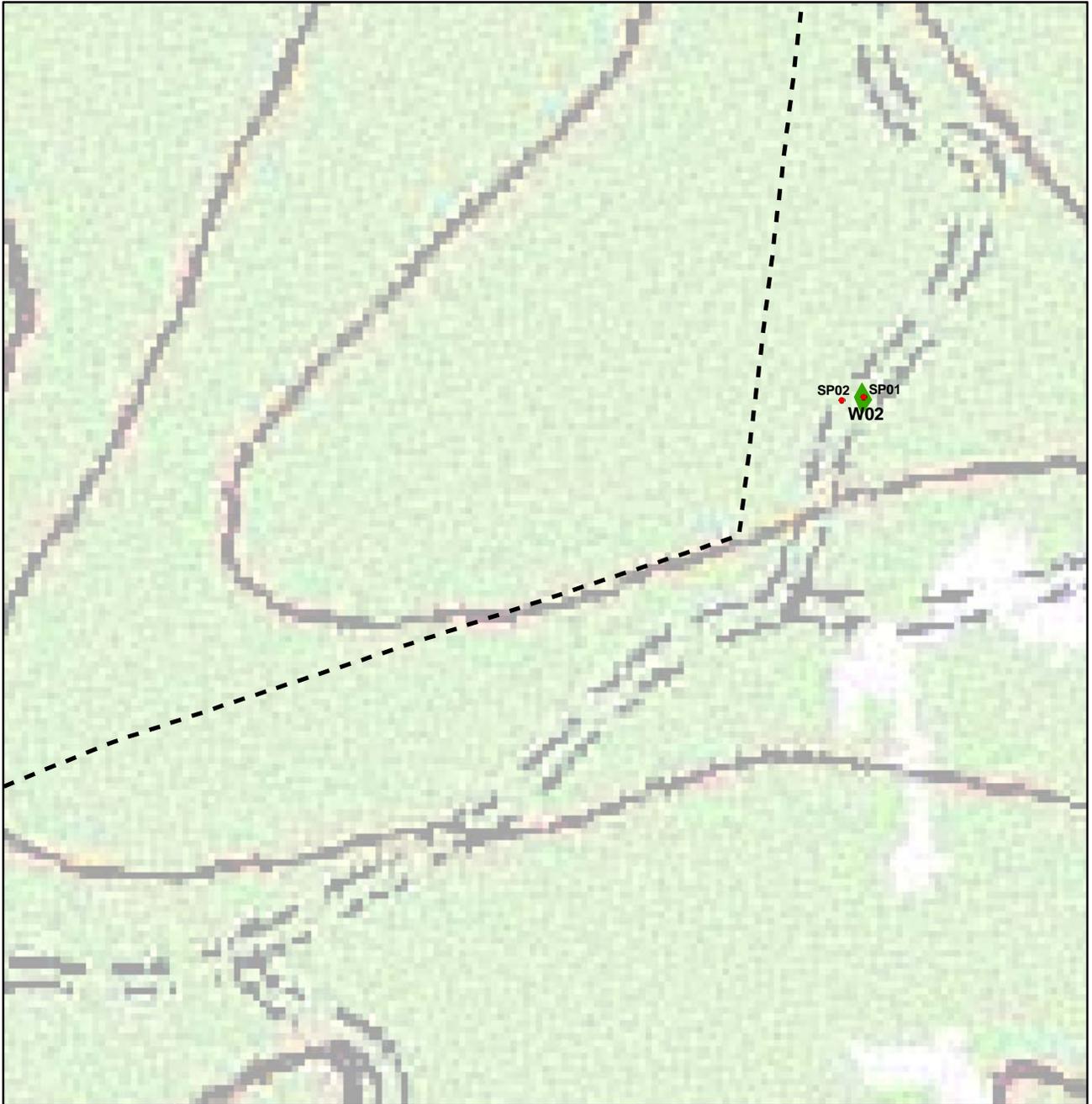


Figure 5d
Delineation Map-Detail

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



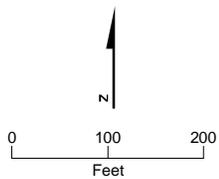
SP02 SP01
W02

LEGEND

- Wetland Plot
- ~ Stream
- Wetland
- ⋯ Wetland Survey Area

Note:

1. USGS 24K Quadrangle: Teanaway.



VICINITY MAP

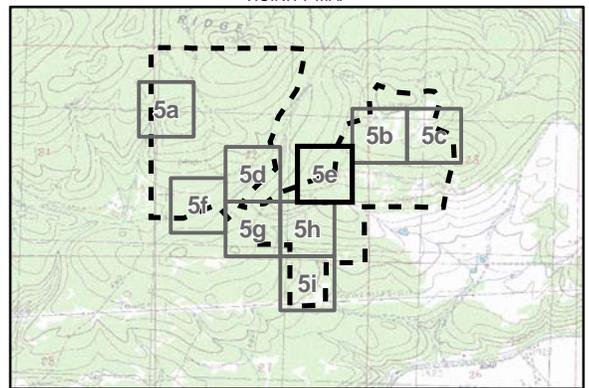
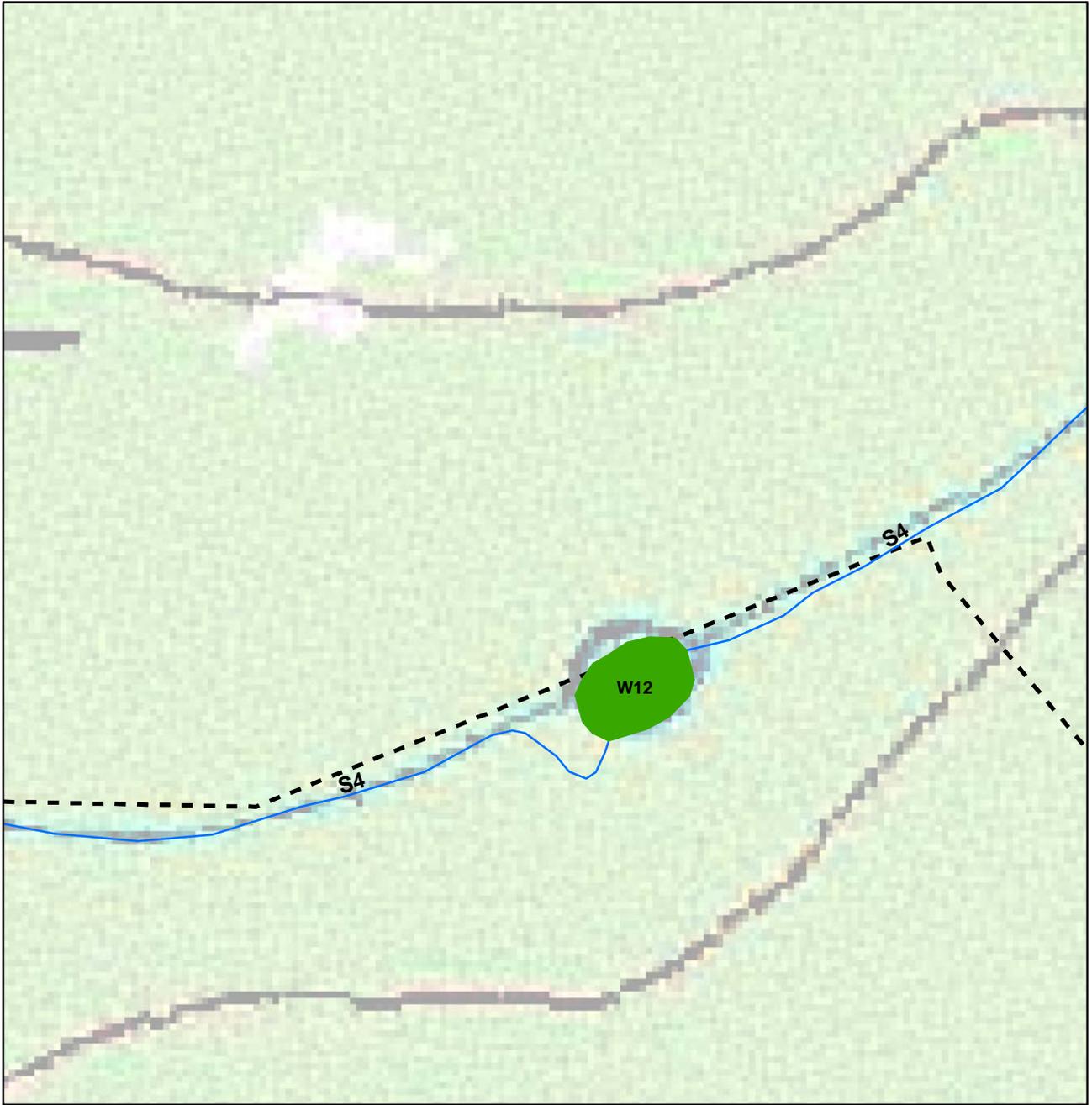


Figure 5e
Delineation Map-Detail

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



VICINITY MAP

LEGEND

- Wetland Plot
- ~ Stream
- Wetland
- Wetland Survey Area

Note:

1. USGS 24K Quadrangle: Teanaway.

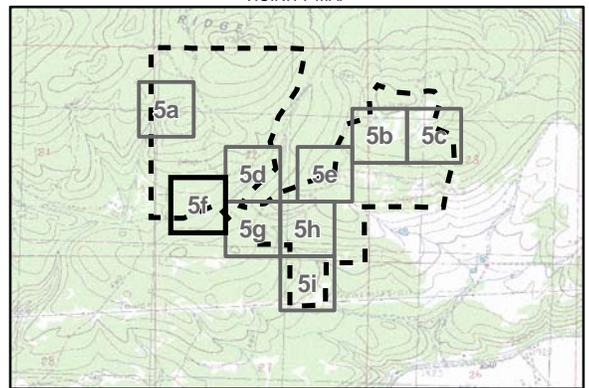
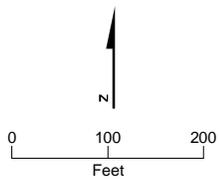
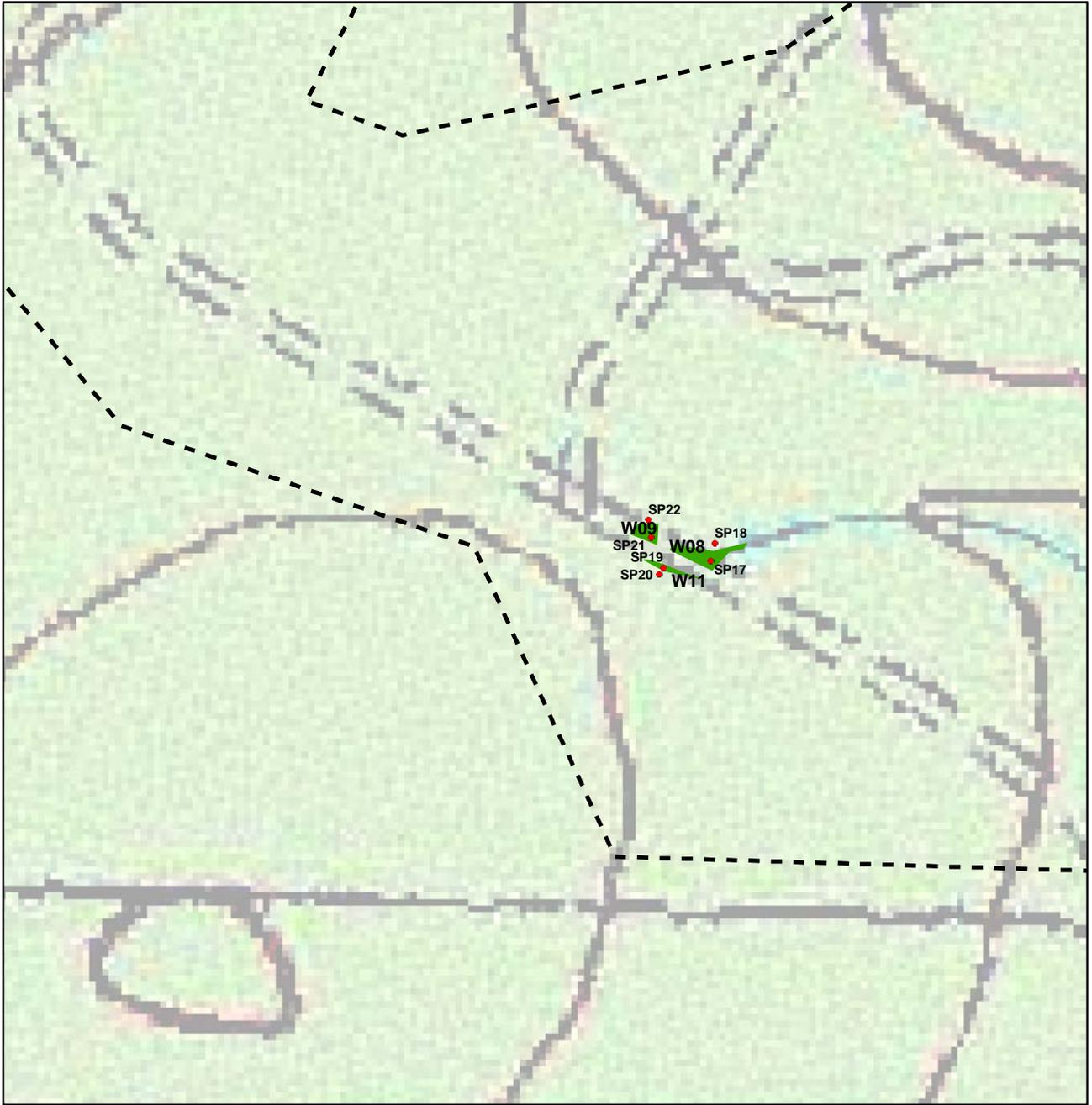


Figure 5f
Delineation Map-Detail

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington





VICINITY MAP

LEGEND

- Wetland Plot
- Stream
- Wetland
- Wetland Survey Area

Note:

1. USGS 24K Quadrangle: Teanaway.

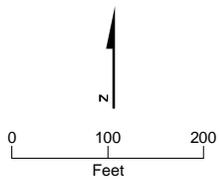
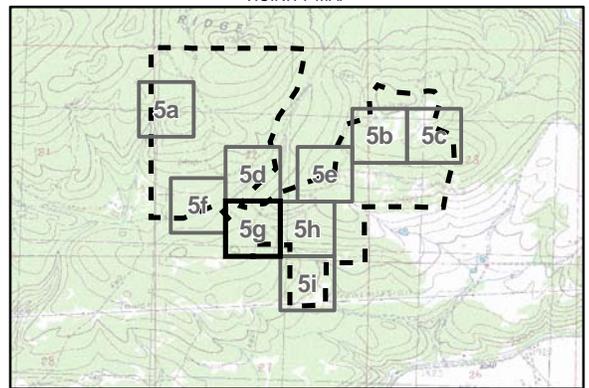
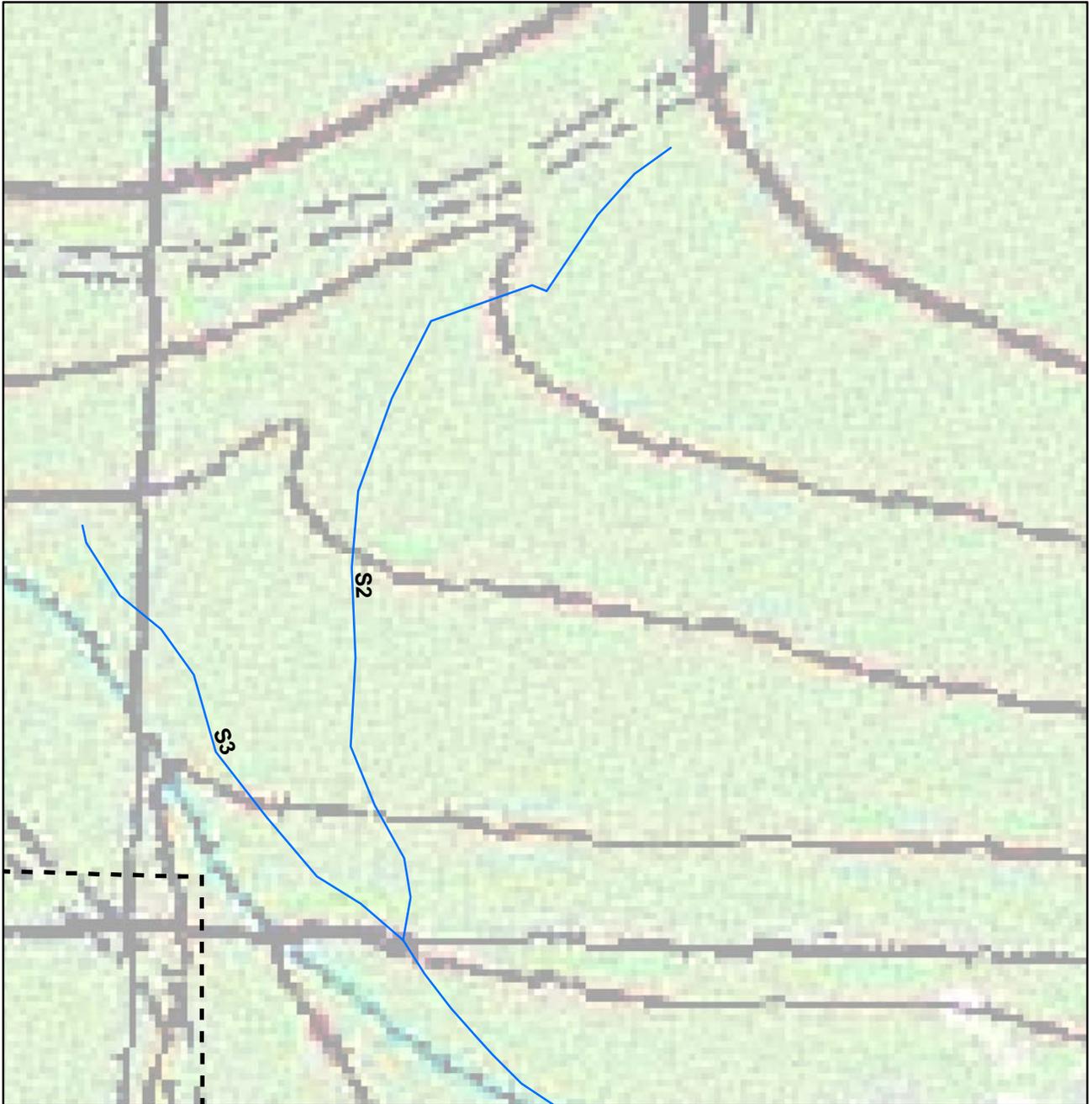


Figure 5g
Delineation Map-Detail

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington

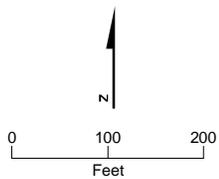


LEGEND

- Wetland Plot
- ~ Stream
- Wetland
- Wetland Survey Area

Note:

1. USGS 24K Quadrangle: Teanaway.



VICINITY MAP

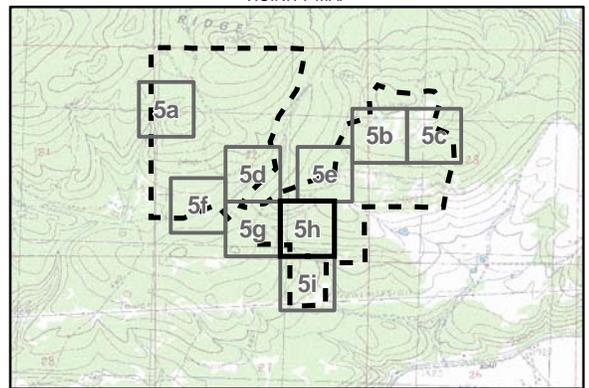


Figure 5h
Delineation Map-Detail

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



VICINITY MAP

LEGEND

- Wetland Plot
- Stream
- Wetland
- Wetland Survey Area

Note:

1. USGS 24K Quadrangle: Teanaway.

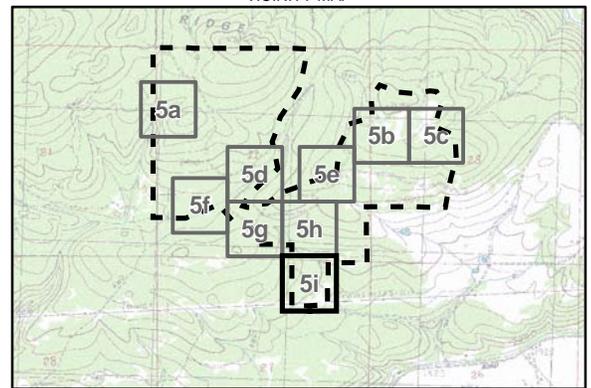
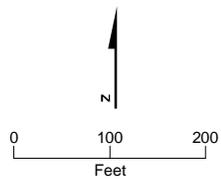


Figure 5i
Delineation Map-Detail

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington

APPENDIX B

**U.S. Army Corps of Engineers Wetland
Determination Data Forms**

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/09/2009
 Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP1
 Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 3
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.21212769 Long: -120.8140945 Datum: NAD 83
 Soil Map Unit Name: 204-Teanaway loam, 25-50 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? N Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: Wetland W2 is a PEM (Cowardin), depressional (HGM). Wetland boundaries determined by the toe of slope of a distinct depressional area and a change from wetland vegetation <i>Juncus parryi</i> to dominant upland vegetation <i>Balsamorhiza sagittata</i> .	

VEGETATION – Use scientific names of plants.

<u>Tree Stratum</u> (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A)
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>1</u> (B)
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
4. _____	_____	_____	_____	
<u>0</u> = Total Cover				
<u>Sapling/Shrub Stratum</u> (Plot size: <u>15'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet:
1. _____	_____	_____	_____	Total % Cover of: _____ Multiply by: _____
2. _____	_____	_____	_____	OBL species _____ x 1 = _____
3. _____	_____	_____	_____	FACW species _____ x 2 = _____
4. _____	_____	_____	_____	FAC species <u>13</u> x 3 = <u>39</u>
5. _____	_____	_____	_____	FACU species _____ x 4 = _____
<u>0</u> = Total Cover				UPL species <u>83</u> x 5 = <u>415</u>
				Column Totals: <u>96</u> (A) <u>454</u> (B)
				Prevalence Index = B/A = <u>4.73</u>
<u>Herb Stratum</u> (Plot size: <u>5'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators:
1. <u>Ventenata dubia</u>	<u>80</u>	<u>Y</u>	<u>NOL</u>	<input type="checkbox"/> Dominance Test is >50%
2. <u>Juncus parryi</u>	<u>10</u>	<u>N</u>	<u>FAC</u>	<input type="checkbox"/> Prevalence Index is ≤3.0 ¹
3. <u>Wyethia amplexicaulis</u>	<u>3</u>	<u>N</u>	<u>FAC</u>	<input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
4. <u>Poa bulbosa</u>	<u>3</u>	<u>N</u>	<u>NOL</u>	<input type="checkbox"/> Wetland Non-Vascular Plants ¹
5. <u>Unknown grasses</u>	<u>4</u>	<u>N</u>	<u>unk.</u>	<input checked="" type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
6. _____	_____	_____	_____	¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
<u>100</u> = Total Cover				
<u>Woody Vine Stratum</u> (Plot size: <u>15'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Present?
1. _____	_____	_____	_____	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
2. _____	_____	_____	_____	
<u>0</u> = Total Cover				
% Bare Ground in Herb Stratum <u>0</u>				
Remarks: Vegetation meets problematic hydrophytic vegetation criteria based on positive hydric soil indicators, algal crust and concave topography that indicate that area ponds water. Vegetation may be more hydrophytic in wetter years – annual invasive <i>Ventenata dubia</i> may dominate in dryer years				

SOIL

Sampling Point: SP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-6	10YR 3/2	85	10YR 4/6	15	C	PL	silt loam	
6-18	10YR 4/2	95	10YR 5/8	5	C	PL	silty clay	

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/09/2009
 Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP2
 Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 2
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.21014404 Long: 120.8173599 Datum: NAD 83
 Soil Map Unit Name: 204-Teaaway loam, 25-50 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? N Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? N (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks: Sample point taken above depressional area.	

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u>)				
1. <u>Pinus ponderosa</u>	10	Y	FACU	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>5</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
2. _____				
3. _____				
4. _____				
	10	= Total Cover		
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				
1. _____				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
2. _____				
3. _____				
4. _____				
5. _____				
	0	= Total Cover		
Herb Stratum (Plot size: <u>5'</u>)				
1. <u>Balsamorhiza sagittata</u>	25	Y	NOL	Hydrophytic Vegetation Indicators: <input type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Wetland Non-Vascular Plants ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2. <u>Lupinus sericeus</u>	20	Y	NOL	
3. <u>Achillea millefolium</u>	15	Y	FACU	
4. <u>Lomatium nudicaule</u>	15	Y	NOL	
5. <u>Poa bulbosa</u>	15	Y	NOL	
6. <u>Unknown grass</u>	5	N	unk.	
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
	95	= Total Cover		
Woody Vine Stratum (Plot size: <u>15'</u>)				
1. _____				Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
2. _____				
	0	= Total Cover		
% Bare Ground in Herb Stratum <u>5</u>				
Remarks:				

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/10/2009

Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP3

Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 3

Subregion (LRR): A - Northwest Forests and Coast Lat: 47.21204758 Long: -120.8098526 Datum: NAD 83
 Soil Map Unit Name: 203-Teanaway loam, 3-10 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? N Are "Normal Circumstances" present? Yes No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: Wetland W6 is a PEM (Cowardin), depressional (HGM). Wetland boundaries determined by the toe of slope of a distinct depressional area containing cracked soils and a change from wetland vegetation <i>Juncus parryi</i> to dominant upland vegetation <i>Balsamorhiza sagittata</i> .	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A)
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>2</u> (B)
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50</u> (A/B)
4. _____	_____	_____	_____	
<u>0</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet:
1. _____	_____	_____	_____	Total % Cover of: _____ Multiply by: _____
2. _____	_____	_____	_____	OBL species _____ x 1 = _____
3. _____	_____	_____	_____	FACW species _____ x 2 = _____
4. _____	_____	_____	_____	FAC species <u>30</u> x 3 = <u>90</u>
5. _____	_____	_____	_____	FACU species _____ x 4 = _____
<u>0</u> = Total Cover				UPL species <u>70</u> x 5 = <u>350</u>
				Column Totals: <u>100</u> (A) <u>440</u> (B)
				Prevalence Index = B/A = <u>4.4</u>
Herb Stratum (Plot size: <u>5'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators:
1. <u>Ventenata dubia</u>	<u>70</u>	<u>Y</u>	<u>NOL</u>	<input type="checkbox"/> Dominance Test is >50%
2. <u>Juncus parryi</u>	<u>30</u>	<u>Y</u>	<u>FAC</u>	<input type="checkbox"/> Prevalence Index is ≤3.0 ¹
3. _____	_____	_____	_____	<input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
4. _____	_____	_____	_____	<input type="checkbox"/> Wetland Non-Vascular Plants ¹
5. _____	_____	_____	_____	<input checked="" type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
6. _____	_____	_____	_____	¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
<u>100</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>15'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Present?
1. _____	_____	_____	_____	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
2. _____	_____	_____	_____	
<u>0</u> = Total Cover				
% Bare Ground in Herb Stratum <u>0</u>				
Remarks: Vegetation meets problematic hydrophytic vegetation criteria based on positive hydric soil indicators, surface cracks and concave topography that indicate that area ponds water. Vegetation may be more hydrophytic in wetter years – annual invasive <i>Ventenata dubia</i> may dominate in dryer years				

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/10/2009
 Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP4
 Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 5
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.21211243 Long: -120.8099365 Datum: NAD 83
 Soil Map Unit Name: 203-Teanaway loam, 3-10 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? N Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? N (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks: Sample point taken above depressional area.	

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u>)				
1. <u>Pinus ponderosa</u>	10	Y	FACU	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
2. _____				
3. _____				
4. _____				
	10	= Total Cover		
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				
1. _____				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
2. _____				
3. _____				
4. _____				
5. _____				
	0	= Total Cover		
Herb Stratum (Plot size: <u>5'</u>)				
1. <u>Balsamorhiza sagittata</u>	70	Y	NOL	Hydrophytic Vegetation Indicators: <input type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Wetland Non-Vascular Plants ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2. <u>Lupinus sericeus</u>	10	N	NOL	
3. <u>Achillea millefolium</u>	3	N	FACU	
4. <u>Lomatium nudicaule</u>	3	N	NOL	
5. <u>Poa bulbosa</u>	7	N	NOL	
6. <u>Bromus sp.</u>	7	N	unk.	
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
	100	= Total Cover		
Woody Vine Stratum (Plot size: <u>15'</u>)				
1. _____				Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
2. _____				
	0	= Total Cover		
% Bare Ground in Herb Stratum <u>0</u>				
Remarks:				

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Teaway Solar Reserve City/County: Kittitas Sampling Date: 06/10/2009

Applicant/Owner: Teaway Solar Reserve, LLC State: WA Sampling Point: SP5

Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR): A - Northwest Forests and Coast Lat: 47.21197891 Long: -120.8116913 Datum: NAD 83
 Soil Map Unit Name: 203-Teaway loam, 3-10 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? N Are "Normal Circumstances" present? Yes No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: Wetland W7 is a PEM (Cowardin), depressional (HGM). Wetland boundaries determined by the toe of slope of a distinct depressional area containing cracked soils and a change from dominant wetland vegetation <i>Juncus parryi</i> to dominant upland vegetation <i>Balsamorhiza sagittata</i> .	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50</u> (A/B)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
_____ = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				
1. _____	_____	_____	_____	Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species <u>70</u> x 3 = <u>210</u> FACU species _____ x 4 = _____ UPL species <u>30</u> x 5 = <u>150</u> Column Totals: <u>100</u> (A) <u>360</u> (B) Prevalence Index = B/A = <u>3.6</u>
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
Herb Stratum (Plot size: <u>5'</u>)				
1. <u>Ventenata dubia</u>	<u>30</u>	<u>Y</u>	<u>NOL</u>	Hydrophytic Vegetation Indicators: <input type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Wetland Non-Vascular Plants ¹ <input checked="" type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2. <u>Juncus parryi</u>	<u>60</u>	<u>Y</u>	<u>FAC</u>	
3. <u>Wyethia amplexicaulis</u>	<u>7</u>	<u>N</u>	<u>FAC</u>	
4. <u>Allium douglasii</u>	<u>3</u>	<u>N</u>	<u>FAC</u>	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
_____ = Total Cover				
Woody Vine Stratum (Plot size: <u>15'</u>)				
1. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
2. _____	_____	_____	_____	
_____ = Total Cover				
% Bare Ground in Herb Stratum <u>0</u>				

Remarks: Vegetation meets problematic hydrophytic vegetation criteria based on positive hydric soil indicators, a restrictive layer at 4", surface cracks and concave topography that indicate that area ponds water. Vegetation may be more hydrophytic in wetter years – annual invasive *Ventenata dubia* may dominate in dryer years

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/10/2009
 Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP6
 Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 5
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.21193314 Long: -120.8116608 Datum: NAD 83
 Soil Map Unit Name: 203-Teanaway loam, 3-10 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? N Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? N (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks: Sample point taken above depressional area.	

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status		
Tree Stratum (Plot size: <u>30'</u>)					
1. _____	_____	_____	_____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)	
2. _____	_____	_____	_____		
3. _____	_____	_____	_____		
4. _____	_____	_____	_____		
<u>0</u> = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____	
Sapling/Shrub Stratum (Plot size: <u>15'</u>)					
1. _____	_____	_____	_____		
2. _____	_____	_____	_____		
3. _____	_____	_____	_____		
4. _____	_____	_____	_____		
5. _____	_____	_____	_____		
<u>0</u> = Total Cover					
Herb Stratum (Plot size: <u>5'</u>)					
1. <u>Balsamorhiza sagittata</u>	<u>30</u>	<u>Y</u>	<u>NOL</u>	Hydrophytic Vegetation Indicators: <input type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Wetland Non-Vascular Plants ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
2. <u>Lupinus sericeus</u>	<u>30</u>	<u>Y</u>	<u>NOL</u>		
3. <u>Achillea millefolium</u>	<u>8</u>	<u>N</u>	<u>FACU</u>		
4. <u>Lomatium nudicaule</u>	<u>7</u>	<u>N</u>	<u>UPL</u>		
5. <u>Poa bulbosa</u>	<u>7</u>	<u>N</u>	<u>NOL</u>		
6. <u>Agrostis sp.</u>	<u>7</u>	<u>N</u>	<u>unk.</u>		
7. <u>Vicia americana</u>	<u>5</u>	<u>N</u>	<u>FAC</u>		
8. _____	_____	_____	_____		
9. _____	_____	_____	_____		
10. _____	_____	_____	_____		
11. _____	_____	_____	_____		
<u>100</u> = Total Cover					
Woody Vine Stratum (Plot size: <u>15'</u>)					
1. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
2. _____	_____	_____	_____		
<u>0</u> = Total Cover					
% Bare Ground in Herb Stratum <u>~6</u>					
Remarks:					

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/16/2009
 Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP7
 Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 1
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.21212769 Long: -120.8140945 Datum: NAD 83
 Soil Map Unit Name: 203-Teaaway loam, 3-10 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? N Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: Wetland W4 is a PEM (Cowardin), depression (HGM). Wetland boundaries determined by the toe of slope of a distinct depression area containing cracked soils.	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
_____ = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. <u>Ventenata dubia</u>	<u>95</u>	<u>Y</u>	<u>NOL</u>	
2. <u>Castilleja tenuis</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
_____ = Total Cover				
Woody Vine Stratum (Plot size: <u>15'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
_____ = Total Cover				
% Bare Ground in Herb Stratum <u>0</u>				

Dominance Test worksheet:
 Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)
 Total Number of Dominant Species Across All Strata: 1 (B)
 Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:
 Total % Cover of: _____ Multiply by: _____
 OBL species _____ x 1 = _____
 FACW species _____ x 2 = _____
 FAC species _____ x 3 = _____
 FACU species 5 x 4 = 20
 UPL species 95 x 5 = 475
 Column Totals: 100 (A) 495 (B)
 Prevalence Index = B/A = 4.95

Hydrophytic Vegetation Indicators:
 Dominance Test is >50%
 Prevalence Index is ≤3.0¹
 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 Wetland Non-Vascular Plants¹
 Problematic Hydrophytic Vegetation¹ (Explain)
¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
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Remarks: Vegetation meets problematic hydrophytic vegetation criteria based on positive hydric soil indicators, a restrictive layer at 12", surface cracks and concave topography that indicate that area ponds water. Vegetation may be more hydrophytic in wetter years – annual invasive *Ventenata dubia* may dominate in dryer years

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/16/2009
 Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP8
 Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 3
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.21209717 Long: -120.8140869 Datum: NAD 83
 Soil Map Unit Name: 203-Teanaway loam, 3-10 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? N Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? N (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks: Sample point taken above depressional area.	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A)
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>1</u> (B)
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
4. _____	_____	_____	_____	
<u>0</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				Prevalence Index worksheet:
1. _____	_____	_____	_____	Total % Cover of: _____ Multiply by: _____
2. _____	_____	_____	_____	OBL species _____ x 1 = _____
3. _____	_____	_____	_____	FACW species _____ x 2 = _____
4. _____	_____	_____	_____	FAC species _____ x 3 = _____
5. _____	_____	_____	_____	FACU species _____ x 4 = _____
<u>0</u> = Total Cover				UPL species _____ x 5 = _____
				Column Totals: _____ (A) _____ (B)
				Prevalence Index = B/A = _____
Herb Stratum (Plot size: <u>5'</u>)				Hydrophytic Vegetation Indicators:
1. <u>Ventenata dubia</u>	95	Y	NOL	<input type="checkbox"/> Dominance Test is >50%
2. <u>Potentilla drummondii</u>	5	N	FAC	<input type="checkbox"/> Prevalence Index is ≤3.0 ¹
3. _____	_____	_____	_____	<input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
4. _____	_____	_____	_____	<input type="checkbox"/> Wetland Non-Vascular Plants ¹
5. _____	_____	_____	_____	<input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
6. _____	_____	_____	_____	¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
<u>100</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>15'</u>)				Hydrophytic Vegetation Present?
1. _____	_____	_____	_____	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
2. _____	_____	_____	_____	
<u>0</u> = Total Cover				
% Bare Ground in Herb Stratum _____				
Remarks:				

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/16/2009

Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP9

Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR): A - Northwest Forests and Coast Lat: 47.21216965 Long: -120.8132324 Datum: NAD 83
 Soil Map Unit Name: 203-Teaaway loam, 3-10 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? N Are "Normal Circumstances" present? Yes No

Are Vegetation , Soil , or Hydrology naturally problematic? Y (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: Wetland W7 is a PEM (Cowardin), depressional (HGM). Wetland boundaries determined by the toe of slope of a distinct depressional area containing cracked soils.	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
<u>0</u> = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species <u>5</u> x 4 = <u>20</u> UPL species <u>95</u> x 5 = <u>475</u> Column Totals: <u>100</u> (A) <u>495</u> (B) Prevalence Index = B/A = <u>4.95</u>
Sapling/Shrub Stratum (Plot size: <u>15'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
<u>0</u> = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. <u>Ventenata dubia</u>	<u>95</u>	<u>Y</u>	<u>NOL</u>	
2. <u>Castilleja tenuis</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
<u>100</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>15'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
<u>0</u> = Total Cover				
% Bare Ground in Herb Stratum <u>0</u>				
Remarks: Vegetation meets problematic hydrophytic vegetation criteria based on positive hydric soil indicators, a restrictive layer at 12", surface cracks and concave topography that indicate that area ponds water. Vegetation may be more hydrophytic in wetter years – annual invasive <i>Ventenata dubia</i> may dominate in dryer years.				

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/16/2009
 Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP10
 Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 3
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.21223831 Long: 120.8131332 Datum: NAD 83
 Soil Map Unit Name: 203-Teaaway loam, 3-10 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? N Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? N (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks: Sample point taken above depressional area.	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A)
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>1</u> (B)
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
4. _____	_____	_____	_____	
<u>0</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				Prevalence Index worksheet:
1. _____	_____	_____	_____	Total % Cover of: _____ Multiply by: _____
2. _____	_____	_____	_____	OBL species _____ x 1 = _____
3. _____	_____	_____	_____	FACW species _____ x 2 = _____
4. _____	_____	_____	_____	FAC species _____ x 3 = _____
5. _____	_____	_____	_____	FACU species _____ x 4 = _____
<u>0</u> = Total Cover				UPL species _____ x 5 = _____
				Column Totals: _____ (A) _____ (B)
				Prevalence Index = B/A = _____
Herb Stratum (Plot size: <u>5'</u>)				Hydrophytic Vegetation Indicators:
1. <u>Ventenata dubia</u>	<u>80</u>	<u>Y</u>	<u>NOL</u>	<input type="checkbox"/> Dominance Test is >50%
2. <u>Castilleja tenuis</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	<input type="checkbox"/> Prevalence Index is ≤3.0 ¹
3. <u>Potentilla gracilis</u>	<u>trace</u>	<u>N</u>	<u>FAC</u>	<input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
4. <u>Juncus parryi</u>	<u>trace</u>	<u>N</u>	<u>FAC</u>	<input type="checkbox"/> Wetland Non-Vascular Plants ¹
5. <u>Zigadenus venenosus</u>	<u>trace</u>	<u>N</u>	<u>FACU</u>	<input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
6. _____	_____	_____	_____	¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
<u>85</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>15'</u>)				Hydrophytic Vegetation Present?
1. _____	_____	_____	_____	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
2. _____	_____	_____	_____	
<u>0</u> = Total Cover				
% Bare Ground in Herb Stratum <u>15</u>				
Remarks:				

SOIL

Sampling Point: SP10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-12	10YR 2/2	100					silt loam	
12-								gravel/rock refusal
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.					² Location: PL=Pore Lining, M=Matrix.			
Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)						Indicators for Problematic Hydric Soils³:		
<input type="checkbox"/> Histosol (A1)			<input type="checkbox"/> Sandy Redox (S5)			<input type="checkbox"/> 2 cm Muck (A10)		
<input type="checkbox"/> Histic Epipedon (A2)			<input type="checkbox"/> Stripped Matrix (S6)			<input type="checkbox"/> Red Parent Material (TF2)		
<input type="checkbox"/> Black Histic (A3)			<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)			<input type="checkbox"/> Other (Explain in Remarks)		
<input type="checkbox"/> Hydrogen Sulfide (A4)			<input type="checkbox"/> Loamy Gleyed Matrix (F2)			³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.		
<input type="checkbox"/> Depleted Below Dark Surface (A11)			<input type="checkbox"/> Depleted Matrix (F3)					
<input type="checkbox"/> Thick Dark Surface (A12)			<input type="checkbox"/> Redox Dark Surface (F6)					
<input type="checkbox"/> Sandy Mucky Mineral (S1)			<input type="checkbox"/> Depleted Dark Surface (F7)					
<input type="checkbox"/> Sandy Gleyed Matrix (S4)			<input type="checkbox"/> Redox Depressions (F8)					
Restrictive Layer (if present):								
Type: <u>Gravel/rock</u>								
Depth (inches): <u>12"+</u>						Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		
Remarks:								

HYDROLOGY

Wetland Hydrology Indicators:					
<u>Primary Indicators (minimum of one required; check all that apply)</u>			<u>Secondary Indicators (2 or more required)</u>		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)			
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)			
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)			
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)			
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)			
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)			
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> FAC-Neutral Test (D5)			
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)			
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)			
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)					
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)					
Field Observations:					
Surface Water Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____	Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		
Water Table Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____			
Saturation Present? (includes capillary fringe)	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____			
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:					
Remarks:					

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/16/2009
 Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP11
 Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 1
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.2124176 Long: -120.8120422 Datum: NAD 83
 Soil Map Unit Name: 203-Teanaway loam, 3-10 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? N Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? Y (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: Wetland W5 is a PEM (Cowardin), depressional (HGM). Wetland boundaries determined by the toe of slope of a distinct depressional area containing cracked soils.	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
<u>0</u> = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species <u>5</u> x 4 = <u>20</u> UPL species <u>95</u> x 5 = <u>475</u> Column Totals: <u>100</u> (A) <u>495</u> (B) Prevalence Index = B/A = <u>4.95</u>
Sapling/Shrub Stratum (Plot size: <u>15'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
<u>0</u> = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. <u>Ventenata dubia</u>	<u>95</u>	<u>Y</u>	<u>NOL</u>	
2. <u>Castilleja tenuis</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	
3. <u>Juncus parryi</u>	<u>trace</u>	<u>N</u>	<u>FAC</u>	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
<u>100</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>15'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
<u>0</u> = Total Cover				
% Bare Ground in Herb Stratum <u>0</u>				
Remarks: Vegetation meets problematic hydrophytic vegetation criteria based on positive hydric soil indicators, a restrictive layer at 12", surface cracks and concave topography that indicate that area ponds water. Vegetation may be more hydrophytic in wetter years – annual invasive <i>Ventenata dubia</i> may dominate in dryer years				

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/16/2009
 Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP12
 Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 3
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.21247482 Long: -120.8120422 Datum: NAD 83
 Soil Map Unit Name: 203-Teanaway loam, 3-10 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? N Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? N (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks: Sample point taken above depressional area.	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>33</u> (A/B)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
_____ = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)				Hydrophytic Vegetation Indicators: <input type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Wetland Non-Vascular Plants ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. <u>Poa bulbosa</u>	25	Y	NOL	
2. <u>Castilleja tenuis</u>	15	Y	FACU	
3. <u>Potentilla gracilis</u>	5	N	FAC	
4. <u>Agrostis scabra</u>	20	Y	FAC	
5. <u>Zigadenus venenosus</u>	5	N	FACU	
6. <u>Achillea millefolium</u>	10	N	FACU	
7. <u>Lomatium simplex</u>	5	N	NOL	
8. <u>Lupinus sericeus</u>	5	N	NOL	
9. <u>Balsamorhiza sagittata</u>	10	N	NOL	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
_____ = Total Cover				
Woody Vine Stratum (Plot size: <u>15'</u>)				Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
_____ = Total Cover				
% Bare Ground in Herb Stratum <u>0</u>				
Remarks:				

SOIL

Sampling Point: SP12

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-12	10YR 2/2	100					silt loam	
12-								gravel/rock refusal
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.					² Location: PL=Pore Lining, M=Matrix.			
Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)						Indicators for Problematic Hydric Soils³:		
<input type="checkbox"/> Histosol (A1)			<input type="checkbox"/> Sandy Redox (S5)			<input type="checkbox"/> 2 cm Muck (A10)		
<input type="checkbox"/> Histic Epipedon (A2)			<input type="checkbox"/> Stripped Matrix (S6)			<input type="checkbox"/> Red Parent Material (TF2)		
<input type="checkbox"/> Black Histic (A3)			<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)			<input type="checkbox"/> Other (Explain in Remarks)		
<input type="checkbox"/> Hydrogen Sulfide (A4)			<input type="checkbox"/> Loamy Gleyed Matrix (F2)			³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.		
<input type="checkbox"/> Depleted Below Dark Surface (A11)			<input type="checkbox"/> Depleted Matrix (F3)					
<input type="checkbox"/> Thick Dark Surface (A12)			<input type="checkbox"/> Redox Dark Surface (F6)					
<input type="checkbox"/> Sandy Mucky Mineral (S1)			<input type="checkbox"/> Depleted Dark Surface (F7)					
<input type="checkbox"/> Sandy Gleyed Matrix (S4)			<input type="checkbox"/> Redox Depressions (F8)					
Restrictive Layer (if present):								
Type: <u>Gravel/rock</u>								
Depth (inches): <u>12"+</u>						Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		
Remarks:								

HYDROLOGY

Wetland Hydrology Indicators:					
Primary Indicators (minimum of one required; check all that apply)			Secondary Indicators (2 or more required)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)			
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)			
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)			
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)			
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)			
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)			
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> FAC-Neutral Test (D5)			
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)			
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)			
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)					
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)					
Field Observations:					
Surface Water Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____	Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		
Water Table Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____			
Saturation Present? (includes capillary fringe)	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____			
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:					
Remarks:					

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/16/2009
 Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP13
 Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 1
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.21183395 Long: -120.8102341 Datum: NAD 83
 Soil Map Unit Name: 203-Teanaway loam, 3-10 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? N Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? Y (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: Wetland W3 is a PEM (Cowardin), depressional (HGM). Wetland boundaries determined by the toe of slope of a distinct depressional area containing cracked soils.	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
<u>0</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
<u>0</u> = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. <u>Ventenata dubia</u>	<u>90</u>	<u>Y</u>	<u>NOL</u>	
2. <u>Castilleja tenuis</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	
3. <u>Juncus parryi</u>	<u>5</u>	<u>N</u>	<u>FAC</u>	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
<u>100</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>15'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
<u>0</u> = Total Cover				
% Bare Ground in Herb Stratum <u>0</u>				

Dominance Test worksheet:
 Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)
 Total Number of Dominant Species Across All Strata: 1 (B)
 Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:
 Total % Cover of: _____ Multiply by: _____
 OBL species _____ x 1 = _____
 FACW species _____ x 2 = _____
 FAC species 5 x 3 = 15
 FACU species 5 x 4 = 20
 UPL species 90 x 5 = 450
 Column Totals: 100 (A) 485 (B)
 Prevalence Index = B/A = 4.85

Hydrophytic Vegetation Indicators:
 Dominance Test is >50%
 Prevalence Index is ≤3.0¹
 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 Wetland Non-Vascular Plants¹
 Problematic Hydrophytic Vegetation¹ (Explain)
¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes No

Remarks: Vegetation meets problematic hydrophytic vegetation criteria based on positive hydric soil indicators, a restrictive layer at 12", surface cracks and concave topography that indicate that area ponds water. Vegetation may be more hydrophytic in wetter years – annual invasive *Ventenata dubia* may dominate in dryer years

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/16/2009
 Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP14
 Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 3
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.21188354 Long: -120.8101349 Datum: NAD 83
 Soil Map Unit Name: 203-Teanaway loam, 3-10 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? N Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? N (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks: Sample point taken above depressional area.	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>33</u> (A/B)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
_____ = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
_____ = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)				
1. <u>Poa bulbosa</u>	25	Y	NOL	
2. <u>Castilleja tenuis</u>	15	Y	FACU	
3. <u>Potentilla drummondii</u>	5	N	FAC	
4. <u>Agrostis scabra</u>	20	Y	FAC	
5. <u>Zigadenus venenosus</u>	5	N	FACU	
6. <u>Achillea millefolium</u>	10	N	FACU	
7. <u>Lomatium simplex</u>	5	N	NOL	
8. <u>Lupinus sericeus</u>	5	N	NOL	
9. <u>Balsamorhiza sagittata</u>	10	N	NOL	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
_____ = Total Cover				
Woody Vine Stratum (Plot size: <u>15'</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
_____ = Total Cover				
% Bare Ground in Herb Stratum <u>0</u>				
Remarks:				

SOIL

Sampling Point: SP14

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-12	10YR 3/2	100					silt loam	
12-								gravel/rock refusal
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)						Indicators for Problematic Hydric Soils³:		
<input type="checkbox"/> Histosol (A1)			<input type="checkbox"/> Sandy Redox (S5)			<input type="checkbox"/> 2 cm Muck (A10)		
<input type="checkbox"/> Histic Epipedon (A2)			<input type="checkbox"/> Stripped Matrix (S6)			<input type="checkbox"/> Red Parent Material (TF2)		
<input type="checkbox"/> Black Histic (A3)			<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)			<input type="checkbox"/> Other (Explain in Remarks)		
<input type="checkbox"/> Hydrogen Sulfide (A4)			<input type="checkbox"/> Loamy Gleyed Matrix (F2)			³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.		
<input type="checkbox"/> Depleted Below Dark Surface (A11)			<input type="checkbox"/> Depleted Matrix (F3)					
<input type="checkbox"/> Thick Dark Surface (A12)			<input type="checkbox"/> Redox Dark Surface (F6)					
<input type="checkbox"/> Sandy Mucky Mineral (S1)			<input type="checkbox"/> Depleted Dark Surface (F7)					
<input type="checkbox"/> Sandy Gleyed Matrix (S4)			<input type="checkbox"/> Redox Depressions (F8)					
Restrictive Layer (if present):								
Type: <u>Gravel/rock</u>								
Depth (inches): <u>12"+</u>						Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		
Remarks:								

HYDROLOGY

Wetland Hydrology Indicators:					
Primary Indicators (minimum of one required; check all that apply)			Secondary Indicators (2 or more required)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)			
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)			
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)			
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)			
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)			
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)			
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> FAC-Neutral Test (D5)			
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)			
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)			
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)					
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)					
Field Observations:					
Surface Water Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____	Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		
Water Table Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____			
Saturation Present? (includes capillary fringe)	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____			
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:					
Remarks:					

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/16/2009
 Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP15
 Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 1
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.21208572 Long: -120.8093414 Datum: NAD 83
 Soil Map Unit Name: 203-Teanaway loam, 3-10 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? N Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? N (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: Wetland W1 is a PEM (Cowardin), depressional (HGM). Wetland boundaries determined by the toe of slope of a distinct depressional area containing cracked soils.	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
<u>0</u> = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
Sapling/Shrub Stratum (Plot size: <u>15'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
<u>0</u> = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Wetland Non-Vascular Plants ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. <u>Gnaphalium palustre</u>	<u>5</u>	<u>Y</u>	<u>FAC</u>	
2. <u>Polygonum polygaloides</u>	<u>trace</u>	<u>N</u>	<u>FACW</u>	
3. <u>Navarretia brewerii</u>	<u>trace</u>	<u>N</u>	<u>NOL</u>	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
<u>5</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>15'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
<u>0</u> = Total Cover				
% Bare Ground in Herb Stratum <u>95</u>				
Remarks:				

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/16/2009
 Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP16
 Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 3
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.21212006 Long: -120.809288 Datum: NAD 83
 Soil Map Unit Name: 203-Teanaway loam, 3-10 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? N Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? N (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks: Sample point taken above depressional area.	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>33</u> (A/B)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
_____ = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
Sapling/Shrub Stratum (Plot size: <u>15'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	Hydrophytic Vegetation Indicators: <input type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Wetland Non-Vascular Plants ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
_____ = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. <u>Poa bulbosa</u>	10	N	NOL	
2. <u>Castilleja tenuis</u>	12	Y	FACU	
3. <u>Potentilla gracilis</u>	5	N	FAC	
4. <u>Agrostis scabra</u>	20	Y	FAC	
5. <u>Agrostemma githago</u>	20	Y	NOL	
6. <u>Lomatium simplex</u>	10	N	NOL	
7. <u>Juncus parryi</u>	10	N	FAC	
8. <u>Balsamorhiza sagittata</u>	8	N	NOL	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
_____ = Total Cover				
Woody Vine Stratum (Plot size: <u>15'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
_____ = Total Cover				
% Bare Ground in Herb Stratum <u>0</u>				
Remarks:				

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/17/2009
 Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP17
 Investigator(s): Renee Storey/Katina Kapantais Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 3
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.20587158 Long: 120.8251495 Datum: NAD 83
 Soil Map Unit Name: 203-Teanaway loam, 3-10 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? N Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? N (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: Wetland W8 is a PEM (Cowardin), depressional (HGM). Wetland boundaries determined by the toe of slope of a distinct depressional area containing cracked soils and a change from dominant wetland vegetation <i>Eleocharis palustris</i> to dominant upland vegetation <i>Achillea millefolium</i> .	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A)
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>1</u> (B)
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
4. _____	_____	_____	_____	
0 = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				Prevalence Index worksheet:
1. _____	_____	_____	_____	Total % Cover of: _____ Multiply by: _____
2. _____	_____	_____	_____	OBL species _____ x 1 = _____
3. _____	_____	_____	_____	FACW species _____ x 2 = _____
4. _____	_____	_____	_____	FAC species _____ x 3 = _____
5. _____	_____	_____	_____	FACU species _____ x 4 = _____
0 = Total Cover				UPL species _____ x 5 = _____
				Column Totals: _____ (A) _____ (B)
				Prevalence Index = B/A = _____
Herb Stratum (Plot size: <u>5'</u>)				Hydrophytic Vegetation Indicators:
1. <u>Eleocharis palustris</u>	70	Y	OBL	<input checked="" type="checkbox"/> Dominance Test is >50%
2. <u>Juncus parryi</u>	5	N	FAC	<input type="checkbox"/> Prevalence Index is ≤3.0 ¹
3. _____	_____	_____	_____	<input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
4. _____	_____	_____	_____	<input type="checkbox"/> Wetland Non-Vascular Plants ¹
5. _____	_____	_____	_____	<input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
6. _____	_____	_____	_____	¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
75 = Total Cover				
Woody Vine Stratum (Plot size: <u>15'</u>)				Hydrophytic Vegetation Present?
1. _____	_____	_____	_____	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
2. _____	_____	_____	_____	
0 = Total Cover				
% Bare Ground in Herb Stratum <u>25</u>				
Remarks:				

SOIL

Sampling Point: SP17

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-10	10YR 4/2	95	7.5YR 5/8	5	C	PL	silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Loamy Mucky Mineral (F1) (**except MLRA 1**)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10)
- Red Parent Material (TF2)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Surface Soil Cracks (B6)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)

Secondary Indicators (2 or more required)

- Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres along Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Stunted or Stressed Plants (D1) (**LRR A**)
- Other (Explain in Remarks)
- Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- Drainage Patterns (B10)
- Dry-Season Water Table (C2)
- Saturation Visible on Aerial Imagery (C9)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- FAC-Neutral Test (D5)
- Raised Ant Mounds (D6) (**LRR A**)
- Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes No Depth (inches): _____
 Water Table Present? Yes No Depth (inches): _____
 Saturation Present? Yes No Depth (inches): _____
 (includes capillary fringe)

Wetland Hydrology Present? Yes No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Wetland is along road fill at road culvert outlet.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Teaway Solar Reserve City/County: Kittitas Sampling Date: 06/17/2009
 Applicant/Owner: Teaway Solar Reserve, LLC State: WA Sampling Point: SP18
 Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 5
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.20593262 Long: -120.8251266 Datum: NAD 83
 Soil Map Unit Name: 203-Teaway loam, 3-10 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? N Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? N (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks: Sample point taken above depressional area.	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
<u>10</u> = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
<u>0</u> = Total Cover				
<u>0</u> = Total Cover				
<u>90</u> = Total Cover				
<u>0</u> = Total Cover				
<u>10</u> = Total Cover				Hydrophytic Vegetation Indicators: <input type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Wetland Non-Vascular Plants ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
<u>0</u> = Total Cover				
<u>0</u> = Total Cover				Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
<u>0</u> = Total Cover				
Remarks:				

SOIL

Sampling Point: SP18

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-3	10YR 4/2	100					silt loam	
3-12	10YR 4/2	90	7.5YR 4/6	10	C	PL	silt loam	
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)						Indicators for Problematic Hydric Soils³:		
<input type="checkbox"/> Histosol (A1)		<input type="checkbox"/> Sandy Redox (S5)		<input type="checkbox"/> 2 cm Muck (A10)				
<input type="checkbox"/> Histic Epipedon (A2)		<input type="checkbox"/> Stripped Matrix (S6)		<input type="checkbox"/> Red Parent Material (TF2)				
<input type="checkbox"/> Black Histic (A3)		<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)				<input type="checkbox"/> Other (Explain in Remarks)		
<input type="checkbox"/> Hydrogen Sulfide (A4)		<input type="checkbox"/> Loamy Gleyed Matrix (F2)						
<input type="checkbox"/> Depleted Below Dark Surface (A11)		<input checked="" type="checkbox"/> Depleted Matrix (F3)						
<input type="checkbox"/> Thick Dark Surface (A12)		<input type="checkbox"/> Redox Dark Surface (F6)		³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.				
<input type="checkbox"/> Sandy Mucky Mineral (S1)		<input type="checkbox"/> Depleted Dark Surface (F7)						
<input type="checkbox"/> Sandy Gleyed Matrix (S4)		<input type="checkbox"/> Redox Depressions (F8)						
Restrictive Layer (if present):						Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
Type: _____								
Depth (inches): _____								
Remarks:								

HYDROLOGY

Wetland Hydrology Indicators:					
Primary Indicators (minimum of one required; check all that apply)			Secondary Indicators (2 or more required)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)			
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)			
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)			
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)			
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)			
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)			
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> FAC-Neutral Test (D5)			
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)			
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)			
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)					
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)					
Field Observations:			Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>		
Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____	Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____				
Saturation Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe)					
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:					
Remarks:					

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/17/2009
 Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP19
 Investigator(s): Renee Storey/Katina Kapantais Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 3
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.20584869 Long: -120.825386 Datum: NAD 83
 Soil Map Unit Name: 203-Teanaway loam, 3-10 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? N Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? N (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: Wetland W11 is a PEM (Cowardin), depressional (HGM). Wetland boundaries determined by the toe of slope of a distinct depressional area containing cracked soils and a change from dominant wetland vegetation <i>Eleocharis palustris</i> to dominant upland vegetation <i>Achillea millefolium</i> . Wetland appears to be a created roadside ditch.	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A)
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>1</u> (B)
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
4. _____	_____	_____	_____	
<u>0</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				Prevalence Index worksheet:
1. _____	_____	_____	_____	Total % Cover of: _____ Multiply by: _____
2. _____	_____	_____	_____	OBL species _____ x 1 = _____
3. _____	_____	_____	_____	FACW species _____ x 2 = _____
4. _____	_____	_____	_____	FAC species _____ x 3 = _____
5. _____	_____	_____	_____	FACU species _____ x 4 = _____
<u>0</u> = Total Cover				UPL species _____ x 5 = _____
				Column Totals: _____ (A) _____ (B)
				Prevalence Index = B/A = _____
Herb Stratum (Plot size: <u>5'</u>)				Hydrophytic Vegetation Indicators:
1. <u>Eleocharis palustris</u>	<u>70</u>	<u>Y</u>	<u>OBL</u>	<input checked="" type="checkbox"/> Dominance Test is >50%
2. <u>Juncus parryi</u>	<u>5</u>	<u>N</u>	<u>FAC</u>	<input type="checkbox"/> Prevalence Index is ≤3.0 ¹
3. _____	_____	_____	_____	<input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
4. _____	_____	_____	_____	<input type="checkbox"/> Wetland Non-Vascular Plants ¹
5. _____	_____	_____	_____	<input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
6. _____	_____	_____	_____	¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
<u>100</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>15'</u>)				Hydrophytic Vegetation Present?
1. _____	_____	_____	_____	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
2. _____	_____	_____	_____	
<u>0</u> = Total Cover				
% Bare Ground in Herb Stratum <u>25</u>				
Remarks:				

SOIL

Sampling Point: SP19

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-10	10YR 4/2	95	7.5YR 5/8	5	C	PL	silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Loamy Mucky Mineral (F1) (**except MLRA 1**)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10)
- Red Parent Material (TF2)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Surface Soil Cracks (B6)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)

- Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres along Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Stunted or Stressed Plants (D1) (**LRR A**)
- Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- Drainage Patterns (B10)
- Dry-Season Water Table (C2)
- Saturation Visible on Aerial Imagery (C9)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- FAC-Neutral Test (D5)
- Raised Ant Mounds (D6) (**LRR A**)
- Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes No Depth (inches): _____
 Water Table Present? Yes No Depth (inches): _____
 Saturation Present? Yes No Depth (inches): _____
 (includes capillary fringe)

Wetland Hydrology Present? Yes No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Only apparent source of hydrology is precipitation and snow melt.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Teaway Solar Reserve City/County: Kittitas Sampling Date: 06/17/2009
 Applicant/Owner: Teaway Solar Reserve, LLC State: WA Sampling Point: SP20
 Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 5
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.20582581 Long: -120.8254089 Datum: NAD 83
 Soil Map Unit Name: 203-Teaway loam, 3-10 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? N Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? N (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks: Sample point taken above depressional area.	

VEGETATION – Use scientific names of plants.

Stratum	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
Tree Stratum (Plot size: <u>30'</u>)				Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A)
1. _____				Total Number of Dominant Species Across All Strata: <u>2</u> (B)
2. _____				
3. _____				
4. _____				
	<u>10</u>	= Total Cover		Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
	<u>0</u>	= Total Cover		
Herb Stratum (Plot size: <u>5'</u>)				Hydrophytic Vegetation Indicators: <input type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Wetland Non-Vascular Plants ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. <u>Agropyron smithii</u>	<u>10</u>	<u>N</u>	<u>FACU</u>	
2. <u>Agrostemma githago</u>	<u>40</u>	<u>Y</u>	<u>NOL</u>	
3. <u>Achillea millefolium</u>	<u>20</u>	<u>Y</u>	<u>FACU</u>	
4. <u>Juncus parryi</u>	<u>15</u>	<u>N</u>	<u>FAC</u>	
5. <u>Madia exigua</u>	<u>5</u>	<u>N</u>	<u>NOL</u>	
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
	<u>90</u>	= Total Cover		
Woody Vine Stratum (Plot size: <u>15'</u>)				Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
1. _____				
2. _____				
	<u>0</u>	= Total Cover		
% Bare Ground in Herb Stratum <u>10</u>				
Remarks:				

SOIL

Sampling Point: SP20

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-3	10YR 4/2	100					silt loam	
3-12	10YR 4/2	90	7.5YR 4/6	10	C	PL	silt loam	
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)						Indicators for Problematic Hydric Soils³:		
<input type="checkbox"/> Histosol (A1)		<input type="checkbox"/> Sandy Redox (S5)		<input type="checkbox"/> 2 cm Muck (A10)				
<input type="checkbox"/> Histic Epipedon (A2)		<input type="checkbox"/> Stripped Matrix (S6)		<input type="checkbox"/> Red Parent Material (TF2)				
<input type="checkbox"/> Black Histic (A3)		<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)				<input type="checkbox"/> Other (Explain in Remarks)		
<input type="checkbox"/> Hydrogen Sulfide (A4)		<input type="checkbox"/> Loamy Gleyed Matrix (F2)						
<input type="checkbox"/> Depleted Below Dark Surface (A11)		<input checked="" type="checkbox"/> Depleted Matrix (F3)						
<input type="checkbox"/> Thick Dark Surface (A12)		<input type="checkbox"/> Redox Dark Surface (F6)		³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.				
<input type="checkbox"/> Sandy Mucky Mineral (S1)		<input type="checkbox"/> Depleted Dark Surface (F7)						
<input type="checkbox"/> Sandy Gleyed Matrix (S4)		<input type="checkbox"/> Redox Depressions (F8)						
Restrictive Layer (if present):								
Type: _____								
Depth (inches): _____						Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
Remarks:								

HYDROLOGY

Wetland Hydrology Indicators:					
Primary Indicators (minimum of one required; check all that apply)			Secondary Indicators (2 or more required)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)	
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)	
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> FAC-Neutral Test (D5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)	
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)			
<input type="checkbox"/> Drift Deposits (B3)					
<input type="checkbox"/> Algal Mat or Crust (B4)					
<input type="checkbox"/> Iron Deposits (B5)					
<input type="checkbox"/> Surface Soil Cracks (B6)					
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)					
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)					
Field Observations:					
Surface Water Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____	Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		
Water Table Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____			
Saturation Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____			
(includes capillary fringe)					
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:					
Remarks:					

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/17/2009
 Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP21
 Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 2
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.20595169 Long: -120.8254471 Datum: NAD 83
 Soil Map Unit Name: 203-Teanaway loam, 3-10 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? N Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? Y (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: Wetland W9 is a PEM (Cowardin), depression (HGM). Wetland boundaries determined by the toe of slope of a distinct depression area containing cracked soils.	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
<u>0</u> = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species <u>50</u> x 5 = <u>250</u> Column Totals: <u>50</u> (A) <u>250</u> (B) Prevalence Index = B/A = <u>5</u>
Sapling/Shrub Stratum (Plot size: <u>15'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
<u>0</u> = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. <u>Ventenata dubia</u>	<u>50</u>	<u>Y</u>	<u>NOL</u>	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
<u>50</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>15'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
<u>0</u> = Total Cover				
% Bare Ground in Herb Stratum <u>50</u>				
Remarks: Vegetation meets problematic hydrophytic vegetation criteria based on positive hydric soil indicators, a restrictive layer at 12", surface cracks and concave topography that indicate that area ponds water. Vegetation may be more hydrophytic in wetter years – annual invasive <i>Ventenata dubia</i> may dominate in dryer years.				

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/17/2009
 Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP22
 Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 2
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.20600891 Long: -120.8254623 Datum: NAD 83
 Soil Map Unit Name: 203-Teanaway loam, 3-10 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? N Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? N (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks: Sample point taken above depressional area.	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
_____ = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)				
1. <u>Agropyron spicatum</u>	35	Y	UPL	
2. <u>Lupinus sericeus</u>	25	Y	NOL	
3. <u>Agropyron smithii</u>	30	Y	FACU	
4. <u>Lomatium nudicaule</u>	10	N	NOL	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
_____ = Total Cover				
Woody Vine Stratum (Plot size: <u>15'</u>)				
1. _____	_____	_____	_____	Hydrophytic Vegetation Indicators: <input type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Wetland Non-Vascular Plants ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2. _____	_____	_____	_____	
_____ = Total Cover				
% Bare Ground in Herb Stratum <u>0</u>				Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks:				

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Teanaway Solar Reserve City/County: Kittitas Sampling Date: 06/17/2009
 Applicant/Owner: Teanaway Solar Reserve, LLC State: WA Sampling Point: SP23
 Investigator(s): Renee Storey/Katina Kapantais Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 3
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.20911407 Long: -120.8263702 Datum: NAD 83
 Soil Map Unit Name: 203-Teanaway loam, 3-10 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? N Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: Wetland W10 is a PEM (Cowardin), depressional (HGM). Wetland boundaries determined by the toe of slope of a distinct depressional area containing cracked soils.	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50</u> (A/B)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
_____ = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				
1. _____	_____	_____	_____	Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species <u>10</u> x 2 = <u>20</u> FAC species <u>30</u> x 3 = <u>90</u> FACU species _____ x 4 = _____ UPL species <u>30</u> x 5 = <u>150</u> Column Totals: <u>70</u> (A) <u>260</u> (B) Prevalence Index = B/A = <u>3.7</u>
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)				
1. <u>Ventenata dubia</u>	<u>30</u>	<u>Y</u>	<u>NOL</u>	Hydrophytic Vegetation Indicators: <input type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Wetland Non-Vascular Plants ¹ <input checked="" type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2. <u>Juncus parryi</u>	<u>30</u>	<u>Y</u>	<u>FAC</u>	
3. <u>Scirpus sp.</u>	<u>10</u>	<u>N</u>	<u>FACW/OBL</u>	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
_____ = Total Cover				
Woody Vine Stratum (Plot size: <u>15'</u>)				
1. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
2. _____	_____	_____	_____	
_____ = Total Cover				
% Bare Ground in Herb Stratum <u>30</u>				
Remarks: Vegetation meets problematic hydrophytic vegetation criteria based on positive hydric soil indicators, surface cracks and concave topography that indicate that area ponds water. Vegetation may be more hydrophytic in wetter years – annual invasive Ventenata dubia may dominate in dryer years.				

SOIL

Sampling Point: SP23

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-16+	10YR 4/1	50	5YR 4/6	10	C	PL	silt loam	Mixed matrix
0-16+	10YR 4/2	40						Mixed matrix

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Teaway Solar Reserve City/County: Kittitas Sampling Date: 06/17/2009
 Applicant/Owner: Teaway Solar Reserve, LLC State: WA Sampling Point: SP24
 Investigator(s): Forrest Parsons/Joel Shaich Section, Township, Range: T20N R16E S23
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 2
 Subregion (LRR): A - Northwest Forests and Coast Lat: 47.20905685 Long: -120.8263702 Datum: NAD 83
 Soil Map Unit Name: 203-Teaway loam, 3-10 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? N Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? N (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks: Sample point taken above depressional area.	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. <u>Pinus ponderosa</u>	30	Y	FACU	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
2. _____				
3. _____				
4. _____				
<u>30</u> = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
Sapling/Shrub Stratum (Plot size: <u>15'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. <u>Syphoricarpos albus</u>	40	Y	FACU	
2. _____				
3. _____				
4. _____				
5. _____				
<u>40</u> = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators: <input type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Wetland Non-Vascular Plants ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. <u>Achillea millefolium</u>	20	Y	FACU	
2. <u>Penstemon procerus</u>	trace	N	NI	
3. _____				
4. _____				
5. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
<u>20</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>15'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
1. _____				
2. _____				
<u>0</u> = Total Cover				
% Bare Ground in Herb Stratum <u>20</u>				
Remarks: 10% ground cover and pine needles				

APPENDIX C

Site Photographs



Photo 1: Wetland W1 facing north from SP15.



Photo 2: Wetland W2 facing northeast toward SP1.



Photo 3: Wetland W3 facing southwest from SP14.



Photo 4: Wetland W3 facing north from SP13.



Photo 5: SP8 facing southwest.



Photo 6: Wetland W4 facing northeast from SP7.



Photo 7: SP12 facing east. Wetland W7 is in the background.



Photo 8: Wetland W5 facing northeast from SP11.



Photo 9: Wetland W6 facing northwest toward SP4.



Photo 10: Wetland W6 facing northeast from the eastern half of the wetland.



Photo 11: Wetland W7 facing south from transitional area at north end of the wetland.



Photo 12: Wetland W7 facing west between SP5 and SP6.



Photo 13: SP10 facing west.



Photo 14: Wetland W7 facing east from SP9.

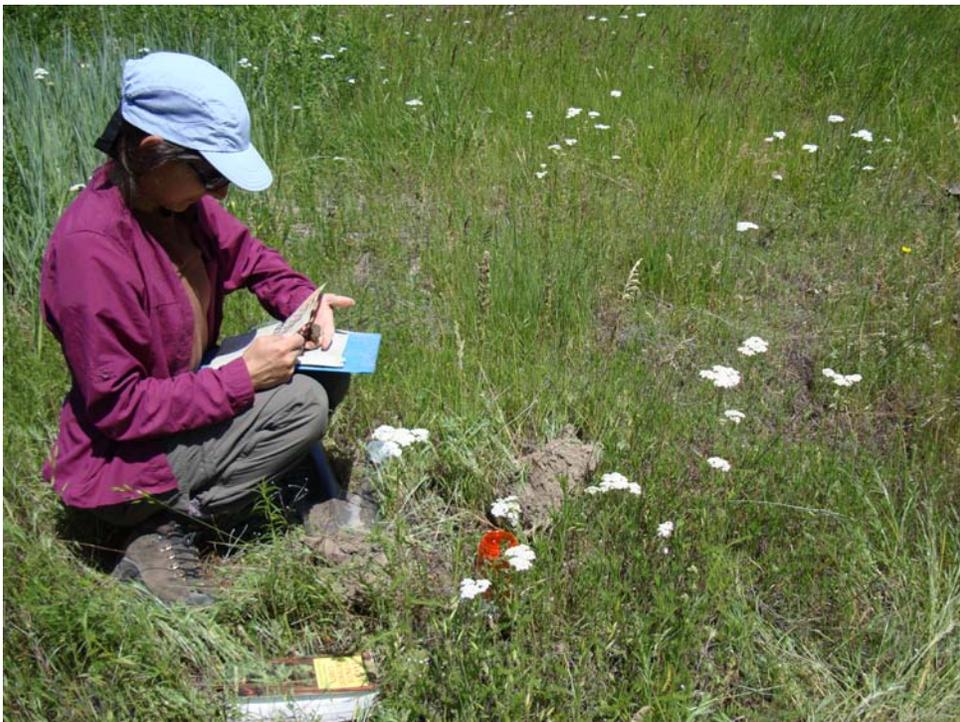


Photo 15: SP18 facing northeast.



Photo 16: Wetland W8 facing northwest from SP17.



Photo 17: SP22 facing northwest.



Photo 18: Wetland W9 facing west toward SP21.



Photo 19: SP24 facing east.



Photo 10: Wetland W10 facing southeast toward SP23.



Photo 21: Wetland W11 facing east from SP19.



Photo 22: Wetland W12 facing west.



Photo 23: Wetland W12 facing northwest.



Photo 24: Stream S1 facing south (downstream) at transmission line corridor.



Photo 25: Stream S1 facing north (upstream) at transmission line corridor.



Photo 26: Stream S2 facing south (downstream) at the southern portion of project area.



Photo 27: Stream S2 facing north (upstream) in southern portion of project area.



Photo 28: Stream S2 facing south (downstream) upstream from the confluence with S3.



Photo 29: Stream S2 facing north (upstream) upstream from the confluence with S3.



Photo 30: Stream S2 facing south near a road crossing and downstream from the confluence with S3.



Photo 31: Stream S3 facing south (downstream).



Photo 32: Stream S3 facing north (upstream).



Photo 33: Stream S4 facing west (downstream) toward road culvert.



Photo 34: Stream S4 facing northeast (upstream).



Photo 35: Stream S5 facing southwest from headwater.



Photo 36: S5 facing southwest near west edge of project area.

APPENDIX D

Washington Wetland Rating Forms and Associated Figures

Wetland name or number W1

WETLAND RATING FORM – EASTERN WASHINGTON

Version 2 - Updated June 2006 to increase accuracy and reproducibility among users
Updated Oct 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): W1 Date of site visit: 6/9/09

Rated by Forrest Parsons/Joel Shaich Trained by Ecology? Yes ___ No X Date of training _____

SEC: 23 TOWNSHIP: 20N RANGE: 16E Is S/T/R in Appendix D? Yes ___ No X

Map of wetland unit: Figure 2 Estimated size 0.01 acre

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I ___ II ___ III X IV ___

Category I = Score >=70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for "Water Quality" Functions	9
Score for Hydrologic Functions	20
Score for Habitat Functions	15
TOTAL score for functions	44

Category based on SPECIAL CHARACTERISTICS of wetland

I ___ II ___ III ___ Does not Apply X

Final Category (choose the "highest" category from above)

3

Summary of basic information about the wetland unit

Wetland Type		Wetland Class	
Vernal Pool		Depressional	X
Alkali		Riverine	
Natural Heritage Wetland		Lake-fringe	
Bog		Slope	
Forest			
None of the above	X	Check if unit has multiple HGM classes present	

Does the wetland being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That Need Special Protection, and That Are Not Included in the Rating	YES	NO
<p>SP1. <i>Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered animal or plant species (T/E species)?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.</p>		X
<p>SP2. <i>Has the wetland unit been documented as habitat for any State listed Threatened or Endangered animal species?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands (see p. 19 of data form).</p>		X
<p>SP3. <i>Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?</i></p>		X
<p>SP4. <i>Does the wetland unit have a local significance in addition to its functions?</i> For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.</p>		X

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 20 for more detailed instructions on classifying wetlands.

Classification of Vegetated Wetlands for Eastern Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Does the entire wetland unit **meet both** of the following criteria?

The vegetated part of the wetland is on the shores of a body of open water (without any vegetation on the surface) at least 20 acres (8 ha) in size;

At least 30% of the open water area is deeper than 3 m (10 ft)?

NO - go to Step 2 **YES** - The wetland class is **Lake-fringe (lacustrine fringe)**

2. Does the entire wetland unit **meet all** of the following criteria?

The wetland is on a slope (*slope can be very gradual*),

The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.

The water leaves the wetland **without being impounded**?

NOTE: *Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a foot deep).*

NO - go to Step 3 **YES** - The wetland class is **Slope**

3. Is the entire wetland unit in a valley or stream channel where it gets inundated by overbank flooding from that stream or river? In general, the flooding should occur at least once every ten years to answer "yes." *The wetland can contain depressions that are filled with water when the river is not flooding.*

NO - go to Step 4 **YES** - The wetland class is **Riverine**

4. Is the entire wetland unit in a topographic depression, outside areas that are inundated by overbank flooding, in which water ponds, or is saturated to the surface, at some time of the year. *This means that any outlet, if present, is higher than the interior of the wetland.*

NO - go to Step 5 **YES** - The wetland class is **Depressional**

5. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

Wetland name or number W1

HGM Classes Within One Delineated Wetland Boundary	Class to Use for Rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine (riverine is within boundary of depression)	Depressional
Depressional + Lake-fringe	Depressional

If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

D Depressional Wetlands		Points
WATER QUALITY FUNCTIONS - Indicators that the wetland functions to improve water quality		(only 1 score per box)
D	D 1.0 Does the wetland unit have the <u>potential</u> to improve water quality?	(see p. 38)
D	D 1.1 Characteristics of surface water flows out of the wetland unit: Wetland has no surface water outlet - points = 5 Wetland has an intermittently flowing outlet points = 3 Wetland has a highly constricted permanently flowing outlet points = 3 Wetland has a permanently flowing surface outlet points = 1	5
D	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (use NRCS definitions of soil types) YES points = 3 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class) Wetland has persistent, ungrazed, vegetation for > 2/3 of area points = 5 Wetland has persistent, ungrazed, vegetation from 1/3 to 2/3 of area points = 3 Wetland has persistent, ungrazed vegetation from 1/10 to < 1/3 of area points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area points = 0 Map of Cowardin vegetation classes	Figure 2 1
D	D 1.4 Characteristics of seasonal ponding or inundation. <i>This is the area of ponding that fluctuates every year. Do not count the area that is permanently ponded.</i> Area seasonally ponded is > 1/2 total area of wetland points = 3 Area seasonally ponded is 1/4 - 1/2 total area of wetland points = 1 Area seasonally ponded is < 1/4 total area of wetland points = 0 NOTE: See text for indicators of seasonal and permanent inundation/flooding. Map of Hydroperiods	Figure 8 3
D	Total for D 1 Add the points in the boxes above	9
D	D 2. Does the wetland unit have the <u>opportunity</u> to improve water quality? Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity. — Grazing in the wetland or within 150 ft — Untreated stormwater discharges to wetland — Tilled fields or orchards within 150 ft of wetland — A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging — Residential, urban areas, golf courses are within 150 ft of wetland — Wetland is fed by groundwater high in phosphorus or nitrogen — Other _____ YES multiplier is 2 NO multiplier is 1	multiplier <u>1</u>
D	TOTAL - Water Quality Functions Multiply the score from D1 by the multiplier in D2 <i>Record score on p. 1 of field form</i>	9

These questions apply to wetlands of all HGM classes.		Points (only 1 score per box)								
HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat										
H 1. Does the wetland unit have the <u>potential</u> to provide habitat for many species?										
<p>H 1.1 <u>Categories of vegetation structure</u> (see p.62) <i>Check the vegetation classes (as defined by Cowardin) and heights of emergents present. Size threshold for each class or height category is 1/4 acre or more than 10% of the area if unit is < 2.5 acres.</i></p> <p><input type="checkbox"/> Aquatic bed <input checked="" type="checkbox"/> Emergent plants 0-12 in. (0 – 30 cm) high are the highest layer and have > 30% cover <input type="checkbox"/> Emergent plants >12 – 40 in. (>30 – 100cm) high are the highest layer with >30% cover <input type="checkbox"/> Emergent plants > 40 in. (> 100cm) high are the highest layer with >30% cover <input type="checkbox"/> Scrub/shrub (areas where shrubs have >30% cover) <input type="checkbox"/> Forested (areas where trees have >30% cover)</p> <p><i>Add the number of vegetation types that qualify. If you have:</i></p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td>4-6 types</td> <td>points = 3</td> </tr> <tr> <td>3 types</td> <td>points = 2</td> </tr> <tr> <td>2 types</td> <td>points = 1</td> </tr> <tr> <td>1 type</td> <td>points = 0</td> </tr> </table> <p>Map of Cowardin vegetation classes and areas with different heights of emergents</p>		4-6 types	points = 3	3 types	points = 2	2 types	points = 1	1 type	points = 0	<p>Figure 2</p> <p style="text-align: center; font-size: 2em;">0</p>
4-6 types	points = 3									
3 types	points = 2									
2 types	points = 1									
1 type	points = 0									
<p>H 1.2. Is one of the vegetation types “aquatic bed?” (see p .64) YES = 1 point NO = 0 points</p>		0								
<p>H 1.3. <u>Surface Water</u> (see p.65)</p> <p>H 1.3.1 Does the unit have areas of “open” water (without herbaceous or shrub plants) over at least 1/4 acre or 10% of its area during the spring (March – early June) OR in early fall (August – end of September)? <i>Note: answer YES for Lake-fringe wetlands</i></p> <p><input checked="" type="radio"/> YES = 3 points & go to H 1.4 NO = go to H 1.3.2</p> <p>H 1.3.2 Does the unit have an intermittent or permanent stream within its boundaries, or along one side, over at least 1/4 acre or 10% of its area, AND that has an unvegetated bottom (<i>answer yes only if H 1.3.1 is NO</i>)?</p> <p>YES = 3 points NO = 0 points</p> <p style="text-align: center;">Map showing areas of open water</p>		<p>Figure 8</p> <p style="text-align: center; font-size: 2em;">3</p>								
<p>H 1.4. <u>Richness of Plant Species</u> (see p. 66) Count the number of plant species in the wetland that cover at least 10 ft². (<i>different patches of the same species can be combined to meet the size threshold</i>) <i>You do not have to name the species.</i> <i>Do not include Eurasean Milfoil, reed canarygrass, purple loosestrife, Russian Olive, Phragmites ,Canadian Thistle, Yellow-flag Iris, and Salt Cedar (Tamarisk)</i></p> <p>If you counted: > 9 species points = 2 4-9 species points = 1 # of species <u>3</u> < 4 species points = 0 points</p> <p><i>List species below if you wish</i></p>		0								

<p>H 1.5. Interspersion of habitats (see p. 67) Decided from the diagrams below whether interspersion between categories of vegetation (described in H 1.1), or categories and un-vegetated areas (can include open water or mudflats) is high, medium, low, or none.</p> <p>None = 0 points Low = 1 point Moderate = 2 points Moderate = 2 points</p> <p>High = 3 points High = 3 points [Riparian braided channel]</p> <p>NOTE: If you have four or more vegetation categories or three vegetation categories and open water the rating is always “high”. Use maps from H1.1 and H1.3</p>	<p>Figure 2</p> <p style="text-align: center; font-size: 2em;">1</p>
<p>H 1.6. Special Habitat Features: (see p. 68) Check the habitat features that are present in the wetland unit. The number of checks is the number of points you put into the next column.</p> <p><input type="checkbox"/> Loose rocks larger than 4" or large, downed, woody debris (>4in. diameter) within the area of surface ponding or in stream.</p> <p><input type="checkbox"/> Cattails or bulrushes are present within the unit.</p> <p><input type="checkbox"/> Standing snags (diameter at the bottom > 4 inches) in the wetland unit or within 30 m (100ft) of the edge.</p> <p><input type="checkbox"/> Emergent or shrub vegetation in areas that are permanently inundated/ponded. <i>The presence of “yellow flag” Iris is a good indicator of vegetation in areas permanently ponded.</i></p> <p><input type="checkbox"/> Stable steep banks of fine material that might be used by beaver or muskrat for denning (>45 degree slope) OR signs of recent beaver activity</p> <p><input type="checkbox"/> Invasive species cover less than 20% in each stratum of vegetation (<i>canopy, sub-canopy, shrubs, herbaceous, moss/ground cover</i>)</p> <p style="text-align: right;"><i>Maximum score possible = 6</i></p>	<p style="text-align: center; font-size: 2em;">0</p>
<p style="text-align: right;">TOTAL Potential to provide habitat Add the scores in the column above</p>	<p style="text-align: center; font-size: 2em; border: 2px dashed black;">4</p>

Comments

<p>H 2.0 Does the wetland have the opportunity to provide habitat for many species?</p>	
<p>H 2.1 Buffers (<i>see p. 71</i>) <i>Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of “undisturbed.” Relatively undisturbed also means no grazing, no landscaping, no daily human use, and no structures or paving within undisturbed part of buffer.</i></p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference Points = 5 — 330 ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. Points = 4 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. Points = 4 — 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . Points = 3 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. Points = 3 <p style="text-align: center;">If buffer does not meet any of the criteria above</p> <ul style="list-style-type: none"> — No paved areas (except paved trails) or buildings within 80ft (25 m) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — No paved areas or buildings within 170ft (50m) of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — Heavy grazing in buffer. Points = 1 — Vegetated buffers are <6.6ft wide (2m) for more than 95% of the circumference (e.g . tilled fields, paving, basalt bedrock extend to edge of wetland). Points = 0 — Buffer does not meet any of the criteria above. Points = 1 <p style="text-align: center;">Aerial photo showing buffers</p>	<p>Figure 14</p> <p style="text-align: center; font-size: 2em;">5</p>
<p>H 2.2 Wet Corridors (<i>see p. 72</i>)</p> <p>H 2.2.1 Is the wetland unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor at least ¼ mile long with surface water or flowing water throughout most of the year (> 9 months/yr)? (<i>dams, heavily used gravel roads, paved roads, fields tilled to edge of stream, or pasture to edge of stream are considered breaks in the corridor</i>).</p> <p>YES = 4 points (go to H 2.3) <input checked="" type="radio"/> NO = go to H 2.2.2</p> <p>H 2.2.2 Is the unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor, at least ¼ mile long with water flowing seasonally, OR a lake-fringe wetland without a “wet” corridor, OR a riverine wetland without a surface channel connecting to the stream?</p> <p>YES = 2 points (go to H 2.3) <input checked="" type="radio"/> NO go to H 2.2.3</p> <p>H 2.2.3 Is the wetland within a 1/2 mile of any permanent stream, seasonal stream, or lake (<i>do not include man-made ditches</i>)?</p> <p><input checked="" type="radio"/> YES = 1 point NO = 0 points</p>	<p style="text-align: center; font-size: 2em;">1</p>

H 2.3 Near or adjacent to other priority habitats listed by WDFW (see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report <http://wdfw.wa.gov/hab/phslist.htm>)

Which of the following priority habitats are within 330ft (100m) of the wetland unit? *NOTE: the connections to the habitats can be disturbed.*

- Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acre).
- Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report p. 152*).
- Eastside Steppe:** Non-forested vegetation type dominated by broadleaf herbaceous flora (*full description of herbaceous species found here are in WDFW PHS report p. 153*).
- Old-growth/Mature forests (east of Cascade crest):** (*full descriptions in WDFW PHS report p. 157*). **Old-growth:** Stands are > 150 yrs in age; may be variable in tree species composition and structural characteristics due to the influence of fire, climate, and soils. **Mature:** Stands 80 – 160 yrs old. Decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth.
- Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158*).
- Juniper Savannah:** All juniper woodlands (*SE part of state only; check map*)
- Shrub-steppe:** A nonforested vegetation type consisting of one or more layers of perennial bunchgrasses and a conspicuous but discontinuous layer of shrubs (see Eastside Steppe for sites with little or no shrub cover).
- Riparian:** The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- Inland Dunes** This placeholder is for a new priority habitat that will capture areas known as Inland Dunes. A definition will be developed later in Fall 2008. (*check WDFW web site*)
- Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
- Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
- Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft.
- Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 30 cm (12 in) in eastern Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long.

If wetland has **2 or more** Priority Habitats = **4 points**
 If wetland has **1** Priority Habitat = **2 points**
 No Priority habitats = **0 points**

0

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)

<p>H 2.4 <u>Landscape</u> (choose the one description of the landscape around the wetland that best fits) (see p. 76)</p> <p>— The wetland unit is in an area where annual rainfall is less than 12 inches, and its water regime is not influenced by irrigation practices, dams, or water control structures. (Generally, this x means outside boundaries of reclamation areas, irrigation district, or reservoirs) points = 5</p> <p>— There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing in the connection or an open water connection along a lake shore without heavy boat traffic are OK, but connections should NOT be bisected by paved roads, fill, fields, heavy boat traffic or other development) points = 5</p> <p>— There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed? points = 2</p> <p>— There is at least 1 wetland within ½ mile. points = 1</p> <p>— Does not meet any of the four criteria above points = 0</p>	<p>5</p>	
<p>H 2. TOTAL Score - opportunity for providing habitat Add the scores in the column above</p>	<p>11</p>	
<p>H 3.0 Does the wetland unit have indicators that its ability to provide habitat is reduced?</p>		
<p>H 3.1 <u>Indicator of reduced habitat functions</u> (see p. 75)</p> <p>Do the areas of open water in the wetland unit have a resident population of carp (see text for indicators of the presence of carp)? (NOTE: This question does not apply to reservoirs with water levels controlled by dams, such as the reservoirs on the Columbia and Snake Rivers)</p> <p style="text-align: center;">YES = - 5 points <u>NO</u> = 0 points</p>	<p>Points will be subtracted</p> <p>0</p>	
<p>Total Score for Habitat Functions – add the points for H 1, H 2, and H 3 and record the result on p. 1</p>		<p>15</p>

Comments

<p>SC 5.0 Forested Wetlands (see p. 85)</p> <p>Does the wetland unit have an area of forest (<i>you should have identified a forested class, if present, in question H 1.1</i>) rooted within its boundary that meet at least one of the following three criteria?</p> <ul style="list-style-type: none"> — The wetland is within the “100 year” floodplain of a river or stream — aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant of the “woody” vegetation. (<i>Dominants means it represents at least 50% of the cover of woody species, co-dominant means it represents at least 20% of the total cover of woody species</i>) — There is at least ¼ acre of trees (even in wetlands smaller than 2.5 acres) that are “mature” or “old-growth” according to the definitions for these priority habitats developed by WDFW (<i>see p. 83</i>) <p>YES = go to SC 5.1 NO <i>not a forested wetland with special characteristics</i></p>	
<p>SC 5.1 Does the wetland unit have a forest canopy where more than 50% of the tree species (by cover) are slow growing native trees</p> <p>Slow growing trees are: western red cedar (<i>Thuja plicata</i>), Alaska yellow cedar (<i>Chamaecyparis nootkatensis</i>), pine spp. mostly “white” pine (<i>Pinus monticola</i>), western hemlock (<i>Tsuga heterophylla</i>), Englemann spruce (<i>Picea engelmannii</i>).</p> <p>YES = Category I NO = go to SC 5.2</p>	<p>Cat. I</p>
<p>SC 5.2 Does the unit have areas where aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant species?</p> <p>YES = Category I NO = go to SC 5.3</p>	<p>Cat. I</p>
<p>SC 5.3 Does the wetland unit have areas with a forest canopy where more than 50% of the tree species (by cover) are fast growing species.</p> <p>Fast growing species are:</p> <p>Alders – red (<i>Alnus rubra</i>), thin-leaf (<i>A. tenuifolia</i>)</p> <p>Cottonwoods – narrow-leaf (<i>Populus angustifolia</i>), black (<i>P. balsamifera</i>)</p> <p>Willows- peach-leaf (<i>Salix amygdaloides</i>), Sitka (<i>S. sitchensis</i>), Pacific (<i>S. lasiandra</i>), Aspen - (<i>Populus tremuloides</i>), Water Birch (<i>Betula occidentalis</i>)</p> <p>YES = Category II NO = go to SC 5.5</p>	<p>Cat. II</p>
<p>SC 5.5 Is the forested component of the wetland within the “100 year floodplain” of a river or stream?</p> <p>YES = Category II</p>	<p>Cat. II</p>
<p>Category of wetland based on Special Characteristics</p> <p><i>Choose the “highest” rating if wetland falls into several categories.</i></p> <p>If you answered NO for all types enter “Not Applicable” on p.1</p>	

NA

Wetland name or number W2

WETLAND RATING FORM – EASTERN WASHINGTON

Version 2 - Updated June 2006 to increase accuracy and reproducibility among users
Updated Oct 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): W2 Date of site visit: 6/9/09

Rated by Forrest Parsons/Joel Shaich Trained by Ecology? Yes ___ No X Date of training _____

SEC: 22 TOWNSHIP: 20N RANGE: 16E Is S/T/R in Appendix D? Yes ___ No X

Map of wetland unit: Figure _____ Estimated size 0.004

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I ___ II ___ III X IV ___

Category I = Score >=70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for "Water Quality" Functions	11
Score for Hydrologic Functions	20
Score for Habitat Functions	12
TOTAL score for functions	43

Category based on SPECIAL CHARACTERISTICS of wetland

I ___ II ___ III ___ Does not Apply X

Final Category (choose the "highest" category from above)

3

Summary of basic information about the wetland unit

Wetland Type		Wetland Class	
Vernal Pool		Depressional	X
Alkali		Riverine	
Natural Heritage Wetland		Lake-fringe	
Bog		Slope	
Forest			
None of the above	X	Check if unit has multiple HGM classes present	

Does the wetland being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That Need Special Protection, and That Are Not Included in the Rating	YES	NO
<p>SP1. <i>Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered animal or plant species (T/E species)?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.</p>		X
<p>SP2. <i>Has the wetland unit been documented as habitat for any State listed Threatened or Endangered animal species?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands (see p. 19 of data form).</p>		X
<p>SP3. <i>Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?</i></p>		X
<p>SP4. <i>Does the wetland unit have a local significance in addition to its functions?</i> For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.</p>		X

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 20 for more detailed instructions on classifying wetlands.

Classification of Vegetated Wetlands for Eastern Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Does the entire wetland unit **meet both** of the following criteria?

The vegetated part of the wetland is on the shores of a body of open water (without any vegetation on the surface) at least 20 acres (8 ha) in size;

At least 30% of the open water area is deeper than 3 m (10 ft)?

NO - go to Step 2 **YES** - The wetland class is **Lake-fringe (lacustrine fringe)**

2. Does the entire wetland unit **meet all** of the following criteria?

The wetland is on a slope (*slope can be very gradual*),

The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.

The water leaves the wetland **without being impounded**?

NOTE: *Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a foot deep).*

NO - go to Step 3 **YES** - The wetland class is **Slope**

3. Is the entire wetland unit in a valley or stream channel where it gets inundated by overbank flooding from that stream or river? In general, the flooding should occur at least once every ten years to answer "yes." *The wetland can contain depressions that are filled with water when the river is not flooding.*

NO - go to Step 4 **YES** - The wetland class is **Riverine**

4. Is the entire wetland unit in a topographic depression, outside areas that are inundated by overbank flooding, in which water ponds, or is saturated to the surface, at some time of the year. *This means that any outlet, if present, is higher than the interior of the wetland.*

NO - go to Step 5 **YES** - The wetland class is **Depressional**

5. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

Wetland name or number W2

HGM Classes Within One Delineated Wetland Boundary	Class to Use for Rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine (riverine is within boundary of depression)	Depressional
Depressional + Lake-fringe	Depressional

If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

D Depressional Wetlands		Points
WATER QUALITY FUNCTIONS - Indicators that the wetland functions to improve water quality		(only 1 score per box)
D	D 1.0 Does the wetland unit have the <u>potential</u> to improve water quality?	(see p. 38)
D	D 1.1 Characteristics of surface water flows out of the wetland unit: Wetland has no surface water outlet - points = 5 Wetland has an intermittently flowing outlet points = 3 Wetland has a highly constricted permanently flowing outlet points = 3 Wetland has a permanently flowing surface outlet points = 1	3
D	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (<i>use NRCS definitions of soil types</i>) YES points = 3 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class) Wetland has persistent, ungrazed, vegetation for > 2/3 of area points = 5 Wetland has persistent, ungrazed, vegetation from 1/3 to 2/3 of area points = 3 Wetland has persistent, ungrazed vegetation from 1/10 to < 1/3 of area points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area points = 0 Map of Cowardin vegetation classes	Figure 4 5
D	D 1.4 Characteristics of seasonal ponding or inundation. <i>This is the area of ponding that fluctuates every year. Do not count the area that is permanently ponded.</i> Area seasonally ponded is > 1/2 total area of wetland points = 3 Area seasonally ponded is 1/4 - 1/2 total area of wetland points = 1 Area seasonally ponded is < 1/4 total area of wetland points = 0 NOTE: See text for indicators of seasonal and permanent inundation/flooding. Map of Hydroperiods	Figure 10 3
D	Total for D 1 <i>Add the points in the boxes above</i>	11
D	D 2. Does the wetland unit have the <u>opportunity</u> to improve water quality? Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. <i>Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.</i> — Grazing in the wetland or within 150 ft — Untreated stormwater discharges to wetland — Tilled fields or orchards within 150 ft of wetland — A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging — Residential, urban areas, golf courses are within 150 ft of wetland — Wetland is fed by groundwater high in phosphorus or nitrogen — Other _____ YES multiplier is 2 NO multiplier is 1	multiplier <u>1</u>
D	TOTAL - Water Quality Functions Multiply the score from D1 by the multiplier in D2 <i>Record score on p. 1 of field form</i>	11

These questions apply to wetlands of all HGM classes.		Points (only 1 score per box)								
HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat										
H 1. Does the wetland unit have the <u>potential</u> to provide habitat for many species?										
<p>H 1.1 <u>Categories of vegetation structure</u> (see p.62) Check the vegetation classes (as defined by Cowardin) and heights of emergents present. Size threshold for each class or height category is ¼ acre or more than 10% of the area if unit is < 2.5 acres.</p> <p> <input type="checkbox"/> Aquatic bed <input checked="" type="checkbox"/> Emergent plants 0-12 in. (0 – 30 cm) high are the highest layer and have > 30% cover <input type="checkbox"/> Emergent plants >12 – 40 in.(>30 – 100cm) high are the highest layer with >30% cover <input type="checkbox"/> Emergent plants > 40 in.(> 100cm) high are the highest layer with >30% cover <input type="checkbox"/> Scrub/shrub (areas where shrubs have >30% cover) <input type="checkbox"/> Forested (areas where trees have >30% cover) </p> <p>Add the number of vegetation types that qualify. If you have:</p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td>4-6 types</td> <td>points = 3</td> </tr> <tr> <td>3 types</td> <td>points = 2</td> </tr> <tr> <td>2 types</td> <td>points = 1</td> </tr> <tr> <td>1 type</td> <td>points = 0</td> </tr> </table> <p>Map of Cowardin vegetation classes and areas with different heights of emergents</p>		4-6 types	points = 3	3 types	points = 2	2 types	points = 1	1 type	points = 0	<p>Figure 4</p> <p style="text-align: center; font-size: 2em;">0</p>
4-6 types	points = 3									
3 types	points = 2									
2 types	points = 1									
1 type	points = 0									
<p>H 1.2. Is one of the vegetation types “aquatic bed?” (see p .64) YES = 1 point NO = 0 points</p>		0								
<p>H 1.3. <u>Surface Water</u> (see p.65)</p> <p>H 1.3.1 Does the unit have areas of “open” water (without herbaceous or shrub plants) over at least ¼ acre or 10% of its area during the spring (March – early June) OR in early fall (August – end of September)? <i>Note: answer YES for Lake-fringe wetlands</i> YES = 3 points & go to H 1.4 NO = go to H 1.3.2</p> <p>H 1.3.2 Does the unit have an intermittent or permanent stream within its boundaries, or along one side, over at least ¼ acre or 10% of its area, AND that has an unvegetated bottom (answer yes only if H 1.3.1 is NO)? YES = 3 points NO = 0 points Map showing areas of open water</p>		<p>Figure 10</p> <p style="text-align: center; font-size: 2em;">0</p>								
<p>H 1.4. <u>Richness of Plant Species</u> (see p. 66) Count the number of plant species in the wetland that cover at least 10 ft². (different patches of the same species can be combined to meet the size threshold) You do not have to name the species. Do not include Eurasean Milfoil, reed canarygrass, purple loosestrife, Russian Olive, Phragmites ,Canadian Thistle, Yellow-flag Iris, and Salt Cedar (Tamarisk)</p> <p>If you counted: > 9 species points = 2 4-9 species points = 1 # of species <u>5</u> < 4 species points = 0 points</p> <p>List species below if you wish</p>		1								

<p>H 1.5. Interspersion of habitats (see p. 67) Decided from the diagrams below whether interspersion between categories of vegetation (described in H 1.1), or categories and un-vegetated areas (can include open water or mudflats) is high, medium, low, or none.</p> <p>None = 0 points Low = 1 point Moderate = 2 points</p> <p>High = 3 points [Riparian braided channel]</p> <p>NOTE: If you have four or more vegetation categories or three vegetation categories and open water the rating is always "high". Use maps from H1.1 and H1.3</p>	<p>Figure 4</p> <p style="text-align: center; font-size: 2em;">0</p>
<p>H 1.6. Special Habitat Features: (see p. 68) Check the habitat features that are present in the wetland unit. The number of checks is the number of points you put into the next column.</p> <p><input type="checkbox"/> Loose rocks larger than 4" or large, downed, woody debris (>4in. diameter) within the area of surface ponding or in stream.</p> <p><input type="checkbox"/> Cattails or bulrushes are present within the unit.</p> <p><input type="checkbox"/> Standing snags (diameter at the bottom > 4 inches) in the wetland unit or within 30 m (100ft) of the edge.</p> <p><input type="checkbox"/> Emergent or shrub vegetation in areas that are permanently inundated/ponded. <i>The presence of "yellow flag" Iris is a good indicator of vegetation in areas permanently ponded.</i></p> <p><input type="checkbox"/> Stable steep banks of fine material that might be used by beaver or muskrat for denning (>45 degree slope) OR signs of recent beaver activity</p> <p><input type="checkbox"/> Invasive species cover less than 20% in each stratum of vegetation (<i>canopy, sub-canopy, shrubs, herbaceous, moss/ground cover</i>)</p> <p style="text-align: right;"><i>Maximum score possible = 6</i></p>	<p style="text-align: center; font-size: 2em;">0</p>
<p style="text-align: right;">TOTAL Potential to provide habitat <i>Add the scores in the column above</i></p>	<p style="text-align: center; font-size: 2em; border: 2px dashed black;">1</p>

Comments

<p>H 2.0 Does the wetland have the opportunity to provide habitat for many species?</p>	
<p>H 2.1 Buffers (<i>see p. 71</i>) <i>Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of “undisturbed.” Relatively undisturbed also means no grazing, no landscaping, no daily human use, and no structures or paving within undisturbed part of buffer.</i></p> <p><input checked="" type="checkbox"/> 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference Points = 5</p> <p>— 330 ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. Points = 4</p> <p>— 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. Points = 4</p> <p>— 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . Points = 3</p> <p>— 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. Points = 3</p> <p style="text-align: center;">If buffer does not meet any of the criteria above</p> <p>— No paved areas (except paved trails) or buildings within 80ft (25 m) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. Points = 2</p> <p>— No paved areas or buildings within 170ft (50m) of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. Points = 2</p> <p>— Heavy grazing in buffer. Points = 1</p> <p>— Vegetated buffers are <6.6ft wide (2m) for more than 95% of the circumference (e.g . tilled fields, paving, basalt bedrock extend to edge of wetland). Points = 0</p> <p>— Buffer does not meet any of the criteria above. Points = 1</p> <p style="text-align: center;">Aerial photo showing buffers</p>	<p>Figure 16.</p> <p style="text-align: center; font-size: 2em;">5</p>
<p>H 2.2 Wet Corridors (<i>see p. 72</i>)</p> <p>H 2.2.1 Is the wetland unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor at least ¼ mile long with surface water or flowing water throughout most of the year (> 9 months/yr)? (<i>dams, heavily used gravel roads, paved roads, fields tilled to edge of stream, or pasture to edge of stream are considered breaks in the corridor</i>).</p> <p>YES = 4 points (go to H 2.3) <input checked="" type="radio"/> NO = go to H 2.2.2</p> <p>H 2.2.2 Is the unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor, at least ¼ mile long with water flowing seasonally, OR a lake-fringe wetland without a “wet” corridor, OR a riverine wetland without a surface channel connecting to the stream?</p> <p>YES = 2 points (go to H 2.3) <input checked="" type="radio"/> NO go to H 2.2.3</p> <p>H 2.2.3 Is the wetland within a 1/2 mile of any permanent stream, seasonal stream, or lake (<i>do not include man-made ditches</i>)?</p> <p><input checked="" type="radio"/> YES = 1 point NO = 0 points</p>	<p style="text-align: center; font-size: 2em;">1</p>

H 2.3 Near or adjacent to other priority habitats listed by WDFW (see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report <http://wdfw.wa.gov/hab/phslist.htm>)

Which of the following priority habitats are within 330ft (100m) of the wetland unit? *NOTE: the connections to the habitats can be disturbed.*

- Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acre).
- Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report p. 152*).
- Eastside Steppe:** Non-forested vegetation type dominated by broadleaf herbaceous flora (*full description of herbaceous species found here are in WDFW PHS report p. 153*).
- Old-growth/Mature forests (east of Cascade crest):** (*full descriptions in WDFW PHS report p. 157*). **Old-growth:** Stands are > 150 yrs in age; may be variable in tree species composition and structural characteristics due to the influence of fire, climate, and soils. **Mature:** Stands 80 – 160 yrs old. Decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth.
- Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158*).
- Juniper Savannah:** All juniper woodlands (*SE part of state only; check map*)
- Shrub-steppe:** A nonforested vegetation type consisting of one or more layers of perennial bunchgrasses and a conspicuous but discontinuous layer of shrubs (see Eastside Steppe for sites with little or no shrub cover).
- Riparian:** The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- Inland Dunes** This placeholder is for a new priority habitat that will capture areas known as Inland Dunes. A definition will be developed later in Fall 2008. (*check WDFW web site*)
- Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
- Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
- Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft.
- Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 30 cm (12 in) in eastern Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long.

If wetland has **2 or more** Priority Habitats = **4 points**
 If wetland has **1** Priority Habitat = **2 points**
 No Priority habitats = **0 points**

0

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)

<p>H 2.4 <u>Landscape</u> (choose the one description of the landscape around the wetland that best fits) (see p. 76)</p> <p>— The wetland unit is in an area where annual rainfall is less than 12 inches, and its water regime is not influenced by irrigation practices, dams, or water control structures. (Generally, this x means outside boundaries of reclamation areas, irrigation district, or reservoirs) points = 5</p> <p>— There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing in the connection or an open water connection along a lake shore without heavy boat traffic are OK, but connections should NOT be bisected by paved roads, fill, fields, heavy boat traffic or other development) points = 5</p> <p>— There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed? points = 2</p> <p>— There is at least 1 wetland within ½ mile. points = 1</p> <p>— Does not meet any of the four criteria above points = 0</p>	5
<p>H 2. TOTAL Score - opportunity for providing habitat Add the scores in the column above</p>	11
<p>H 3.0 Does the wetland unit have indicators that its ability to provide habitat is reduced?</p>	
<p>H 3.1 <u>Indicator of reduced habitat functions</u> (see p. 75)</p> <p>Do the areas of open water in the wetland unit have a resident population of carp (see text for indicators of the presence of carp)? (NOTE: This question does not apply to reservoirs with water levels controlled by dams, such as the reservoirs on the Columbia and Snake Rivers)</p> <p style="text-align: center;">YES = - 5 points <u>NO</u> = 0 points</p>	<p>Points will be subtracted</p> <p>0</p>
<p>Total Score for Habitat Functions – add the points for H 1, H 2, and H 3 and record the result on p. 1</p>	12

Comments

<p>SC 5.0 Forested Wetlands (see p. 85)</p> <p>Does the wetland unit have an area of forest (<i>you should have identified a forested class, if present, in question H 1.1</i>) rooted within its boundary that meet at least one of the following three criteria?</p> <ul style="list-style-type: none"> — The wetland is within the “100 year” floodplain of a river or stream — aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant of the “woody” vegetation. (<i>Dominants means it represents at least 50% of the cover of woody species, co-dominant means it represents at least 20% of the total cover of woody species</i>) — There is at least ¼ acre of trees (even in wetlands smaller than 2.5 acres) that are “mature” or “old-growth” according to the definitions for these priority habitats developed by WDFW (<i>see p. 83</i>) <p>YES = go to SC 5.1 NO <i>not a forested wetland with special characteristics</i></p>	
<p>SC 5.1 Does the wetland unit have a forest canopy where more than 50% of the tree species (by cover) are slow growing native trees</p> <p>Slow growing trees are: western red cedar (<i>Thuja plicata</i>), Alaska yellow cedar (<i>Chamaecyparis nootkatensis</i>), pine spp. mostly “white” pine (<i>Pinus monticola</i>), western hemlock (<i>Tsuga heterophylla</i>), Englemann spruce (<i>Picea engelmannii</i>).</p> <p>YES = Category I NO = go to SC 5.2</p>	<p>Cat. I</p>
<p>SC 5.2 Does the unit have areas where aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant species?</p> <p>YES = Category I NO = go to SC 5.3</p>	<p>Cat. I</p>
<p>SC 5.3 Does the wetland unit have areas with a forest canopy where more than 50% of the tree species (by cover) are fast growing species.</p> <p>Fast growing species are:</p> <p>Alders – red (<i>Alnus rubra</i>), thin-leaf (<i>A. tenuifolia</i>)</p> <p>Cottonwoods – narrow-leaf (<i>Populus angustifolia</i>), black (<i>P. balsamifera</i>)</p> <p>Willows- peach-leaf (<i>Salix amygdaloides</i>), Sitka (<i>S. sitchensis</i>), Pacific (<i>S. lasiandra</i>), Aspen - (<i>Populus tremuloides</i>), Water Birch (<i>Betula occidentalis</i>)</p> <p>YES = Category II NO = go to SC 5.5</p>	<p>Cat. II</p>
<p>SC 5.5 Is the forested component of the wetland within the “100 year floodplain” of a river or stream?</p> <p>YES = Category II</p>	<p>Cat. II</p>
<p>Category of wetland based on Special Characteristics</p> <p><i>Choose the “highest” rating if wetland falls into several categories.</i></p> <p>If you answered NO for all types enter “Not Applicable” on p.1</p>	<p>NA</p>

Wetland name or number W3

WETLAND RATING FORM – EASTERN WASHINGTON

Version 2 - Updated June 2006 to increase accuracy and reproducibility among users
Updated Oct 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): W3 Date of site visit: 6/10/09

Rated by Forrest Parsons/Joel Shaich Trained by Ecology? Yes ___ No X Date of training _____

SEC: 23 TOWNSHIP: 20N RANGE: 16E Is S/T/R in Appendix D? Yes ___ No X

Map of wetland unit: Figure _____ Estimated size 0.03 acre

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I ___ II ___ III X IV ___

Category I = Score >=70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for "Water Quality" Functions	11
Score for Hydrologic Functions	20
Score for Habitat Functions	11
TOTAL score for functions	42

Category based on SPECIAL CHARACTERISTICS of wetland

I ___ II ___ III ___ Does not Apply X

Final Category (choose the "highest" category from above)

3

Summary of basic information about the wetland unit

Wetland Type		Wetland Class	
Vernal Pool		Depressional	X
Alkali		Riverine	
Natural Heritage Wetland		Lake-fringe	
Bog		Slope	
Forest			
None of the above	X	Check if unit has multiple HGM classes present	

Does the wetland being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That Need Special Protection, and That Are Not Included in the Rating	YES	NO
<p>SP1. <i>Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered animal or plant species (T/E species)?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.</p>		X
<p>SP2. <i>Has the wetland unit been documented as habitat for any State listed Threatened or Endangered animal species?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands (see p. 19 of data form).</p>		X
<p>SP3. <i>Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?</i></p>		X
<p>SP4. <i>Does the wetland unit have a local significance in addition to its functions?</i> For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.</p>		X

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 20 for more detailed instructions on classifying wetlands.

Classification of Vegetated Wetlands for Eastern Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Does the entire wetland unit **meet both** of the following criteria?

The vegetated part of the wetland is on the shores of a body of open water (without any vegetation on the surface) at least 20 acres (8 ha) in size;

At least 30% of the open water area is deeper than 3 m (10 ft)?

NO - go to Step 2 **YES** - The wetland class is **Lake-fringe (lacustrine fringe)**

2. Does the entire wetland unit **meet all** of the following criteria?

The wetland is on a slope (*slope can be very gradual*),

The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.

The water leaves the wetland **without being impounded**?

NOTE: *Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a foot deep).*

NO - go to Step 3 **YES** - The wetland class is **Slope**

3. Is the entire wetland unit in a valley or stream channel where it gets inundated by overbank flooding from that stream or river? In general, the flooding should occur at least once every ten years to answer "yes." *The wetland can contain depressions that are filled with water when the river is not flooding.*

NO - go to Step 4 **YES** - The wetland class is **Riverine**

4. Is the entire wetland unit in a topographic depression, outside areas that are inundated by overbank flooding, in which water ponds, or is saturated to the surface, at some time of the year. *This means that any outlet, if present, is higher than the interior of the wetland.*

NO - go to Step 5 **YES** - The wetland class is **Depressional**

5. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

Wetland name or number W3

HGM Classes Within One Delineated Wetland Boundary	Class to Use for Rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine (riverine is within boundary of depression)	Depressional
Depressional + Lake-fringe	Depressional

If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

D Depressional Wetlands		Points
WATER QUALITY FUNCTIONS - Indicators that the wetland functions to improve water quality		(only 1 score per box)
D	D 1.0 Does the wetland unit have the <u>potential</u> to improve water quality?	(see p. 38)
D	D 1.1 Characteristics of surface water flows out of the wetland unit: Wetland has no surface water outlet - points = 5 Wetland has an intermittently flowing outlet points = 3 Wetland has a highly constricted permanently flowing outlet points = 3 Wetland has a permanently flowing surface outlet points = 1	3
D	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (use NRCS definitions of soil types) YES points = 3 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class) Wetland has persistent, ungrazed, vegetation for > 2/3 of area points = 5 Wetland has persistent, ungrazed, vegetation from 1/3 to 2/3 of area points = 3 Wetland has persistent, ungrazed vegetation from 1/10 to < 1/3 of area points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area points = 0 Map of Cowardin vegetation classes	Figure 2 5
D	D 1.4 Characteristics of seasonal ponding or inundation. <i>This is the area of ponding that fluctuates every year. Do not count the area that is permanently ponded.</i> Area seasonally ponded is > 1/2 total area of wetland points = 3 Area seasonally ponded is 1/4 - 1/2 total area of wetland points = 1 Area seasonally ponded is < 1/4 total area of wetland points = 0 NOTE: See text for indicators of seasonal and permanent inundation/flooding. Map of Hydroperiods	Figure 8 3
D	Total for D 1 Add the points in the boxes above	11
D	D 2. Does the wetland unit have the <u>opportunity</u> to improve water quality? Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity. — Grazing in the wetland or within 150 ft — Untreated stormwater discharges to wetland — Tilled fields or orchards within 150 ft of wetland — A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging — Residential, urban areas, golf courses are within 150 ft of wetland — Wetland is fed by groundwater high in phosphorus or nitrogen — Other _____ YES multiplier is 2 NO multiplier is 1	multiplier <u>1</u>
D	TOTAL - Water Quality Functions Multiply the score from D1 by the multiplier in D2 <i>Record score on p. 1 of field form</i>	11

These questions apply to wetlands of all HGM classes.		Points (only 1 score per box)								
HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat										
H 1. Does the wetland unit have the <u>potential</u> to provide habitat for many species?										
<p>H 1.1 <u>Categories of vegetation structure</u> (see p.62) Check the vegetation classes (as defined by Cowardin) and heights of emergents present. Size threshold for each class or height category is ¼ acre or more than 10% of the area if unit is < 2.5 acres.</p> <p> <input type="checkbox"/> Aquatic bed <input checked="" type="checkbox"/> Emergent plants 0-12 in. (0 – 30 cm) high are the highest layer and have > 30% cover <input type="checkbox"/> Emergent plants >12 – 40 in.(>30 – 100cm) high are the highest layer with >30% cover <input type="checkbox"/> Emergent plants > 40 in.(> 100cm) high are the highest layer with >30% cover <input type="checkbox"/> Scrub/shrub (areas where shrubs have >30% cover) <input type="checkbox"/> Forested (areas where trees have >30% cover) </p> <p>Add the number of vegetation types that qualify. If you have:</p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td>4-6 types</td> <td>points = 3</td> </tr> <tr> <td>3 types</td> <td>points = 2</td> </tr> <tr> <td>2 types</td> <td>points = 1</td> </tr> <tr> <td>1 type</td> <td>points = 0</td> </tr> </table> <p>Map of Cowardin vegetation classes and areas with different heights of emergents</p>		4-6 types	points = 3	3 types	points = 2	2 types	points = 1	1 type	points = 0	<p>Figure 2</p> <p style="text-align: center; font-size: 2em;">0</p>
4-6 types	points = 3									
3 types	points = 2									
2 types	points = 1									
1 type	points = 0									
<p>H 1.2. Is one of the vegetation types “aquatic bed?” (see p .64) YES = 1 point NO = 0 points</p>		0								
<p>H 1.3. <u>Surface Water</u> (see p.65)</p> <p>H 1.3.1 Does the unit have areas of “open” water (without herbaceous or shrub plants) over at least ¼ acre or 10% of its area during the spring (March – early June) OR in early fall (August – end of September)? <i>Note: answer YES for Lake-fringe wetlands</i> YES = 3 points & go to H 1.4 NO = go to H 1.3.2</p> <p>H 1.3.2 Does the unit have an intermittent or permanent stream within its boundaries, or along one side, over at least ¼ acre or 10% of its area, AND that has an unvegetated bottom (answer yes only if H 1.3.1 is NO)? YES = 3 points NO = 0 points Map showing areas of open water</p>		<p>Figure 8</p> <p style="text-align: center; font-size: 2em;">0</p>								
<p>H 1.4. <u>Richness of Plant Species</u> (see p. 66) Count the number of plant species in the wetland that cover at least 10 ft². (different patches of the same species can be combined to meet the size threshold) You do not have to name the species. Do not include Eurasean Milfoil, reed canarygrass, purple loosestrife, Russian Olive, Phragmites ,Canadian Thistle, Yellow-flag Iris, and Salt Cedar (Tamarisk)</p> <p>If you counted: > 9 species points = 2 4-9 species points = 1 # of species <u>3</u> < 4 species points = 0 points</p> <p>List species below if you wish</p>		0								

<p>H 1.5. Interspersion of habitats (see p. 67) Decided from the diagrams below whether interspersion between categories of vegetation (described in H 1.1), or categories and un-vegetated areas (can include open water or mudflats) is high, medium, low, or none.</p> <p>None = 0 points Low = 1 point Moderate = 2 points Moderate = 2 points</p> <p>High = 3 points High = 3 points [Riparian braided channel]</p> <p>NOTE: If you have four or more vegetation categories or three vegetation categories and open water the rating is always "high". Use maps from H1.1 and H1.3</p>	<p>Figure 2</p> <p style="text-align: center; font-size: 2em;">0</p>
<p>H 1.6. Special Habitat Features: (see p. 68) Check the habitat features that are present in the wetland unit. The number of checks is the number of points you put into the next column.</p> <p><input type="checkbox"/> Loose rocks larger than 4" or large, downed, woody debris (>4in. diameter) within the area of surface ponding or in stream.</p> <p><input type="checkbox"/> Cattails or bulrushes are present within the unit.</p> <p><input type="checkbox"/> Standing snags (diameter at the bottom > 4 inches) in the wetland unit or within 30 m (100ft) of the edge.</p> <p><input type="checkbox"/> Emergent or shrub vegetation in areas that are permanently inundated/ponded. The presence of "yellow flag" <i>Iris</i> is a good indicator of vegetation in areas permanently ponded.</p> <p><input type="checkbox"/> Stable steep banks of fine material that might be used by beaver or muskrat for denning (>45 degree slope) OR signs of recent beaver activity</p> <p><input type="checkbox"/> Invasive species cover less than 20% in each stratum of vegetation (<i>canopy, sub-canopy, shrubs, herbaceous, moss/ground cover</i>)</p> <p style="text-align: right;">Maximum score possible = 6</p>	<p style="text-align: center; font-size: 2em;">0</p>
<p style="text-align: right;">TOTAL Potential to provide habitat Add the scores in the column above</p>	<p style="text-align: center; font-size: 2em; border: 2px dashed black;">0</p>

Comments

<p>H 2.0 Does the wetland have the opportunity to provide habitat for many species?</p>	
<p>H 2.1 Buffers (<i>see p. 71</i>) <i>Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of “undisturbed.” Relatively undisturbed also means no grazing, no landscaping, no daily human use, and no structures or paving within undisturbed part of buffer.</i></p> <p><input checked="" type="checkbox"/> 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference Points = 5</p> <p>— 330 ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. Points = 4</p> <p>— 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. Points = 4</p> <p>— 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . Points = 3</p> <p>— 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. Points = 3</p> <p style="text-align: center;">If buffer does not meet any of the criteria above</p> <p>— No paved areas (except paved trails) or buildings within 80ft (25 m) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. Points = 2</p> <p>— No paved areas or buildings within 170ft (50m) of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. Points = 2</p> <p>— Heavy grazing in buffer. Points = 1</p> <p>— Vegetated buffers are <6.6ft wide (2m) for more than 95% of the circumference (e.g . tilled fields, paving, basalt bedrock extend to edge of wetland). Points = 0</p> <p>— Buffer does not meet any of the criteria above. Points = 1</p> <p style="text-align: center;">Aerial photo showing buffers</p>	<p>Figure 14</p> <p style="text-align: center; font-size: 2em;">5</p>
<p>H 2.2 Wet Corridors (<i>see p. 72</i>)</p> <p>H 2.2.1 Is the wetland unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor at least ¼ mile long with surface water or flowing water throughout most of the year (> 9 months/yr)? (<i>dams, heavily used gravel roads, paved roads, fields tilled to edge of stream, or pasture to edge of stream are considered breaks in the corridor</i>).</p> <p>YES = 4 points (go to H 2.3) <input checked="" type="radio"/> NO = go to H 2.2.2</p> <p>H 2.2.2 Is the unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor, at least ¼ mile long with water flowing seasonally, OR a lake-fringe wetland without a “wet” corridor, OR a riverine wetland without a surface channel connecting to the stream?</p> <p>YES = 2 points (go to H 2.3) <input checked="" type="radio"/> NO go to H 2.2.3</p> <p>H 2.2.3 Is the wetland within a 1/2 mile of any permanent stream, seasonal stream, or lake (<i>do not include man-made ditches</i>)?</p> <p><input checked="" type="radio"/> YES = 1 point NO = 0 points</p>	<p style="text-align: center; font-size: 2em;">1</p>

<p>H 2.3 <u>Near or adjacent to other priority habitats listed by WDFW (see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report http://wdfw.wa.gov/hab/phslist.htm)</u></p> <p>Which of the following priority habitats are within 330ft (100m) of the wetland unit? <i>NOTE: the connections to the habitats can be disturbed.</i></p> <p><input type="checkbox"/> Aspen Stands: Pure or mixed stands of aspen greater than 0.4 ha (1 acre).</p> <p><input type="checkbox"/> Biodiversity Areas and Corridors: Areas of habitat that are relatively important to various species of native fish and wildlife (full descriptions in WDFW PHS report p. 152).</p> <p><input type="checkbox"/> Eastside Steppe: Non-forested vegetation type dominated by broadleaf herbaceous flora (full description of herbaceous species found here are in WDFW PHS report p. 153).</p> <p><input type="checkbox"/> Old-growth/Mature forests (east of Cascade crest): (full descriptions in WDFW PHS report p. 157). <u>Old-growth:</u> Stands are > 150 yrs in age; may be variable in tree species composition and structural characteristics due to the influence of fire, climate, and soils. <u>Mature:</u> Stands 80 – 160 yrs old. Decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth.</p> <p><input type="checkbox"/> Oregon white Oak: Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (full descriptions in WDFW PHS report p. 158).</p> <p><input type="checkbox"/> Juniper Savannah: All juniper woodlands (SE part of state only; check map)</p> <p><input type="checkbox"/> Shrub-steppe: A nonforested vegetation type consisting of one or more layers of perennial bunchgrasses and a conspicuous but discontinuous layer of shrubs (see Eastside Steppe for sites with little or no shrub cover).</p> <p><input type="checkbox"/> Riparian: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.</p> <p><input type="checkbox"/> Inland Dunes This placeholder is for a new priority habitat that will capture areas known as Inland Dunes. A definition will be developed later in Fall 2008. (check WDFW web site)</p> <p><input type="checkbox"/> Instream: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.</p> <p><input type="checkbox"/> Caves: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.</p> <p><input type="checkbox"/> Cliffs: Greater than 7.6 m (25 ft) high and occurring below 5000 ft.</p> <p><input type="checkbox"/> Talus: Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.</p> <p><input type="checkbox"/> Snags and Logs: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 30 cm (12 in) in eastern Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long.</p> <p style="text-align: right;">If wetland has 2 or more Priority Habitats = 4 points If wetland has 1 Priority Habitat = 2 points No Priority habitats = 0 points</p> <p><i>Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)</i></p>	<p>0</p>
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<p>H 2.4 <u>Landscape</u> (choose the one description of the landscape around the wetland that best fits) (see p. 76)</p> <ul style="list-style-type: none"> — The wetland unit is in an area where annual rainfall is less than 12 inches, and its water regime is not influenced by irrigation practices, dams, or water control structures. (Generally, this x means outside boundaries of reclamation areas, irrigation district, or reservoirs) points = 5 — There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing in the connection or an open water connection along a lake shore without heavy boat traffic are OK, but connections should NOT be bisected by paved roads, fill, fields, heavy boat traffic or other development) points = 5 — There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed? points = 2 — There is at least 1 wetland within ½ mile. points = 1 — Does not meet any of the four criteria above points = 0 	5
<p>H 2. TOTAL Score - opportunity for providing habitat Add the scores in the column above</p>	11
<p>H 3.0 Does the wetland unit have indicators that its ability to provide habitat is reduced?</p>	
<p>H 3.1 <u>Indicator of reduced habitat functions</u> (see p. 75) Do the areas of open water in the wetland unit have a resident population of carp (see text for indicators of the presence of carp)? (NOTE: This question does not apply to reservoirs with water levels controlled by dams, such as the reservoirs on the Columbia and Snake Rivers)</p> <p style="text-align: center;">YES = - 5 points <u>NO</u> = 0 points</p>	<p>Points will be subtracted</p> <p>0</p>
<p>Total Score for Habitat Functions – add the points for H 1, H 2, and H 3 and record the result on p. 1</p>	11

Comments

<p>SC 5.0 Forested Wetlands (see p. 85)</p> <p>Does the wetland unit have an area of forest (<i>you should have identified a forested class, if present, in question H 1.1</i>) rooted within its boundary that meet at least one of the following three criteria?</p> <ul style="list-style-type: none"> — The wetland is within the “100 year” floodplain of a river or stream — aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant of the “woody” vegetation. (<i>Dominants means it represents at least 50% of the cover of woody species, co-dominant means it represents at least 20% of the total cover of woody species</i>) — There is at least ¼ acre of trees (even in wetlands smaller than 2.5 acres) that are “mature” or “old-growth” according to the definitions for these priority habitats developed by WDFW (<i>see p. 83</i>) <p>YES = go to SC 5.1 NO – <i>not a forested wetland with special characteristics</i></p>	
<p>SC 5.1 Does the wetland unit have a forest canopy where more than 50% of the tree species (by cover) are slow growing native trees</p> <p>Slow growing trees are: western red cedar (<i>Thuja plicata</i>), Alaska yellow cedar (<i>Chamaecyparis nootkatensis</i>), pine spp. mostly “white” pine (<i>Pinus monticola</i>), western hemlock (<i>Tsuga heterophylla</i>), Englemann spruce (<i>Picea engelmannii</i>).</p> <p>YES = Category I NO = go to SC 5.2</p>	<p>Cat. I</p>
<p>SC 5.2 Does the unit have areas where aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant species?</p> <p>YES = Category I NO = go to SC 5.3</p>	<p>Cat. I</p>
<p>SC 5.3 Does the wetland unit have areas with a forest canopy where more than 50% of the tree species (by cover) are fast growing species.</p> <p>Fast growing species are:</p> <p>Alders – red (<i>Alnus rubra</i>), thin-leaf (<i>A. tenuifolia</i>)</p> <p>Cottonwoods – narrow-leaf (<i>Populus angustifolia</i>), black (<i>P. balsamifera</i>)</p> <p>Willows- peach-leaf (<i>Salix amygdaloides</i>), Sitka (<i>S. sitchensis</i>), Pacific (<i>S. lasiandra</i>), Aspen - (<i>Populus tremuloides</i>), Water Birch (<i>Betula occidentalis</i>)</p> <p>YES = Category II NO = go to SC 5.5</p>	<p>Cat. II</p>
<p>SC 5.5 Is the forested component of the wetland within the “100 year floodplain” of a river or stream?</p> <p>YES = Category II</p>	<p>Cat. II</p>
<p>Category of wetland based on Special Characteristics</p> <p><i>Choose the “highest” rating if wetland falls into several categories.</i></p> <p>If you answered NO for all types enter “Not Applicable” on p.1</p>	<p>NA</p>

Wetland name or number W4

WETLAND RATING FORM – EASTERN WASHINGTON

Version 2 - Updated June 2006 to increase accuracy and reproducibility among users
Updated Oct 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): W4 Date of site visit: 6/10/09

Rated by Forrest Parsons/Joel Shaich Trained by Ecology? Yes ___ No X Date of training _____

SEC: 23 TOWNSHIP: 20N RANGE: 16E Is S/T/R in Appendix D? Yes ___ No X

Map of wetland unit: Figure _____ Estimated size 0.067 acre

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I ___ II ___ III X IV ___

Category I = Score >=70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for "Water Quality" Functions	11
Score for Hydrologic Functions	20
Score for Habitat Functions	11
TOTAL score for functions	42

Category based on SPECIAL CHARACTERISTICS of wetland

I ___ II ___ III ___ Does not Apply X

Final Category (choose the "highest" category from above)

3

Summary of basic information about the wetland unit

Wetland Type		Wetland Class	
Vernal Pool		Depressional	X
Alkali		Riverine	
Natural Heritage Wetland		Lake-fringe	
Bog		Slope	
Forest			
None of the above	X	Check if unit has multiple HGM classes present	

Does the wetland being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That Need Special Protection, and That Are Not Included in the Rating	YES	NO
<p>SP1. <i>Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered animal or plant species (T/E species)?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.</p>		X
<p>SP2. <i>Has the wetland unit been documented as habitat for any State listed Threatened or Endangered animal species?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands (see p. 19 of data form).</p>		X
<p>SP3. <i>Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?</i></p>		X
<p>SP4. <i>Does the wetland unit have a local significance in addition to its functions?</i> For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.</p>		X

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 20 for more detailed instructions on classifying wetlands.

Classification of Vegetated Wetlands for Eastern Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Does the entire wetland unit **meet both** of the following criteria?

The vegetated part of the wetland is on the shores of a body of open water (without any vegetation on the surface) at least 20 acres (8 ha) in size;

At least 30% of the open water area is deeper than 3 m (10 ft)?

NO - go to Step 2 **YES** - The wetland class is **Lake-fringe (lacustrine fringe)**

2. Does the entire wetland unit **meet all** of the following criteria?

The wetland is on a slope (*slope can be very gradual*),

The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.

The water leaves the wetland **without being impounded**?

NOTE: *Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a foot deep).*

NO - go to Step 3 **YES** - The wetland class is **Slope**

3. Is the entire wetland unit in a valley or stream channel where it gets inundated by overbank flooding from that stream or river? In general, the flooding should occur at least once every ten years to answer "yes." *The wetland can contain depressions that are filled with water when the river is not flooding.*

NO - go to Step 4 **YES** - The wetland class is **Riverine**

4. Is the entire wetland unit in a topographic depression, outside areas that are inundated by overbank flooding, in which water ponds, or is saturated to the surface, at some time of the year. *This means that any outlet, if present, is higher than the interior of the wetland.*

NO - go to Step 5 **YES** - The wetland class is **Depressional**

5. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

Wetland name or number W4

HGM Classes Within One Delineated Wetland Boundary	Class to Use for Rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine (riverine is within boundary of depression)	Depressional
Depressional + Lake-fringe	Depressional

If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

D Depressional Wetlands		Points
WATER QUALITY FUNCTIONS - Indicators that the wetland functions to improve water quality		(only 1 score per box)
D	D 1.0 Does the wetland unit have the <u>potential</u> to improve water quality?	(see p. 38)
D	D 1.1 Characteristics of surface water flows out of the wetland unit: Wetland has no surface water outlet - points = 5 Wetland has an intermittently flowing outlet points = 3 Wetland has a highly constricted permanently flowing outlet points = 3 Wetland has a permanently flowing surface outlet points = 1	3
D	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (<i>use NRCS definitions of soil types</i>) YES points = 3 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class) Wetland has persistent, ungrazed, vegetation for > 2/3 of area points = 5 Wetland has persistent, ungrazed, vegetation from 1/3 to 2/3 of area points = 3 Wetland has persistent, ungrazed vegetation from 1/10 to < 1/3 of area points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area points = 0 Map of Cowardin vegetation classes	Figure 1 5
D	D 1.4 Characteristics of seasonal ponding or inundation. <i>This is the area of ponding that fluctuates every year. Do not count the area that is permanently ponded.</i> Area seasonally ponded is > 1/2 total area of wetland points = 3 Area seasonally ponded is 1/4 - 1/2 total area of wetland points = 1 Area seasonally ponded is < 1/4 total area of wetland points = 0 NOTE: See text for indicators of seasonal and permanent inundation/flooding. Map of Hydroperiods	Figure 7 3
D	Total for D 1 <i>Add the points in the boxes above</i>	11
D	D 2. Does the wetland unit have the <u>opportunity</u> to improve water quality? Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. <i>Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.</i> — Grazing in the wetland or within 150 ft — Untreated stormwater discharges to wetland — Tilled fields or orchards within 150 ft of wetland — A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging — Residential, urban areas, golf courses are within 150 ft of wetland — Wetland is fed by groundwater high in phosphorus or nitrogen — Other _____ YES multiplier is 2 NO multiplier is 1	multiplier <u>1</u>
D	TOTAL - Water Quality Functions Multiply the score from D1 by the multiplier in D2 <i>Record score on p. 1 of field form</i>	11

These questions apply to wetlands of all HGM classes.		Points (only 1 score per box)								
HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat										
H 1. Does the wetland unit have the <u>potential</u> to provide habitat for many species?										
<p>H 1.1 Categories of vegetation structure (see p.62) Check the vegetation classes (as defined by Cowardin) and heights of emergents present. Size threshold for each class or height category is ¼ acre or more than 10% of the area if unit is < 2.5 acres.</p> <p> <input type="checkbox"/> Aquatic bed <input checked="" type="checkbox"/> Emergent plants 0-12 in. (0 – 30 cm) high are the highest layer and have > 30% cover <input type="checkbox"/> Emergent plants >12 – 40 in.(>30 – 100cm) high are the highest layer with >30% cover <input type="checkbox"/> Emergent plants > 40 in.(> 100cm) high are the highest layer with >30% cover <input type="checkbox"/> Scrub/shrub (areas where shrubs have >30% cover) <input type="checkbox"/> Forested (areas where trees have >30% cover) </p> <p>Add the number of vegetation types that qualify. If you have:</p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td>4-6 types</td> <td>points = 3</td> </tr> <tr> <td>3 types</td> <td>points = 2</td> </tr> <tr> <td>2 types</td> <td>points = 1</td> </tr> <tr> <td>1 type</td> <td>points = 0</td> </tr> </table>		4-6 types	points = 3	3 types	points = 2	2 types	points = 1	1 type	points = 0	Figure 1
4-6 types	points = 3									
3 types	points = 2									
2 types	points = 1									
1 type	points = 0									
Map of Cowardin vegetation classes and areas with different heights of emergents		0								
<p>H 1.2. Is one of the vegetation types “aquatic bed?” (see p .64) YES = 1 point NO = 0 points</p>		0								
<p>H 1.3. Surface Water (see p.65)</p> <p>H 1.3.1 Does the unit have areas of “open” water (without herbaceous or shrub plants) over at least ¼ acre or 10% of its area during the spring (March – early June) OR in early fall (August – end of September)? <i>Note: answer YES for Lake-fringe wetlands</i> YES = 3 points & go to H 1.4 NO = go to H 1.3.2</p> <p>H 1.3.2 Does the unit have an intermittent or permanent stream within its boundaries, or along one side, over at least ¼ acre or 10% of its area, AND that has an unvegetated bottom (<i>answer yes only if H 1.3.1 is NO</i>)? YES = 3 points NO = 0 points</p> <p style="text-align: center;">Map showing areas of open water</p>		Figure 7 0								
<p>H 1.4. Richness of Plant Species (see p. 66) Count the number of plant species in the wetland that cover at least 10 ft². (<i>different patches of the same species can be combined to meet the size threshold</i>) You do not have to name the species. Do not include Eurasean Milfoil, reed canarygrass, purple loosestrife, Russian Olive, Phragmites ,Canadian Thistle, Yellow-flag Iris, and Salt Cedar (Tamarisk)</p> <p>If you counted: > 9 species points = 2 4-9 species points = 1 # of species <u>2</u> < 4 species points = 0 points</p> <p>List species below if you wish</p>		0								

<p>H 1.5. Interspersion of habitats (see p. 67) Decided from the diagrams below whether interspersion between categories of vegetation (described in H 1.1), or categories and un-vegetated areas (can include open water or mudflats) is high, medium, low, or none.</p> <p>None = 0 points Low = 1 point Moderate = 2 points Moderate = 2 points</p> <p>High = 3 points High = 3 points [Riparian braided channel]</p> <p>NOTE: If you have four or more vegetation categories or three vegetation categories and open water the rating is always "high". Use maps from H1.1 and H1.3</p>	<p>Figure 4</p> <p style="text-align: center; font-size: 2em;">0</p>
<p>H 1.6. Special Habitat Features: (see p. 68) Check the habitat features that are present in the wetland unit. The number of checks is the number of points you put into the next column.</p> <p><input type="checkbox"/> Loose rocks larger than 4" or large, downed, woody debris (>4in. diameter) within the area of surface ponding or in stream.</p> <p><input type="checkbox"/> Cattails or bulrushes are present within the unit.</p> <p><input type="checkbox"/> Standing snags (diameter at the bottom > 4 inches) in the wetland unit or within 30 m (100ft) of the edge.</p> <p><input type="checkbox"/> Emergent or shrub vegetation in areas that are permanently inundated/ponded. <i>The presence of "yellow flag" Iris is a good indicator of vegetation in areas permanently ponded.</i></p> <p><input type="checkbox"/> Stable steep banks of fine material that might be used by beaver or muskrat for denning (>45 degree slope) OR signs of recent beaver activity</p> <p><input type="checkbox"/> Invasive species cover less than 20% in each stratum of vegetation (<i>canopy, sub-canopy, shrubs, herbaceous, moss/ground cover</i>)</p> <p style="text-align: right;"><i>Maximum score possible = 6</i></p>	<p style="text-align: center; font-size: 2em;">0</p>
<p style="text-align: right;">TOTAL Potential to provide habitat <i>Add the scores in the column above</i></p>	<p style="text-align: center; font-size: 2em; border: 2px dashed black;">0</p>

Comments

<p>H 2.0 Does the wetland have the opportunity to provide habitat for many species?</p>	
<p>H 2.1 Buffers (<i>see p. 71</i>) <i>Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of “undisturbed.” Relatively undisturbed also means no grazing, no landscaping, no daily human use, and no structures or paving within undisturbed part of buffer.</i></p> <p><input checked="" type="checkbox"/> 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference Points = 5</p> <p>— 330 ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. Points = 4</p> <p>— 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. Points = 4</p> <p>— 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . Points = 3</p> <p>— 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. Points = 3</p> <p style="text-align: center;">If buffer does not meet any of the criteria above</p> <p>— No paved areas (except paved trails) or buildings within 80ft (25 m) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. Points = 2</p> <p>— No paved areas or buildings within 170ft (50m) of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. Points = 2</p> <p>— Heavy grazing in buffer. Points = 1</p> <p>— Vegetated buffers are <6.6ft wide (2m) for more than 95% of the circumference (e.g . tilled fields, paving, basalt bedrock extend to edge of wetland). Points = 0</p> <p>— Buffer does not meet any of the criteria above. Points = 1</p> <p style="text-align: center;">Aerial photo showing buffers</p>	<p>Figure 13</p> <p style="text-align: center; font-size: 2em;">5</p>
<p>H 2.2 Wet Corridors (<i>see p. 72</i>)</p> <p>H 2.2.1 Is the wetland unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor at least ¼ mile long with surface water or flowing water throughout most of the year (> 9 months/yr)? (<i>dams, heavily used gravel roads, paved roads, fields tilled to edge of stream, or pasture to edge of stream are considered breaks in the corridor</i>).</p> <p>YES = 4 points (go to H 2.3) <input type="radio"/> NO = go to H 2.2.2</p> <p>H 2.2.2 Is the unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor, at least ¼ mile long with water flowing seasonally, OR a lake-fringe wetland without a “wet” corridor, OR a riverine wetland without a surface channel connecting to the stream?</p> <p>YES = 2 points (go to H 2.3) <input type="radio"/> NO go to H 2.2.3</p> <p>H 2.2.3 Is the wetland within a 1/2 mile of any permanent stream, seasonal stream, or lake (<i>do not include man-made ditches</i>)?</p> <p><input checked="" type="radio"/> YES = 1 point NO = 0 points</p>	<p style="text-align: center; font-size: 2em;">1</p>

H 2.3 Near or adjacent to other priority habitats listed by WDFW (see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report <http://wdfw.wa.gov/hab/phslist.htm>)

Which of the following priority habitats are within 330ft (100m) of the wetland unit? *NOTE: the connections to the habitats can be disturbed.*

- Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acre).
- Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report p. 152*).
- Eastside Steppe:** Non-forested vegetation type dominated by broadleaf herbaceous flora (*full description of herbaceous species found here are in WDFW PHS report p. 153*).
- Old-growth/Mature forests (east of Cascade crest):** (*full descriptions in WDFW PHS report p. 157*). **Old-growth:** Stands are > 150 yrs in age; may be variable in tree species composition and structural characteristics due to the influence of fire, climate, and soils. **Mature:** Stands 80 – 160 yrs old. Decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth.
- Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158*).
- Juniper Savannah:** All juniper woodlands (*SE part of state only; check map*)
- Shrub-steppe:** A nonforested vegetation type consisting of one or more layers of perennial bunchgrasses and a conspicuous but discontinuous layer of shrubs (see Eastside Steppe for sites with little or no shrub cover).
- Riparian:** The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- Inland Dunes** This placeholder is for a new priority habitat that will capture areas known as Inland Dunes. A definition will be developed later in Fall 2008. (*check WDFW web site*)
- Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
- Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
- Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft.
- Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 30 cm (12 in) in eastern Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long.

If wetland has **2 or more** Priority Habitats = **4 points**
 If wetland has **1** Priority Habitat = **2 points**
 No Priority habitats = **0 points**

0

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)

<p>H 2.4 <u>Landscape</u> (choose the one description of the landscape around the wetland that best fits) (see p. 76)</p> <p>— The wetland unit is in an area where annual rainfall is less than 12 inches, and its water regime is not influenced by irrigation practices, dams, or water control structures. (Generally, this x means outside boundaries of reclamation areas, irrigation district, or reservoirs) points = 5</p> <p>— There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing in the connection or an open water connection along a lake shore without heavy boat traffic are OK, but connections should NOT be bisected by paved roads, fill, fields, heavy boat traffic or other development) points = 5</p> <p>— There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed? points = 2</p> <p>— There is at least 1 wetland within ½ mile. points = 1</p> <p>— Does not meet any of the four criteria above points = 0</p>	<p>5</p>
<p>H 2. TOTAL Score - opportunity for providing habitat Add the scores in the column above</p>	<p>11</p>
<p>H 3.0 Does the wetland unit have indicators that its ability to provide habitat is reduced?</p>	
<p>H 3.1 <u>Indicator of reduced habitat functions</u> (see p. 75) Do the areas of open water in the wetland unit have a resident population of carp (see text for indicators of the presence of carp)? (NOTE: This question does not apply to reservoirs with water levels controlled by dams, such as the reservoirs on the Columbia and Snake Rivers)</p> <p style="text-align: center;">YES = - 5 points <u>NO</u> = 0 points</p>	<p>Points will be subtracted</p> <p>0</p>
<p>Total Score for Habitat Functions – add the points for H 1, H 2, and H 3 and record the result on p. 1</p>	<p>11</p>

Comments

<p>SC 5.0 Forested Wetlands (see p. 85)</p> <p>Does the wetland unit have an area of forest (<i>you should have identified a forested class, if present, in question H 1.1</i>) rooted within its boundary that meet at least one of the following three criteria?</p> <ul style="list-style-type: none"> — The wetland is within the “100 year” floodplain of a river or stream — aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant of the “woody” vegetation. (<i>Dominants means it represents at least 50% of the cover of woody species, co-dominant means it represents at least 20% of the total cover of woody species</i>) — There is at least ¼ acre of trees (even in wetlands smaller than 2.5 acres) that are “mature” or “old-growth” according to the definitions for these priority habitats developed by WDFW (<i>see p. 83</i>) <p>YES = go to SC 5.1 NO <i>not a forested wetland with special characteristics</i></p>	
<p>SC 5.1 Does the wetland unit have a forest canopy where more than 50% of the tree species (by cover) are slow growing native trees</p> <p>Slow growing trees are: western red cedar (<i>Thuja plicata</i>), Alaska yellow cedar (<i>Chamaecyparis nootkatensis</i>), pine spp. mostly “white” pine (<i>Pinus monticola</i>), western hemlock (<i>Tsuga heterophylla</i>), Englemann spruce (<i>Picea engelmannii</i>).</p> <p>YES = Category I NO = go to SC 5.2</p>	<p>Cat. I</p>
<p>SC 5.2 Does the unit have areas where aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant species?</p> <p>YES = Category I NO = go to SC 5.3</p>	<p>Cat. I</p>
<p>SC 5.3 Does the wetland unit have areas with a forest canopy where more than 50% of the tree species (by cover) are fast growing species.</p> <p>Fast growing species are:</p> <p>Alders – red (<i>Alnus rubra</i>), thin-leaf (<i>A. tenuifolia</i>)</p> <p>Cottonwoods – narrow-leaf (<i>Populus angustifolia</i>), black (<i>P. balsamifera</i>)</p> <p>Willows- peach-leaf (<i>Salix amygdaloides</i>), Sitka (<i>S. sitchensis</i>), Pacific (<i>S. lasiandra</i>), Aspen - (<i>Populus tremuloides</i>), Water Birch (<i>Betula occidentalis</i>)</p> <p>YES = Category II NO = go to SC 5.5</p>	<p>Cat. II</p>
<p>SC 5.5 Is the forested component of the wetland within the “100 year floodplain” of a river or stream?</p> <p>YES = Category II</p>	<p>Cat. II</p>
<p>Category of wetland based on Special Characteristics</p> <p><i>Choose the “highest” rating if wetland falls into several categories.</i></p> <p>If you answered NO for all types enter “Not Applicable” on p.1</p>	<p>NA</p>

Wetland name or number W5

WETLAND RATING FORM – EASTERN WASHINGTON

Version 2 - Updated June 2006 to increase accuracy and reproducibility among users
Updated Oct 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): W5 Date of site visit: 6/10/09

Rated by Forrest Parsons/Joel Shaich Trained by Ecology? Yes ___ No X Date of training _____

SEC: 23 TOWNSHIP: 20N RANGE: 16E Is S/T/R in Appendix D? Yes ___ No X

Map of wetland unit: Figure _____ Estimated size 0.004 acre

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I ___ II ___ III X IV ___

Category I = Score >=70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for "Water Quality" Functions	11
Score for Hydrologic Functions	20
Score for Habitat Functions	11
TOTAL score for functions	42

Category based on SPECIAL CHARACTERISTICS of wetland

I ___ II ___ III ___ Does not Apply X

3

Final Category (choose the "highest" category from above)

Summary of basic information about the wetland unit

Wetland Type		Wetland Class	
Vernal Pool		Depressional	X
Alkali		Riverine	
Natural Heritage Wetland		Lake-fringe	
Bog		Slope	
Forest			
None of the above	X	Check if unit has multiple HGM classes present	

Does the wetland being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That Need Special Protection, and That Are Not Included in the Rating	YES	NO
<p>SP1. <i>Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered animal or plant species (T/E species)?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.</p>		X
<p>SP2. <i>Has the wetland unit been documented as habitat for any State listed Threatened or Endangered animal species?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands (see p. 19 of data form).</p>		X
<p>SP3. <i>Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?</i></p>		X
<p>SP4. <i>Does the wetland unit have a local significance in addition to its functions?</i> For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.</p>		X

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 20 for more detailed instructions on classifying wetlands.

Classification of Vegetated Wetlands for Eastern Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Does the entire wetland unit **meet both** of the following criteria?

The vegetated part of the wetland is on the shores of a body of open water (without any vegetation on the surface) at least 20 acres (8 ha) in size;

At least 30% of the open water area is deeper than 3 m (10 ft)?

NO - go to Step 2 **YES** - The wetland class is **Lake-fringe (lacustrine fringe)**

2. Does the entire wetland unit **meet all** of the following criteria?

The wetland is on a slope (*slope can be very gradual*),

The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.

The water leaves the wetland **without being impounded**?

NOTE: *Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a foot deep).*

NO - go to Step 3 **YES** - The wetland class is **Slope**

3. Is the entire wetland unit in a valley or stream channel where it gets inundated by overbank flooding from that stream or river? In general, the flooding should occur at least once every ten years to answer "yes." *The wetland can contain depressions that are filled with water when the river is not flooding.*

NO - go to Step 4 **YES** - The wetland class is **Riverine**

4. Is the entire wetland unit in a topographic depression, outside areas that are inundated by overbank flooding, in which water ponds, or is saturated to the surface, at some time of the year. *This means that any outlet, if present, is higher than the interior of the wetland.*

NO - go to Step 5 **YES** - The wetland class is **Depressional**

5. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

Wetland name or number W5

HGM Classes Within One Delineated Wetland Boundary	Class to Use for Rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine (riverine is within boundary of depression)	Depressional
Depressional + Lake-fringe	Depressional

If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

D Depressional Wetlands		Points
WATER QUALITY FUNCTIONS - Indicators that the wetland functions to improve water quality		(only 1 score per box)
D	D 1.0 Does the wetland unit have the <u>potential</u> to improve water quality?	(see p. 38)
D	D 1.1 Characteristics of surface water flows out of the wetland unit: Wetland has no surface water outlet - points = 5 Wetland has an intermittently flowing outlet points = 3 Wetland has a highly constricted permanently flowing outlet points = 3 Wetland has a permanently flowing surface outlet points = 1	3
D	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (use NRCS definitions of soil types) YES points = 3 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class) Wetland has persistent, ungrazed, vegetation for > 2/3 of area points = 5 Wetland has persistent, ungrazed, vegetation from 1/3 to 2/3 of area points = 3 Wetland has persistent, ungrazed vegetation from 1/10 to < 1/3 of area points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area points = 0 Map of Cowardin vegetation classes	Figure 1 5
D	D 1.4 Characteristics of seasonal ponding or inundation. <i>This is the area of ponding that fluctuates every year. Do not count the area that is permanently ponded.</i> Area seasonally ponded is > 1/2 total area of wetland points = 3 Area seasonally ponded is 1/4 - 1/2 total area of wetland points = 1 Area seasonally ponded is < 1/4 total area of wetland points = 0 NOTE: See text for indicators of seasonal and permanent inundation/flooding. Map of Hydroperiods	Figure 7 3
D	Total for D 1 Add the points in the boxes above	11
D	D 2. Does the wetland unit have the <u>opportunity</u> to improve water quality? Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity. — Grazing in the wetland or within 150 ft — Untreated stormwater discharges to wetland — Tilled fields or orchards within 150 ft of wetland — A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging — Residential, urban areas, golf courses are within 150 ft of wetland — Wetland is fed by groundwater high in phosphorus or nitrogen — Other _____ YES multiplier is 2 NO multiplier is 1	multiplier <u>1</u>
D	TOTAL - Water Quality Functions Multiply the score from D1 by the multiplier in D2 <i>Record score on p. 1 of field form</i>	11

These questions apply to wetlands of all HGM classes.		Points (only 1 score per box)								
HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat										
H 1. Does the wetland unit have the <u>potential</u> to provide habitat for many species?										
<p>H 1.1 <u>Categories of vegetation structure</u> (see p.62) <i>Check the vegetation classes (as defined by Cowardin) and heights of emergents present. Size threshold for each class or height category is 1/4 acre or more than 10% of the area if unit is < 2.5 acres.</i></p> <p><input type="checkbox"/> Aquatic bed <input checked="" type="checkbox"/> Emergent plants 0-12 in. (0 – 30 cm) high are the highest layer and have > 30% cover <input type="checkbox"/> Emergent plants >12 – 40 in.(>30 – 100cm) high are the highest layer with >30% cover <input type="checkbox"/> Emergent plants > 40 in.(> 100cm) high are the highest layer with >30% cover <input type="checkbox"/> Scrub/shrub (areas where shrubs have >30% cover) <input type="checkbox"/> Forested (areas where trees have >30% cover)</p> <p><i>Add the number of vegetation types that qualify. If you have:</i></p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td>4-6 types</td> <td>points = 3</td> </tr> <tr> <td>3 types</td> <td>points = 2</td> </tr> <tr> <td>2 types</td> <td>points = 1</td> </tr> <tr> <td>1 type</td> <td>points = 0</td> </tr> </table> <p>Map of Cowardin vegetation classes and areas with different heights of emergents</p>		4-6 types	points = 3	3 types	points = 2	2 types	points = 1	1 type	points = 0	Figure 1 0
4-6 types	points = 3									
3 types	points = 2									
2 types	points = 1									
1 type	points = 0									
<p>H 1.2. Is one of the vegetation types “aquatic bed?” (see p .64) YES = 1 point NO = 0 points</p>		0								
<p>H 1.3. <u>Surface Water</u> (see p.65)</p> <p>H 1.3.1 Does the unit have areas of “open” water (without herbaceous or shrub plants) over at least 1/4 acre or 10% of its area during the spring (March – early June) OR in early fall (August – end of September)? <i>Note: answer YES for Lake-fringe wetlands</i> YES = 3 points & go to H 1.4 NO = go to H 1.3.2</p> <p>H 1.3.2 Does the unit have an intermittent or permanent stream within its boundaries, or along one side, over at least 1/4 acre or 10% of its area, AND that has an unvegetated bottom (answer yes only if H 1.3.1 is NO)? YES = 3 points NO = 0 points</p> <p style="text-align: center;">Map showing areas of open water</p>		Figure 7 0								
<p>H 1.4. <u>Richness of Plant Species</u> (see p. 66) Count the number of plant species in the wetland that cover at least 10 ft². (different patches of the same species can be combined to meet the size threshold) You do not have to name the species. Do not include Eurasean Milfoil, reed canarygrass, purple loosestrife, Russian Olive, Phragmites ,Canadian Thistle, Yellow-flag Iris, and Salt Cedar (Tamarisk)</p> <p>If you counted: > 9 species points = 2 4-9 species points = 1 # of species <u>3</u> < 4 species points = 0 points</p> <p><i>List species below if you wish</i></p>		 0								

<p>H 1.5. Interspersion of habitats (see p. 67) Decided from the diagrams below whether interspersion between categories of vegetation (described in H 1.1), or categories and un-vegetated areas (can include open water or mudflats) is high, medium, low, or none.</p> <p>None = 0 points Low = 1 point Moderate = 2 points Moderate = 2 points</p> <p>High = 3 points High = 3 points High = 3 points</p> <p>[Riparian braided channel]</p> <p>NOTE: If you have four or more vegetation categories or three vegetation categories and open water the rating is always "high". Use maps from H1.1 and H1.3</p>	<p>Figure 1</p> <p style="text-align: center;">0</p>
<p>H 1.6. Special Habitat Features: (see p. 68) Check the habitat features that are present in the wetland unit. The number of checks is the number of points you put into the next column.</p> <p><input type="checkbox"/> Loose rocks larger than 4" or large, downed, woody debris (>4in. diameter) within the area of surface ponding or in stream.</p> <p><input type="checkbox"/> Cattails or bulrushes are present within the unit.</p> <p><input type="checkbox"/> Standing snags (diameter at the bottom > 4 inches) in the wetland unit or within 30 m (100ft) of the edge.</p> <p><input type="checkbox"/> Emergent or shrub vegetation in areas that are permanently inundated/ponded. <i>The presence of "yellow flag" Iris is a good indicator of vegetation in areas permanently ponded.</i></p> <p><input type="checkbox"/> Stable steep banks of fine material that might be used by beaver or muskrat for denning (>45 degree slope) OR signs of recent beaver activity</p> <p><input type="checkbox"/> Invasive species cover less than 20% in each stratum of vegetation (<i>canopy, sub-canopy, shrubs, herbaceous, moss/ground cover</i>)</p> <p style="text-align: right;"><i>Maximum score possible = 6</i></p>	<p style="text-align: center;">0</p>
<p style="text-align: right;">TOTAL Potential to provide habitat <i>Add the scores in the column above</i></p>	<p style="text-align: center;">0</p>

Comments

<p>H 2.0 Does the wetland have the opportunity to provide habitat for many species?</p>	
<p>H 2.1 Buffers (<i>see p. 71</i>) <i>Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of “undisturbed.” Relatively undisturbed also means no grazing, no landscaping, no daily human use, and no structures or paving within undisturbed part of buffer.</i></p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference Points = 5 — 330 ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. Points = 4 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. Points = 4 — 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . Points = 3 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. Points = 3 <p style="text-align: center;">If buffer does not meet any of the criteria above</p> <ul style="list-style-type: none"> — No paved areas (except paved trails) or buildings within 80ft (25 m) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — No paved areas or buildings within 170ft (50m) of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — Heavy grazing in buffer. Points = 1 — Vegetated buffers are <6.6ft wide (2m) for more than 95% of the circumference (e.g . tilled fields, paving, basalt bedrock extend to edge of wetland). Points = 0 — Buffer does not meet any of the criteria above. Points = 1 <p style="text-align: center;">Aerial photo showing buffers</p>	<p>Figure 13</p> <p style="text-align: center; font-size: 2em;">5</p>
<p>H 2.2 Wet Corridors (<i>see p. 72</i>)</p> <p>H 2.2.1 Is the wetland unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor at least ¼ mile long with surface water or flowing water throughout most of the year (> 9 months/yr)? (<i>dams, heavily used gravel roads, paved roads, fields tilled to edge of stream, or pasture to edge of stream are considered breaks in the corridor</i>).</p> <p>YES = 4 points (go to H 2.3) <input checked="" type="radio"/> NO = go to H 2.2.2</p> <p>H 2.2.2 Is the unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor, at least ¼ mile long with water flowing seasonally, OR a lake-fringe wetland without a “wet” corridor, OR a riverine wetland without a surface channel connecting to the stream?</p> <p>YES = 2 points (go to H 2.3) <input checked="" type="radio"/> NO go to H 2.2.3</p> <p>H 2.2.3 Is the wetland within a 1/2 mile of any permanent stream, seasonal stream, or lake (<i>do not include man-made ditches</i>)?</p> <p><input checked="" type="radio"/> YES = 1 point NO = 0 points</p>	<p style="text-align: center; font-size: 2em;">1</p>

H 2.3 Near or adjacent to other priority habitats listed by WDFW (see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report <http://wdfw.wa.gov/hab/phslist.htm>)

Which of the following priority habitats are within 330ft (100m) of the wetland unit? *NOTE: the connections to the habitats can be disturbed.*

- Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acre).
- Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report p. 152*).
- Eastside Steppe:** Non-forested vegetation type dominated by broadleaf herbaceous flora (*full description of herbaceous species found here are in WDFW PHS report p. 153*).
- Old-growth/Mature forests (east of Cascade crest):** (*full descriptions in WDFW PHS report p. 157*). **Old-growth:** Stands are > 150 yrs in age; may be variable in tree species composition and structural characteristics due to the influence of fire, climate, and soils. **Mature:** Stands 80 – 160 yrs old. Decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth.
- Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158*).
- Juniper Savannah:** All juniper woodlands (*SE part of state only; check map*)
- Shrub-steppe:** A nonforested vegetation type consisting of one or more layers of perennial bunchgrasses and a conspicuous but discontinuous layer of shrubs (see Eastside Steppe for sites with little or no shrub cover).
- Riparian:** The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- Inland Dunes** This placeholder is for a new priority habitat that will capture areas known as Inland Dunes. A definition will be developed later in Fall 2008. (*check WDFW web site*)
- Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
- Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
- Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft.
- Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 30 cm (12 in) in eastern Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long.

If wetland has **2 or more** Priority Habitats = **4 points**
 If wetland has **1** Priority Habitat = **2 points**
 No Priority habitats = **0 points**

0

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)

<p>H 2.4 <u>Landscape</u> (choose the one description of the landscape around the wetland that best fits) (see p. 76)</p> <ul style="list-style-type: none"> — The wetland unit is in an area where annual rainfall is less than 12 inches, and its water regime is not influenced by irrigation practices, dams, or water control structures. (Generally, this x means outside boundaries of reclamation areas, irrigation district, or reservoirs) points = 5 — There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing in the connection or an open water connection along a lake shore without heavy boat traffic are OK, but connections should NOT be bisected by paved roads, fill, fields, heavy boat traffic or other development) points = 5 — There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed? points = 2 — There is at least 1 wetland within ½ mile. points = 1 — Does not meet any of the four criteria above points = 0 	5
<p>H 2. TOTAL Score - opportunity for providing habitat Add the scores in the column above</p>	11
<p>H 3.0 Does the wetland unit have indicators that its ability to provide habitat is reduced?</p>	
<p>H 3.1 <u>Indicator of reduced habitat functions</u> (see p. 75) Do the areas of open water in the wetland unit have a resident population of carp (see text for indicators of the presence of carp)? (NOTE: This question does not apply to reservoirs with water levels controlled by dams, such as the reservoirs on the Columbia and Snake Rivers)</p> <p style="text-align: center;">YES = - 5 points <u>NO</u> = 0 points</p>	<p>Points will be subtracted</p> <p>0</p>
<p>Total Score for Habitat Functions – add the points for H 1, H 2, and H 3 and record the result on p. 1</p>	11

Comments

<p>SC 5.0 Forested Wetlands (see p. 85)</p> <p>Does the wetland unit have an area of forest (<i>you should have identified a forested class, if present, in question H 1.1</i>) rooted within its boundary that meet at least one of the following three criteria?</p> <ul style="list-style-type: none"> — The wetland is within the “100 year” floodplain of a river or stream — aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant of the “woody” vegetation. (<i>Dominants means it represents at least 50% of the cover of woody species, co-dominant means it represents at least 20% of the total cover of woody species</i>) — There is at least ¼ acre of trees (even in wetlands smaller than 2.5 acres) that are “mature” or “old-growth” according to the definitions for these priority habitats developed by WDFW (<i>see p. 83</i>) <p>YES = go to SC 5.1 NO – <i>not a forested wetland with special characteristics</i></p>	
<p>SC 5.1 Does the wetland unit have a forest canopy where more than 50% of the tree species (by cover) are slow growing native trees</p> <p>Slow growing trees are: western red cedar (<i>Thuja plicata</i>), Alaska yellow cedar (<i>Chamaecyparis nootkatensis</i>), pine spp. mostly “white” pine (<i>Pinus monticola</i>), western hemlock (<i>Tsuga heterophylla</i>), Englemann spruce (<i>Picea engelmannii</i>).</p> <p>YES = Category I NO = go to SC 5.2</p>	<p>Cat. I</p>
<p>SC 5.2 Does the unit have areas where aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant species?</p> <p>YES = Category I NO = go to SC 5.3</p>	<p>Cat. I</p>
<p>SC 5.3 Does the wetland unit have areas with a forest canopy where more than 50% of the tree species (by cover) are fast growing species.</p> <p>Fast growing species are:</p> <p>Alders – red (<i>Alnus rubra</i>), thin-leaf (<i>A. tenuifolia</i>)</p> <p>Cottonwoods – narrow-leaf (<i>Populus angustifolia</i>), black (<i>P. balsamifera</i>)</p> <p>Willows- peach-leaf (<i>Salix amygdaloides</i>), Sitka (<i>S. sitchensis</i>), Pacific (<i>S. lasiandra</i>), Aspen - (<i>Populus tremuloides</i>), Water Birch (<i>Betula occidentalis</i>)</p> <p>YES = Category II NO = go to SC 5.5</p>	<p>Cat. II</p>
<p>SC 5.5 Is the forested component of the wetland within the “100 year floodplain” of a river or stream?</p> <p>YES = Category II</p>	<p>Cat. II</p>
<p>Category of wetland based on Special Characteristics</p> <p><i>Choose the “highest” rating if wetland falls into several categories.</i></p> <p>If you answered NO for all types enter “Not Applicable” on p.1</p>	<p>NA</p>

Wetland name or number W6

WETLAND RATING FORM – EASTERN WASHINGTON

Version 2 - Updated June 2006 to increase accuracy and reproducibility among users
Updated Oct 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): W6 Date of site visit: 6/10/09

Rated by Forrest Parsons/Joel Shaich Trained by Ecology? Yes ___ No X Date of training _____

SEC: 23 TOWNSHIP: 20N RANGE: 16E Is S/T/R in Appendix D? Yes ___ No X

Map of wetland unit: Figure _____ Estimated size 0.253 acre

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I ___ II ___ III X IV ___

Category I = Score >=70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for "Water Quality" Functions	11
Score for Hydrologic Functions	20
Score for Habitat Functions	11
TOTAL score for functions	42

Category based on SPECIAL CHARACTERISTICS of wetland

I ___ II ___ III ___ Does not Apply X

Final Category (choose the "highest" category from above)

3

Summary of basic information about the wetland unit

Wetland Type		Wetland Class	
Vernal Pool		Depressional	X
Alkali		Riverine	
Natural Heritage Wetland		Lake-fringe	
Bog		Slope	
Forest			
None of the above	X	Check if unit has multiple HGM classes present	

Does the wetland being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That Need Special Protection, and That Are Not Included in the Rating	YES	NO
<p>SP1. <i>Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered animal or plant species (T/E species)?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.</p>		X
<p>SP2. <i>Has the wetland unit been documented as habitat for any State listed Threatened or Endangered animal species?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands (see p. 19 of data form).</p>		X
<p>SP3. <i>Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?</i></p>		X
<p>SP4. <i>Does the wetland unit have a local significance in addition to its functions?</i> For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.</p>		X

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 20 for more detailed instructions on classifying wetlands.

Classification of Vegetated Wetlands for Eastern Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Does the entire wetland unit **meet both** of the following criteria?

The vegetated part of the wetland is on the shores of a body of open water (without any vegetation on the surface) at least 20 acres (8 ha) in size;

At least 30% of the open water area is deeper than 3 m (10 ft)?

NO - go to Step 2 **YES** - The wetland class is **Lake-fringe (lacustrine fringe)**

2. Does the entire wetland unit **meet all** of the following criteria?

The wetland is on a slope (*slope can be very gradual*),

The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.

The water leaves the wetland **without being impounded**?

NOTE: *Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a foot deep).*

NO - go to Step 3 **YES** - The wetland class is **Slope**

3. Is the entire wetland unit in a valley or stream channel where it gets inundated by overbank flooding from that stream or river? In general, the flooding should occur at least once every ten years to answer "yes." *The wetland can contain depressions that are filled with water when the river is not flooding.*

NO - go to Step 4 **YES** - The wetland class is **Riverine**

4. Is the entire wetland unit in a topographic depression, outside areas that are inundated by overbank flooding, in which water ponds, or is saturated to the surface, at some time of the year. *This means that any outlet, if present, is higher than the interior of the wetland.*

NO - go to Step 5 **YES** - The wetland class is **Depressional**

5. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

Wetland name or number W6

HGM Classes Within One Delineated Wetland Boundary	Class to Use for Rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine (riverine is within boundary of depression)	Depressional
Depressional + Lake-fringe	Depressional

If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

D Depressional Wetlands		Points
WATER QUALITY FUNCTIONS - Indicators that the wetland functions to improve water quality		(only 1 score per box)
D	D 1.0 Does the wetland unit have the <u>potential</u> to improve water quality?	(see p. 38)
D	D 1.1 Characteristics of surface water flows out of the wetland unit: Wetland has no surface water outlet - points = 5 Wetland has an intermittently flowing outlet points = 3 Wetland has a highly constricted permanently flowing outlet points = 3 Wetland has a permanently flowing surface outlet points = 1	3
D	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (use NRCS definitions of soil types) YES points = 3 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class) Wetland has persistent, ungrazed, vegetation for > 2/3 of area points = 5 Wetland has persistent, ungrazed, vegetation from 1/3 to 2/3 of area points = 3 Wetland has persistent, ungrazed vegetation from 1/10 to < 1/3 of area points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area points = 0 Map of Cowardin vegetation classes	Figure 2 5
D	D 1.4 Characteristics of seasonal ponding or inundation. <i>This is the area of ponding that fluctuates every year. Do not count the area that is permanently ponded.</i> Area seasonally ponded is > 1/2 total area of wetland points = 3 Area seasonally ponded is 1/4 - 1/2 total area of wetland points = 1 Area seasonally ponded is < 1/4 total area of wetland points = 0 NOTE: See text for indicators of seasonal and permanent inundation/flooding. Map of Hydroperiods	Figure 8 3
D	Total for D 1 Add the points in the boxes above	11
D	D 2. Does the wetland unit have the <u>opportunity</u> to improve water quality? Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity. — Grazing in the wetland or within 150 ft — Untreated stormwater discharges to wetland — Tilled fields or orchards within 150 ft of wetland — A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging — Residential, urban areas, golf courses are within 150 ft of wetland — Wetland is fed by groundwater high in phosphorus or nitrogen — Other _____ YES multiplier is 2 NO multiplier is 1	multiplier <u>1</u>
D	TOTAL - Water Quality Functions Multiply the score from D1 by the multiplier in D2 <i>Record score on p. 1 of field form</i>	11

D Depressional Wetlands HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion		Points (only 1 score per box)
D	D 3.0 Does the wetland unit have the <u>potential</u> to reduce flooding and stream erosion?	(see p. 39)
D	D 3.1 Characteristics of surface water flows out of the wetland unit: Wetland has no surface water outlet points = 8 Wetland has an intermittently flowing outlet points = 4 Wetland has a highly constricted permanently flowing outlet points = 4 Wetland has a permanently flowing surface outlet points = 0	4
D	D 3.2 Depth of storage during wet periods: <i>Estimate the height of ponding above the surface of the wetland (see text for description of measuring height). In wetlands with permanent ponding, the surface is the lowest elevation of "permanent" water)</i> Marks of ponding are at least 3 ft above the surface points = 8 The wetland is a "headwater" wetland" (see p. 39) points = 6 Marks are 2 ft to < 3 ft from surface points = 6 Marks are 1 ft to < 2 ft from surface points = 4 Marks are 6 in to < 1 ft from surface points = 2 No marks above 6 in. or wetland has only saturated soils points = 0	6
D	Total for D 3 Add the points in the boxes above	10
D	D 4.0 Does the wetland unit have the <u>opportunity</u> to reduce flooding and erosion? Answer NO if the major source of water is groundwater, irrigation return flow, or water levels in the wetland are controlled by a reservoir. Answer YES if the wetland is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Note which of the following conditions apply. <input checked="" type="checkbox"/> Wetland is in a headwater of a river or stream that has flooding problems — Wetland drains to a river or stream that has flooding problems — Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems — Other _____ YES multiplier is 2 NO multiplier is 1	(see p. 42) multiplier <u>2</u>
D	TOTAL - Hydrologic Functions Multiply the score from D3 by the multiplier in D4 <i>Record score on p. 1 of field form</i>	20

Comments

These questions apply to wetlands of all HGM classes.		Points (only 1 score per box)								
HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat										
H 1. Does the wetland unit have the <u>potential</u> to provide habitat for many species?										
<p>H 1.1 <u>Categories of vegetation structure</u> (see p.62) <i>Check the vegetation classes (as defined by Cowardin) and heights of emergents present. Size threshold for each class or height category is 1/4 acre or more than 10% of the area if unit is < 2.5 acres.</i></p> <p><input type="checkbox"/> Aquatic bed <input checked="" type="checkbox"/> Emergent plants 0-12 in. (0 – 30 cm) high are the highest layer and have > 30% cover <input type="checkbox"/> Emergent plants >12 – 40 in. (>30 – 100cm) high are the highest layer with >30% cover <input type="checkbox"/> Emergent plants > 40 in. (> 100cm) high are the highest layer with >30% cover <input type="checkbox"/> Scrub/shrub (areas where shrubs have >30% cover) <input type="checkbox"/> Forested (areas where trees have >30% cover)</p> <p><i>Add the number of vegetation types that qualify. If you have:</i></p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td>4-6 types</td> <td>points = 3</td> </tr> <tr> <td>3 types</td> <td>points = 2</td> </tr> <tr> <td>2 types</td> <td>points = 1</td> </tr> <tr> <td>1 type</td> <td>points = 0</td> </tr> </table> <p>Map of Cowardin vegetation classes and areas with different heights of emergents</p>		4-6 types	points = 3	3 types	points = 2	2 types	points = 1	1 type	points = 0	Figure 2 0
4-6 types	points = 3									
3 types	points = 2									
2 types	points = 1									
1 type	points = 0									
<p>H 1.2. Is one of the vegetation types “aquatic bed?” (see p .64) YES = 1 point NO = 0 points</p>		0								
<p>H 1.3. <u>Surface Water</u> (see p.65)</p> <p>H 1.3.1 Does the unit have areas of “open” water (without herbaceous or shrub plants) over at least 1/4 acre or 10% of its area during the spring (March – early June) OR in early fall (August – end of September)? <i>Note: answer YES for Lake-fringe wetlands</i> YES = 3 points & go to H 1.4 NO = go to H 1.3.2</p> <p>H 1.3.2 Does the unit have an intermittent or permanent stream within its boundaries, or along one side, over at least 1/4 acre or 10% of its area, AND that has an unvegetated bottom (<i>answer yes only if H 1.3.1 is NO</i>)? YES = 3 points NO = 0 points</p> <p style="text-align: center;">Map showing areas of open water</p>		Figure 8 0								
<p>H 1.4. <u>Richness of Plant Species</u> (see p. 66) Count the number of plant species in the wetland that cover at least 10 ft². (<i>different patches of the same species can be combined to meet the size threshold</i>) <i>You do not have to name the species.</i> <i>Do not include Eurasean Milfoil, reed canarygrass, purple loosestrife, Russian Olive, Phragmites ,Canadian Thistle, Yellow-flag Iris, and Salt Cedar (Tamarisk)</i></p> <p>If you counted: > 9 species points = 2 4-9 species points = 1 # of species <u>2</u> < 4 species points = 0 points</p> <p><i>List species below if you wish</i></p>		 0								

<p>H 1.5. Interspersion of habitats (see p. 67) Decided from the diagrams below whether interspersion between categories of vegetation (described in H 1.1), or categories and un-vegetated areas (can include open water or mudflats) is high, medium, low, or none.</p> <p>None = 0 points Low = 1 point Moderate = 2 points</p> <p>High = 3 points [Riparian braided channel]</p> <p>NOTE: If you have four or more vegetation categories or three vegetation categories and open water the rating is always "high". Use maps from H1.1 and H1.3</p>	<p>Figure 2</p> <p style="text-align: center;">0</p>
<p>H 1.6. Special Habitat Features: (see p. 68) Check the habitat features that are present in the wetland unit. The number of checks is the number of points you put into the next column.</p> <p><input type="checkbox"/> Loose rocks larger than 4" or large, downed, woody debris (>4in. diameter) within the area of surface ponding or in stream.</p> <p><input type="checkbox"/> Cattails or bulrushes are present within the unit.</p> <p><input type="checkbox"/> Standing snags (diameter at the bottom > 4 inches) in the wetland unit or within 30 m (100ft) of the edge.</p> <p><input type="checkbox"/> Emergent or shrub vegetation in areas that are permanently inundated/ponded. <i>The presence of "yellow flag" Iris is a good indicator of vegetation in areas permanently ponded.</i></p> <p><input type="checkbox"/> Stable steep banks of fine material that might be used by beaver or muskrat for denning (>45 degree slope) OR signs of recent beaver activity</p> <p><input type="checkbox"/> Invasive species cover less than 20% in each stratum of vegetation (<i>canopy, sub-canopy, shrubs, herbaceous, moss/ground cover</i>)</p> <p style="text-align: right;"><i>Maximum score possible = 6</i></p>	<p style="text-align: center;">0</p>
<p style="text-align: right;">TOTAL Potential to provide habitat Add the scores in the column above</p>	<p style="text-align: center;">0</p>

Comments

<p>H 2.0 Does the wetland have the opportunity to provide habitat for many species?</p>	
<p>H 2.1 Buffers (<i>see p. 71</i>) <i>Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of “undisturbed.” Relatively undisturbed also means no grazing, no landscaping, no daily human use, and no structures or paving within undisturbed part of buffer.</i></p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference Points = 5 — 330 ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. Points = 4 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. Points = 4 — 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . Points = 3 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. Points = 3 <p style="text-align: center;">If buffer does not meet any of the criteria above</p> <ul style="list-style-type: none"> — No paved areas (except paved trails) or buildings within 80ft (25 m) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — No paved areas or buildings within 170ft (50m) of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — Heavy grazing in buffer. Points = 1 — Vegetated buffers are <6.6ft wide (2m) for more than 95% of the circumference (e.g . tilled fields, paving, basalt bedrock extend to edge of wetland). Points = 0 — Buffer does not meet any of the criteria above. Points = 1 <p style="text-align: center;">Aerial photo showing buffers</p>	<p>Figure 14</p> <p style="text-align: center; font-size: 2em;">5</p>
<p>H 2.2 Wet Corridors (<i>see p. 72</i>)</p> <p>H 2.2.1 Is the wetland unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor at least ¼ mile long with surface water or flowing water throughout most of the year (> 9 months/yr)? (<i>dams, heavily used gravel roads, paved roads, fields tilled to edge of stream, or pasture to edge of stream are considered breaks in the corridor</i>).</p> <p>YES = 4 points (go to H 2.3) <input checked="" type="radio"/> NO = go to H 2.2.2</p> <p>H 2.2.2 Is the unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor, at least ¼ mile long with water flowing seasonally, OR a lake-fringe wetland without a “wet” corridor, OR a riverine wetland without a surface channel connecting to the stream?</p> <p>YES = 2 points (go to H 2.3) <input checked="" type="radio"/> NO go to H 2.2.3</p> <p>H 2.2.3 Is the wetland within a 1/2 mile of any permanent stream, seasonal stream, or lake (<i>do not include man-made ditches</i>)?</p> <p><input checked="" type="radio"/> YES = 1 point NO = 0 points</p>	<p style="text-align: center; font-size: 2em;">1</p>

H 2.3 Near or adjacent to other priority habitats listed by WDFW (see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report <http://wdfw.wa.gov/hab/phslist.htm>)

Which of the following priority habitats are within 330ft (100m) of the wetland unit? *NOTE: the connections to the habitats can be disturbed.*

- Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acre).
- Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report p. 152*).
- Eastside Steppe:** Non-forested vegetation type dominated by broadleaf herbaceous flora (*full description of herbaceous species found here are in WDFW PHS report p. 153*).
- Old-growth/Mature forests (east of Cascade crest):** (*full descriptions in WDFW PHS report p. 157*). **Old-growth:** Stands are > 150 yrs in age; may be variable in tree species composition and structural characteristics due to the influence of fire, climate, and soils. **Mature:** Stands 80 – 160 yrs old. Decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth.
- Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158*).
- Juniper Savannah:** All juniper woodlands (*SE part of state only; check map*)
- Shrub-steppe:** A nonforested vegetation type consisting of one or more layers of perennial bunchgrasses and a conspicuous but discontinuous layer of shrubs (see Eastside Steppe for sites with little or no shrub cover).
- Riparian:** The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- Inland Dunes** This placeholder is for a new priority habitat that will capture areas known as Inland Dunes. A definition will be developed later in Fall 2008. (*check WDFW web site*)
- Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
- Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
- Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft.
- Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 30 cm (12 in) in eastern Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long.

If wetland has **2 or more** Priority Habitats = **4 points**
 If wetland has **1** Priority Habitat = **2 points**
 No Priority habitats = **0 points**

0

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)

<p>H 2.4 <u>Landscape</u> (choose the one description of the landscape around the wetland that best fits) (see p. 76)</p> <p>— The wetland unit is in an area where annual rainfall is less than 12 inches, and its water regime is not influenced by irrigation practices, dams, or water control structures. (Generally, this x means outside boundaries of reclamation areas, irrigation district, or reservoirs) points = 5</p> <p>— There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing in the connection or an open water connection along a lake shore without heavy boat traffic are OK, but connections should NOT be bisected by paved roads, fill, fields, heavy boat traffic or other development) points = 5</p> <p>— There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed? points = 2</p> <p>— There is at least 1 wetland within ½ mile. points = 1</p> <p>— Does not meet any of the four criteria above points = 0</p>	5
<p>H 2. TOTAL Score - opportunity for providing habitat Add the scores in the column above</p>	11
<p>H 3.0 Does the wetland unit have indicators that its ability to provide habitat is reduced?</p>	
<p>H 3.1 <u>Indicator of reduced habitat functions</u> (see p. 75) Do the areas of open water in the wetland unit have a resident population of carp (see text for indicators of the presence of carp)? (NOTE: This question does not apply to reservoirs with water levels controlled by dams, such as the reservoirs on the Columbia and Snake Rivers)</p> <p style="text-align: center;">YES = - 5 points <u>NO</u> = 0 points</p>	<p>Points will be subtracted</p> <p>0</p>
<p>Total Score for Habitat Functions – add the points for H 1, H 2, and H 3 and record the result on p. 1</p>	11

Comments

<p>SC 5.0 Forested Wetlands (see p. 85)</p> <p>Does the wetland unit have an area of forest (<i>you should have identified a forested class, if present, in question H 1.1</i>) rooted within its boundary that meet at least one of the following three criteria?</p> <ul style="list-style-type: none"> — The wetland is within the “100 year” floodplain of a river or stream — aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant of the “woody” vegetation. (<i>Dominants means it represents at least 50% of the cover of woody species, co-dominant means it represents at least 20% of the total cover of woody species</i>) — There is at least ¼ acre of trees (even in wetlands smaller than 2.5 acres) that are “mature” or “old-growth” according to the definitions for these priority habitats developed by WDFW (<i>see p. 83</i>) <p>YES = go to SC 5.1 NO <i>not a forested wetland with special characteristics</i></p>	
<p>SC 5.1 Does the wetland unit have a forest canopy where more than 50% of the tree species (by cover) are slow growing native trees</p> <p>Slow growing trees are: western red cedar (<i>Thuja plicata</i>), Alaska yellow cedar (<i>Chamaecyparis nootkatensis</i>), pine spp. mostly “white” pine (<i>Pinus monticola</i>), western hemlock (<i>Tsuga heterophylla</i>), Englemann spruce (<i>Picea engelmannii</i>).</p> <p>YES = Category I NO = go to SC 5.2</p>	<p>Cat. I</p>
<p>SC 5.2 Does the unit have areas where aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant species?</p> <p>YES = Category I NO = go to SC 5.3</p>	<p>Cat. I</p>
<p>SC 5.3 Does the wetland unit have areas with a forest canopy where more than 50% of the tree species (by cover) are fast growing species.</p> <p>Fast growing species are:</p> <p>Alders – red (<i>Alnus rubra</i>), thin-leaf (<i>A. tenuifolia</i>)</p> <p>Cottonwoods – narrow-leaf (<i>Populus angustifolia</i>), black (<i>P. balsamifera</i>)</p> <p>Willows- peach-leaf (<i>Salix amygdaloides</i>), Sitka (<i>S. sitchensis</i>), Pacific (<i>S. lasiandra</i>), Aspen - (<i>Populus tremuloides</i>), Water Birch (<i>Betula occidentalis</i>)</p> <p>YES = Category II NO = go to SC 5.5</p>	<p>Cat. II</p>
<p>SC 5.5 Is the forested component of the wetland within the “100 year floodplain” of a river or stream?</p> <p>YES = Category II</p>	<p>Cat. II</p>
<p>Category of wetland based on Special Characteristics</p> <p><i>Choose the “highest” rating if wetland falls into several categories.</i></p> <p>If you answered NO for all types enter “Not Applicable” on p.1</p>	<p>NA</p>

Wetland name or number W7

WETLAND RATING FORM – EASTERN WASHINGTON

Version 2 - Updated June 2006 to increase accuracy and reproducibility among users
Updated Oct 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): W7 Date of site visit: 6/10/09

Rated by Forrest Parsons/Joel Shaich Trained by Ecology? Yes ___ No X Date of training _____

SEC: 23 TOWNSHIP: 20N RANGE: 16E Is S/T/R in Appendix D? Yes ___ No X

Map of wetland unit: Figure _____ Estimated size 0.231 acre

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I ___ II ___ III X IV ___

Category I = Score >=70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for "Water Quality" Functions

11

Score for Hydrologic Functions

20

Score for Habitat Functions

13

TOTAL score for functions

44

Category based on SPECIAL CHARACTERISTICS of wetland

I ___ II ___ III ___ Does not Apply X

Final Category (choose the "highest" category from above)

3

Summary of basic information about the wetland unit

Wetland Type		Wetland Class	
Vernal Pool		Depressional	X
Alkali		Riverine	
Natural Heritage Wetland		Lake-fringe	
Bog		Slope	
Forest			
None of the above	X	Check if unit has multiple HGM classes present	

Does the wetland being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That Need Special Protection, and That Are Not Included in the Rating	YES	NO
<p>SP1. <i>Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered animal or plant species (T/E species)?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.</p>		X
<p>SP2. <i>Has the wetland unit been documented as habitat for any State listed Threatened or Endangered animal species?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands (see p. 19 of data form).</p>		X
<p>SP3. <i>Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?</i></p>		X
<p>SP4. <i>Does the wetland unit have a local significance in addition to its functions?</i> For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.</p>		X

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 20 for more detailed instructions on classifying wetlands.

Classification of Vegetated Wetlands for Eastern Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Does the entire wetland unit **meet both** of the following criteria?

The vegetated part of the wetland is on the shores of a body of open water (without any vegetation on the surface) at least 20 acres (8 ha) in size;

At least 30% of the open water area is deeper than 3 m (10 ft)?

NO - go to Step 2 **YES** - The wetland class is **Lake-fringe (lacustrine fringe)**

2. Does the entire wetland unit **meet all** of the following criteria?

The wetland is on a slope (*slope can be very gradual*),

The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.

The water leaves the wetland **without being impounded**?

NOTE: *Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a foot deep).*

NO - go to Step 3 **YES** - The wetland class is **Slope**

3. Is the entire wetland unit in a valley or stream channel where it gets inundated by overbank flooding from that stream or river? In general, the flooding should occur at least once every ten years to answer "yes." *The wetland can contain depressions that are filled with water when the river is not flooding.*

NO - go to Step 4 **YES** - The wetland class is **Riverine**

4. Is the entire wetland unit in a topographic depression, outside areas that are inundated by overbank flooding, in which water ponds, or is saturated to the surface, at some time of the year. *This means that any outlet, if present, is higher than the interior of the wetland.*

NO - go to Step 5 **YES** - The wetland class is **Depressional**

5. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

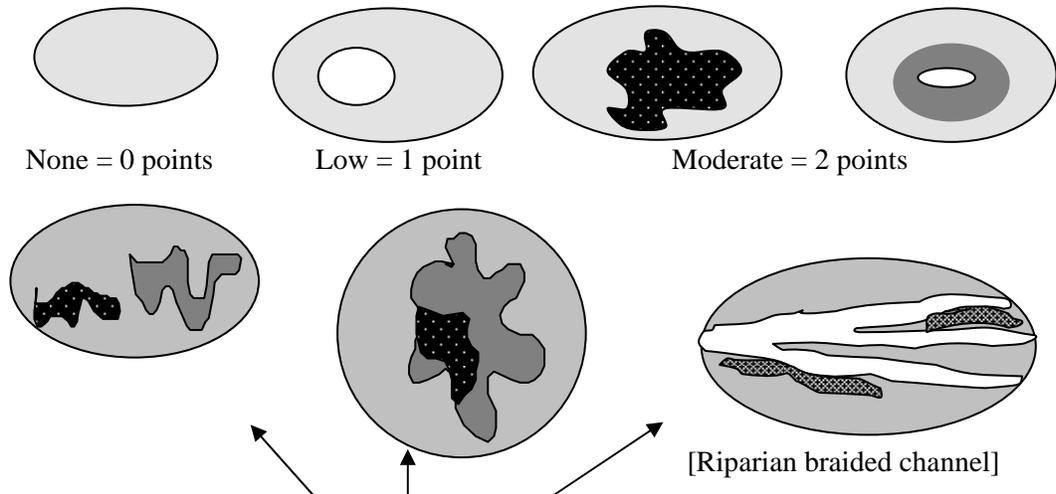
Wetland name or number W7

HGM Classes Within One Delineated Wetland Boundary	Class to Use for Rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine (riverine is within boundary of depression)	Depressional
Depressional + Lake-fringe	Depressional

If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

D Depressional Wetlands		Points
WATER QUALITY FUNCTIONS - Indicators that the wetland functions to improve water quality		(only 1 score per box)
D	D 1.0 Does the wetland unit have the <u>potential</u> to improve water quality?	(see p. 38)
D	D 1.1 Characteristics of surface water flows out of the wetland unit: Wetland has no surface water outlet - points = 5 Wetland has an intermittently flowing outlet points = 3 Wetland has a highly constricted permanently flowing outlet points = 3 Wetland has a permanently flowing surface outlet points = 1	3
D	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (use NRCS definitions of soil types) YES points = 3 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class) Wetland has persistent, ungrazed, vegetation for > 2/3 of area points = 5 Wetland has persistent, ungrazed, vegetation from 1/3 to 2/3 of area points = 3 Wetland has persistent, ungrazed vegetation from 1/10 to < 1/3 of area points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area points = 0 Map of Cowardin vegetation classes	Figure 1 5
D	D 1.4 Characteristics of seasonal ponding or inundation. <i>This is the area of ponding that fluctuates every year. Do not count the area that is permanently ponded.</i> Area seasonally ponded is > 1/2 total area of wetland points = 3 Area seasonally ponded is 1/4 - 1/2 total area of wetland points = 1 Area seasonally ponded is < 1/4 total area of wetland points = 0 NOTE: See text for indicators of seasonal and permanent inundation/flooding. Map of Hydroperiods	Figure 7 3
D	Total for D 1 Add the points in the boxes above	11
D	D 2. Does the wetland unit have the <u>opportunity</u> to improve water quality? Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity. — Grazing in the wetland or within 150 ft — Untreated stormwater discharges to wetland — Tilled fields or orchards within 150 ft of wetland — A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging — Residential, urban areas, golf courses are within 150 ft of wetland — Wetland is fed by groundwater high in phosphorus or nitrogen — Other _____ YES multiplier is 2 NO multiplier is 1	multiplier <u>1</u>
D	TOTAL - Water Quality Functions Multiply the score from D1 by the multiplier in D2 <i>Record score on p. 1 of field form</i>	11

These questions apply to wetlands of all HGM classes.		Points (only 1 score per box)								
HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat										
H 1. Does the wetland unit have the <u>potential</u> to provide habitat for many species?										
<p>H 1.1 <u>Categories of vegetation structure</u> (see p.62) Check the vegetation classes (as defined by Cowardin) and heights of emergents present. Size threshold for each class or height category is ¼ acre or more than 10% of the area if unit is < 2.5 acres.</p> <p><input type="checkbox"/> Aquatic bed <input checked="" type="checkbox"/> Emergent plants 0-12 in. (0 – 30 cm) high are the highest layer and have > 30% cover <input type="checkbox"/> Emergent plants >12 – 40 in.(>30 – 100cm) high are the highest layer with >30% cover <input type="checkbox"/> Emergent plants > 40 in.(> 100cm) high are the highest layer with >30% cover <input type="checkbox"/> Scrub/shrub (areas where shrubs have >30% cover) <input type="checkbox"/> Forested (areas where trees have >30% cover)</p> <p>Add the number of vegetation types that qualify. If you have:</p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td>4-6 types</td> <td>points = 3</td> </tr> <tr> <td>3 types</td> <td>points = 2</td> </tr> <tr> <td>2 types</td> <td>points = 1</td> </tr> <tr> <td>1 type</td> <td>points = 0</td> </tr> </table> <p>Map of Cowardin vegetation classes and areas with different heights of emergents</p>		4-6 types	points = 3	3 types	points = 2	2 types	points = 1	1 type	points = 0	<p>Figure 1</p> <p style="text-align: center; font-size: 2em;">0</p>
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3 types	points = 2									
2 types	points = 1									
1 type	points = 0									
<p>H 1.2. Is one of the vegetation types “aquatic bed?” (see p .64) YES = 1 point NO = 0 points</p>		<p style="font-size: 2em;">0</p>								
<p>H 1.3. <u>Surface Water</u> (see p.65)</p> <p>H 1.3.1 Does the unit have areas of “open” water (without herbaceous or shrub plants) over at least ¼ acre or 10% of its area during the spring (March – early June) OR in early fall (August – end of September)? <i>Note: answer YES for Lake-fringe wetlands</i> YES = 3 points & go to H 1.4 <input checked="" type="radio"/> NO = go to H 1.3.2</p> <p>H 1.3.2 Does the unit have an intermittent or permanent stream within its boundaries, or along one side, over at least ¼ acre or 10% of its area, AND that has an unvegetated bottom (answer yes only if H 1.3.1 is NO)? YES = 3 points <input checked="" type="radio"/> NO = 0 points</p> <p style="text-align: center;">Map showing areas of open water</p>		<p>Figure 7</p> <p style="text-align: center; font-size: 2em;">0</p>								
<p>H 1.4. <u>Richness of Plant Species</u> (see p. 66) Count the number of plant species in the wetland that cover at least 10 ft². (different patches of the same species can be combined to meet the size threshold) You do not have to name the species. Do not include Eurasean Milfoil, reed canarygrass, purple loosestrife, Russian Olive, Phragmites ,Canadian Thistle, Yellow-flag Iris, and Salt Cedar (Tamarisk)</p> <p>If you counted: > 9 species points = 2 4-9 species points = 1 # of species <u>5</u> < 4 species points = 0 points</p> <p>List species below if you wish</p>		<p style="font-size: 2em;">1</p>								

<p>H 1.5. Interspersion of habitats (see p. 67) Decided from the diagrams below whether interspersion between categories of vegetation (described in H 1.1), or categories and un-vegetated areas (can include open water or mudflats) is high, medium, low, or none.</p>  <p>None = 0 points Low = 1 point Moderate = 2 points</p> <p>High = 3 points</p> <p>[Riparian braided channel]</p> <p>NOTE: If you have four or more vegetation categories or three vegetation categories and open water the rating is always "high". Use maps from H1.1 and H1.3</p>	<p>Figure 1</p> <p style="text-align: center; font-size: 2em;">1</p>
<p>H 1.6. Special Habitat Features: (see p. 68) Check the habitat features that are present in the wetland unit. The number of checks is the number of points you put into the next column.</p> <p><input type="checkbox"/> Loose rocks larger than 4" or large, downed, woody debris (>4in. diameter) within the area of surface ponding or in stream.</p> <p><input type="checkbox"/> Cattails or bulrushes are present within the unit.</p> <p><input type="checkbox"/> Standing snags (diameter at the bottom > 4 inches) in the wetland unit or within 30 m (100ft) of the edge.</p> <p><input type="checkbox"/> Emergent or shrub vegetation in areas that are permanently inundated/ponded. <i>The presence of "yellow flag" Iris is a good indicator of vegetation in areas permanently ponded.</i></p> <p><input type="checkbox"/> Stable steep banks of fine material that might be used by beaver or muskrat for denning (>45 degree slope) OR signs of recent beaver activity</p> <p><input type="checkbox"/> Invasive species cover less than 20% in each stratum of vegetation (<i>canopy, sub-canopy, shrubs, herbaceous, moss/ground cover</i>)</p> <p style="text-align: right;"><i>Maximum score possible = 6</i></p>	<p style="text-align: center; font-size: 2em;">0</p>
<p style="text-align: right;">TOTAL Potential to provide habitat <i>Add the scores in the column above</i></p>	<p style="text-align: center; font-size: 2em; border: 2px dashed black;">2</p>

Comments

<p>H 2.0 Does the wetland have the opportunity to provide habitat for many species?</p>	
<p>H 2.1 Buffers (<i>see p. 71</i>) <i>Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of “undisturbed.” Relatively undisturbed also means no grazing, no landscaping, no daily human use, and no structures or paving within undisturbed part of buffer.</i></p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference Points = 5 — 330 ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. Points = 4 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. Points = 4 — 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . Points = 3 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. Points = 3 <p style="text-align: center;">If buffer does not meet any of the criteria above</p> <ul style="list-style-type: none"> — No paved areas (except paved trails) or buildings within 80ft (25 m) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — No paved areas or buildings within 170ft (50m) of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — Heavy grazing in buffer. Points = 1 — Vegetated buffers are <6.6ft wide (2m) for more than 95% of the circumference (e.g . tilled fields, paving, basalt bedrock extend to edge of wetland). Points = 0 — Buffer does not meet any of the criteria above. Points = 1 <p style="text-align: center;">Aerial photo showing buffers</p>	<p>Figure 13</p> <p style="text-align: center; font-size: 2em;">5</p>
<p>H 2.2 Wet Corridors (<i>see p. 72</i>)</p> <p>H 2.2.1 Is the wetland unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor at least ¼ mile long with surface water or flowing water throughout most of the year (> 9 months/yr)? (<i>dams, heavily used gravel roads, paved roads, fields tilled to edge of stream, or pasture to edge of stream are considered breaks in the corridor</i>).</p> <p>YES = 4 points (go to H 2.3) <input checked="" type="radio"/> NO = go to H 2.2.2</p> <p>H 2.2.2 Is the unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor, at least ¼ mile long with water flowing seasonally, OR a lake-fringe wetland without a “wet” corridor, OR a riverine wetland without a surface channel connecting to the stream?</p> <p>YES = 2 points (go to H 2.3) <input checked="" type="radio"/> NO go to H 2.2.3</p> <p>H 2.2.3 Is the wetland within a 1/2 mile of any permanent stream, seasonal stream, or lake (<i>do not include man-made ditches</i>)?</p> <p><input checked="" type="radio"/> YES = 1 point NO = 0 points</p>	<p style="text-align: center; font-size: 2em;">1</p>

<p>H 2.3 <u>Near or adjacent to other priority habitats listed by WDFW (see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report http://wdfw.wa.gov/hab/phslist.htm)</u></p> <p>Which of the following priority habitats are within 330ft (100m) of the wetland unit? <i>NOTE: the connections to the habitats can be disturbed.</i></p> <p><input type="checkbox"/> Aspen Stands: Pure or mixed stands of aspen greater than 0.4 ha (1 acre).</p> <p><input type="checkbox"/> Biodiversity Areas and Corridors: Areas of habitat that are relatively important to various species of native fish and wildlife (<i>full descriptions in WDFW PHS report p. 152</i>).</p> <p><input type="checkbox"/> Eastside Steppe: Non-forested vegetation type dominated by broadleaf herbaceous flora (<i>full description of herbaceous species found here are in WDFW PHS report p. 153</i>).</p> <p><input type="checkbox"/> Old-growth/Mature forests (east of Cascade crest): (<i>full descriptions in WDFW PHS report p. 157</i>). Old-growth: Stands are > 150 yrs in age; may be variable in tree species composition and structural characteristics due to the influence of fire, climate, and soils. Mature: Stands 80 – 160 yrs old. Decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth.</p> <p><input type="checkbox"/> Oregon white Oak: Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (<i>full descriptions in WDFW PHS report p. 158</i>).</p> <p><input type="checkbox"/> Juniper Savannah: All juniper woodlands (<i>SE part of state only; check map</i>)</p> <p><input type="checkbox"/> Shrub-steppe: A nonforested vegetation type consisting of one or more layers of perennial bunchgrasses and a conspicuous but discontinuous layer of shrubs (see Eastside Steppe for sites with little or no shrub cover).</p> <p><input type="checkbox"/> Riparian: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.</p> <p><input type="checkbox"/> Inland Dunes This placeholder is for a new priority habitat that will capture areas known as Inland Dunes. A definition will be developed later in Fall 2008. (<i>check WDFW web site</i>)</p> <p><input type="checkbox"/> Instream: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.</p> <p><input type="checkbox"/> Caves: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.</p> <p><input type="checkbox"/> Cliffs: Greater than 7.6 m (25 ft) high and occurring below 5000 ft.</p> <p><input type="checkbox"/> Talus: Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.</p> <p><input type="checkbox"/> Snags and Logs: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 30 cm (12 in) in eastern Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long.</p> <p style="text-align: right;">If wetland has 2 or more Priority Habitats = 4 points If wetland has 1 Priority Habitat = 2 points No Priority habitats = 0 points</p> <p><i>Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)</i></p>	<p>0</p>
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<p>H 2.4 <u>Landscape</u> (choose the one description of the landscape around the wetland that best fits) (see p. 76)</p> <ul style="list-style-type: none"> — The wetland unit is in an area where annual rainfall is less than 12 inches, and its water regime is not influenced by irrigation practices, dams, or water control structures. (Generally, this x means outside boundaries of reclamation areas, irrigation district, or reservoirs) points = 5 — There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing in the connection or an open water connection along a lake shore without heavy boat traffic are OK, but connections should NOT be bisected by paved roads, fill, fields, heavy boat traffic or other development) points = 5 — There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed? points = 2 — There is at least 1 wetland within ½ mile. points = 1 — Does not meet any of the four criteria above points = 0 	<p>5</p>
<p>H 2. TOTAL Score - opportunity for providing habitat Add the scores in the column above</p>	<p>11</p>
<p>H 3.0 Does the wetland unit have indicators that its ability to provide habitat is reduced?</p>	
<p>H 3.1 <u>Indicator of reduced habitat functions</u> (see p. 75) Do the areas of open water in the wetland unit have a resident population of carp (see text for indicators of the presence of carp)? (NOTE: This question does not apply to reservoirs with water levels controlled by dams, such as the reservoirs on the Columbia and Snake Rivers)</p> <p style="text-align: center;">YES = - 5 points <u>NO</u> = 0 points</p>	<p>Points will be subtracted</p> <p>0</p>
<p>Total Score for Habitat Functions – add the points for H 1, H 2, and H 3 and record the result on p. 1</p>	
<p>13</p>	

Comments

<p>SC 5.0 Forested Wetlands (see p. 85)</p> <p>Does the wetland unit have an area of forest (<i>you should have identified a forested class, if present, in question H 1.1</i>) rooted within its boundary that meet at least one of the following three criteria?</p> <ul style="list-style-type: none"> — The wetland is within the “100 year” floodplain of a river or stream — aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant of the “woody” vegetation. (<i>Dominants means it represents at least 50% of the cover of woody species, co-dominant means it represents at least 20% of the total cover of woody species</i>) — There is at least ¼ acre of trees (even in wetlands smaller than 2.5 acres) that are “mature” or “old-growth” according to the definitions for these priority habitats developed by WDFW (<i>see p. 83</i>) <p>YES = go to SC 5.1 NO – <i>not a forested wetland with special characteristics</i></p>	
<p>SC 5.1 Does the wetland unit have a forest canopy where more than 50% of the tree species (by cover) are slow growing native trees</p> <p>Slow growing trees are: western red cedar (<i>Thuja plicata</i>), Alaska yellow cedar (<i>Chamaecyparis nootkatensis</i>), pine spp. mostly “white” pine (<i>Pinus monticola</i>), western hemlock (<i>Tsuga heterophylla</i>), Englemann spruce (<i>Picea engelmannii</i>).</p> <p>YES = Category I NO = go to SC 5.2</p>	<p>Cat. I</p>
<p>SC 5.2 Does the unit have areas where aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant species?</p> <p>YES = Category I NO = go to SC 5.3</p>	<p>Cat. I</p>
<p>SC 5.3 Does the wetland unit have areas with a forest canopy where more than 50% of the tree species (by cover) are fast growing species.</p> <p>Fast growing species are:</p> <p>Alders – red (<i>Alnus rubra</i>), thin-leaf (<i>A. tenuifolia</i>)</p> <p>Cottonwoods – narrow-leaf (<i>Populus angustifolia</i>), black (<i>P. balsamifera</i>)</p> <p>Willows- peach-leaf (<i>Salix amygdaloides</i>), Sitka (<i>S. sitchensis</i>), Pacific (<i>S. lasiandra</i>), Aspen - (<i>Populus tremuloides</i>), Water Birch (<i>Betula occidentalis</i>)</p> <p>YES = Category II NO = go to SC 5.5</p>	<p>Cat. II</p>
<p>SC 5.5 Is the forested component of the wetland within the “100 year floodplain” of a river or stream?</p> <p>YES = Category II</p>	<p>Cat. II</p>
<p>Category of wetland based on Special Characteristics</p> <p><i>Choose the “highest” rating if wetland falls into several categories.</i></p> <p>If you answered NO for all types enter “Not Applicable” on p.1</p>	<p>NA</p>

Wetland name or number W8

WETLAND RATING FORM – EASTERN WASHINGTON

Version 2 - Updated June 2006 to increase accuracy and reproducibility among users
Updated Oct 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): W8 Date of site visit: 6/10/09

Rated by Forrest Parsons/Joel Shaich Trained by Ecology? Yes ___ No X Date of training _____

SEC: 22 TOWNSHIP: 20N RANGE: 16E Is S/T/R in Appendix D? Yes ___ No X

Map of wetland unit: Figure _____ Estimated size 0.027 acre

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I ___ II ___ III X IV ___

Category I = Score >=70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for "Water Quality" Functions	14
Score for Hydrologic Functions	20
Score for Habitat Functions	12
TOTAL score for functions	46

Category based on SPECIAL CHARACTERISTICS of wetland

I ___ II ___ III ___ Does not Apply X

Final Category (choose the "highest" category from above)

3

Summary of basic information about the wetland unit

Wetland Type		Wetland Class	
Vernal Pool		Depressional	X
Alkali		Riverine	
Natural Heritage Wetland		Lake-fringe	
Bog		Slope	
Forest			
None of the above	X	Check if unit has multiple HGM classes present	

Does the wetland being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That Need Special Protection, and That Are Not Included in the Rating	YES	NO
<p>SP1. <i>Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered animal or plant species (T/E species)?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.</p>		X
<p>SP2. <i>Has the wetland unit been documented as habitat for any State listed Threatened or Endangered animal species?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands (see p. 19 of data form).</p>		X
<p>SP3. <i>Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?</i></p>		X
<p>SP4. <i>Does the wetland unit have a local significance in addition to its functions?</i> For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.</p>		X

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 20 for more detailed instructions on classifying wetlands.

Classification of Vegetated Wetlands for Eastern Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Does the entire wetland unit **meet both** of the following criteria?

The vegetated part of the wetland is on the shores of a body of open water (without any vegetation on the surface) at least 20 acres (8 ha) in size;

At least 30% of the open water area is deeper than 3 m (10 ft)?

NO - go to Step 2 **YES** - The wetland class is **Lake-fringe (lacustrine fringe)**

2. Does the entire wetland unit **meet all** of the following criteria?

The wetland is on a slope (*slope can be very gradual*),

The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.

The water leaves the wetland **without being impounded**?

NOTE: *Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a foot deep).*

NO - go to Step 3 **YES** - The wetland class is **Slope**

3. Is the entire wetland unit in a valley or stream channel where it gets inundated by overbank flooding from that stream or river? In general, the flooding should occur at least once every ten years to answer "yes." *The wetland can contain depressions that are filled with water when the river is not flooding.*

NO - go to Step 4 **YES** - The wetland class is **Riverine**

4. Is the entire wetland unit in a topographic depression, outside areas that are inundated by overbank flooding, in which water ponds, or is saturated to the surface, at some time of the year. *This means that any outlet, if present, is higher than the interior of the wetland.*

NO - go to Step 5 **YES** - The wetland class is **Depressional**

5. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

Wetland name or number W8

HGM Classes Within One Delineated Wetland Boundary	Class to Use for Rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine (riverine is within boundary of depression)	Depressional
Depressional + Lake-fringe	Depressional

If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

D Depressional Wetlands		Points
WATER QUALITY FUNCTIONS - Indicators that the wetland functions to improve water quality		(only 1 score per box)
D	D 1.0 Does the wetland unit have the <u>potential</u> to improve water quality?	(see p. 38)
D	D 1.1 Characteristics of surface water flows out of the wetland unit: Wetland has no surface water outlet - points = 5 Wetland has an intermittently flowing outlet points = 3 Wetland has a highly constricted permanently flowing outlet points = 3 Wetland has a permanently flowing surface outlet points = 1	3
D	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (use NRCS definitions of soil types) YES points = 3 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class) Wetland has persistent, ungrazed, vegetation for > 2/3 of area points = 5 Wetland has persistent, ungrazed, vegetation from 1/3 to 2/3 of area points = 3 Wetland has persistent, ungrazed vegetation from 1/10 to < 1/3 of area points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area points = 0 Map of Cowardin vegetation classes	Figure 6 1
D	D 1.4 Characteristics of seasonal ponding or inundation. <i>This is the area of ponding that fluctuates every year. Do not count the area that is permanently ponded.</i> Area seasonally ponded is > 1/2 total area of wetland points = 3 Area seasonally ponded is 1/4 - 1/2 total area of wetland points = 1 Area seasonally ponded is < 1/4 total area of wetland points = 0 NOTE: See text for indicators of seasonal and permanent inundation/flooding. Map of Hydroperiods	Figure 12 3
D	Total for D 1 Add the points in the boxes above	7
D	D 2. Does the wetland unit have the <u>opportunity</u> to improve water quality? Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity. — Grazing in the wetland or within 150 ft — Untreated stormwater discharges to wetland — Tilled fields or orchards within 150 ft of wetland <input checked="" type="checkbox"/> A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging — Residential, urban areas, golf courses are within 150 ft of wetland — Wetland is fed by groundwater high in phosphorus or nitrogen — Other _____ YES multiplier is 2 NO multiplier is 1	multiplier <u>2</u>
D	TOTAL - Water Quality Functions Multiply the score from D1 by the multiplier in D2 <i>Record score on p. 1 of field form</i>	14

These questions apply to wetlands of all HGM classes.		Points (only 1 score per box)								
HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat										
H 1. Does the wetland unit have the <u>potential</u> to provide habitat for many species?										
<p>H 1.1 <u>Categories of vegetation structure</u> (see p.62) <i>Check the vegetation classes (as defined by Cowardin) and heights of emergents present. Size threshold for each class or height category is 1/4 acre or more than 10% of the area if unit is < 2.5 acres.</i></p> <p><input type="checkbox"/> Aquatic bed <input checked="" type="checkbox"/> Emergent plants 0-12 in. (0 – 30 cm) high are the highest layer and have > 30% cover <input type="checkbox"/> Emergent plants >12 – 40 in.(>30 – 100cm) high are the highest layer with >30% cover <input type="checkbox"/> Emergent plants > 40 in.(> 100cm) high are the highest layer with >30% cover <input type="checkbox"/> Scrub/shrub (areas where shrubs have >30% cover) <input type="checkbox"/> Forested (areas where trees have >30% cover)</p> <p><i>Add the number of vegetation types that qualify. If you have:</i></p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td>4-6 types</td> <td>points = 3</td> </tr> <tr> <td>3 types</td> <td>points = 2</td> </tr> <tr> <td>2 types</td> <td>points = 1</td> </tr> <tr> <td>1 type</td> <td>points = 0</td> </tr> </table> <p>Map of Cowardin vegetation classes and areas with different heights of emergents</p>		4-6 types	points = 3	3 types	points = 2	2 types	points = 1	1 type	points = 0	<p>Figure 6</p> <p style="text-align: center; font-size: 2em;">0</p>
4-6 types	points = 3									
3 types	points = 2									
2 types	points = 1									
1 type	points = 0									
<p>H 1.2. Is one of the vegetation types “aquatic bed?” (see p .64) YES = 1 point NO = 0 points</p>		<p style="font-size: 2em;">0</p>								
<p>H 1.3. <u>Surface Water</u> (see p.65)</p> <p>H 1.3.1 Does the unit have areas of “open” water (without herbaceous or shrub plants) over at least 1/4 acre or 10% of its area during the spring (March – early June) OR in early fall (August – end of September)? <i>Note: answer YES for Lake-fringe wetlands</i></p> <p><input checked="" type="radio"/> YES = 3 points & go to H 1.4 NO = go to H 1.3.2</p> <p>H 1.3.2 Does the unit have an intermittent or permanent stream within its boundaries, or along one side, over at least 1/4 acre or 10% of its area, AND that has an unvegetated bottom (<i>answer yes only if H 1.3.1 is NO</i>)?</p> <p>YES = 3 points NO = 0 points</p> <p style="text-align: center;">Map showing areas of open water</p>		<p>Figure 12</p> <p style="text-align: center; font-size: 2em;">3</p>								
<p>H 1.4. <u>Richness of Plant Species</u> (see p. 66) Count the number of plant species in the wetland that cover at least 10 ft². (<i>different patches of the same species can be combined to meet the size threshold</i>) <i>You do not have to name the species.</i> <i>Do not include Eurasean Milfoil, reed canarygrass, purple loosestrife, Russian Olive, Phragmites ,Canadian Thistle, Yellow-flag Iris, and Salt Cedar (Tamarisk)</i></p> <p>If you counted: > 9 species points = 2 4-9 species points = 1 # of species <u>2</u> < 4 species points = 0 points</p> <p><i>List species below if you wish</i></p>		<p style="font-size: 2em;">0</p>								

<p>H 1.5. Interspersion of habitats (<i>see p. 67</i>) Decided from the diagrams below whether interspersion between categories of vegetation (described in H 1.1), or categories and un-vegetated areas (can include open water or mudflats) is high, medium, low, or none.</p> <p>None = 0 points Low = 1 point Moderate = 2 points Moderate = 2 points</p> <p>High = 3 points High = 3 points [Riparian braided channel]</p> <p>NOTE: If you have four or more vegetation categories or three vegetation categories and open water the rating is always “high”. Use maps from H1.1 and H1.3</p>	<p>Figure 6</p> <p style="text-align: center;">1</p>
<p>H 1.6. Special Habitat Features: (<i>see p. 68</i>) Check the habitat features that are present in the wetland unit. The number of checks is the number of points you put into the next column.</p> <p><input type="checkbox"/> Loose rocks larger than 4" or large, downed, woody debris (>4in. diameter) within the area of surface ponding or in stream.</p> <p><input type="checkbox"/> Cattails or bulrushes are present within the unit.</p> <p><input type="checkbox"/> Standing snags (diameter at the bottom > 4 inches) in the wetland unit or within 30 m (100ft) of the edge.</p> <p><input type="checkbox"/> Emergent or shrub vegetation in areas that are permanently inundated/ponded. <i>The presence of “yellow flag” Iris is a good indicator of vegetation in areas permanently ponded.</i></p> <p><input type="checkbox"/> Stable steep banks of fine material that might be used by beaver or muskrat for denning (>45 degree slope) OR signs of recent beaver activity</p> <p><input checked="" type="checkbox"/> Invasive species cover less than 20% in each stratum of vegetation (<i>canopy, sub-canopy, shrubs, herbaceous, moss/ground cover</i>)</p> <p style="text-align: right;"><i>Maximum score possible = 6</i></p>	<p style="text-align: center;">1</p>
<p style="text-align: right;">TOTAL Potential to provide habitat <i>Add the scores in the column above</i></p>	<p style="text-align: center; border: 2px dashed black;">5</p>

Comments

<p>H 2.0 Does the wetland have the opportunity to provide habitat for many species?</p>	
<p>H 2.1 Buffers (<i>see p. 71</i>) <i>Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of “undisturbed.” Relatively undisturbed also means no grazing, no landscaping, no daily human use, and no structures or paving within undisturbed part of buffer.</i></p> <ul style="list-style-type: none"> — 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference Points = 5 X 330 ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. Points = 4 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. Points = 4 — 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . Points = 3 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. Points = 3 <p style="text-align: center;">If buffer does not meet any of the criteria above</p> <ul style="list-style-type: none"> — No paved areas (except paved trails) or buildings within 80ft (25 m) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — No paved areas or buildings within 170ft (50m) of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — Heavy grazing in buffer. Points = 1 — Vegetated buffers are <6.6ft wide (2m) for more than 95% of the circumference (e.g . tilled fields, paving, basalt bedrock extend to edge of wetland). Points = 0 — Buffer does not meet any of the criteria above. Points = 1 <p style="text-align: center;">Aerial photo showing buffers</p>	<p>Figure 18</p> <p style="text-align: center; font-size: 2em;">4</p>
<p>H 2.2 Wet Corridors (<i>see p. 72</i>)</p> <p>H 2.2.1 Is the wetland unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor at least ¼ mile long with surface water or flowing water throughout most of the year (> 9 months/yr)? (<i>dams, heavily used gravel roads, paved roads, fields tilled to edge of stream, or pasture to edge of stream are considered breaks in the corridor</i>).</p> <p>YES = 4 points (go to H 2.3) (NO) = go to H 2.2.2</p> <p>H 2.2.2 Is the unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor, at least ¼ mile long with water flowing seasonally, OR a lake-fringe wetland without a “wet” corridor, OR a riverine wetland without a surface channel connecting to the stream?</p> <p>YES = 2 points (go to H 2.3) (NO) go to H 2.2.3</p> <p>H 2.2.3 Is the wetland within a 1/2 mile of any permanent stream, seasonal stream, or lake (<i>do not include man-made ditches</i>)?</p> <p>(YES) = 1 point NO = 0 points</p>	<p style="text-align: center; font-size: 2em;">1</p>

H 2.3 Near or adjacent to other priority habitats listed by WDFW (see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report <http://wdfw.wa.gov/hab/phslist.htm>)

Which of the following priority habitats are within 330ft (100m) of the wetland unit? *NOTE: the connections to the habitats can be disturbed.*

- Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acre).
- Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report p. 152*).
- Eastside Steppe:** Non-forested vegetation type dominated by broadleaf herbaceous flora (*full description of herbaceous species found here are in WDFW PHS report p. 153*).
- Old-growth/Mature forests (east of Cascade crest):** (*full descriptions in WDFW PHS report p. 157*). **Old-growth:** Stands are > 150 yrs in age; may be variable in tree species composition and structural characteristics due to the influence of fire, climate, and soils. **Mature:** Stands 80 – 160 yrs old. Decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth.
- Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158*).
- Juniper Savannah:** All juniper woodlands (*SE part of state only; check map*)
- Shrub-steppe:** A nonforested vegetation type consisting of one or more layers of perennial bunchgrasses and a conspicuous but discontinuous layer of shrubs (see Eastside Steppe for sites with little or no shrub cover).
- Riparian:** The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- Inland Dunes** This placeholder is for a new priority habitat that will capture areas known as Inland Dunes. A definition will be developed later in Fall 2008. (*check WDFW web site*)
- Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
- Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
- Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft.
- Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 30 cm (12 in) in eastern Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long.

If wetland has **2 or more** Priority Habitats = **4 points**
 If wetland has **1** Priority Habitat = **2 points**
 No Priority habitats = **0 points**

0

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)

<p>H 2.4 <u>Landscape</u> (choose the one description of the landscape around the wetland that best fits) (see p. 76)</p> <ul style="list-style-type: none"> — The wetland unit is in an area where annual rainfall is less than 12 inches, and its water regime is not influenced by irrigation practices, dams, or water control structures. (Generally, this means outside boundaries of reclamation areas, irrigation district, or reservoirs) points = 5 — There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing in the connection or an open water connection along a lake shore without heavy boat traffic are OK, but connections should NOT be bisected by paved roads, fill, fields, heavy boat traffic or other development) points = 5 <input checked="" type="checkbox"/> There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed? points = 2 — There is at least 1 wetland within ½ mile. points = 1 — Does not meet any of the four criteria above points = 0 	2
<p>H 2. TOTAL Score - opportunity for providing habitat Add the scores in the column above</p>	7
<p>H 3.0 Does the wetland unit have indicators that its ability to provide habitat is reduced?</p>	
<p>H 3.1 <u>Indicator of reduced habitat functions</u> (see p. 75) Do the areas of open water in the wetland unit have a resident population of carp (see text for indicators of the presence of carp)? (NOTE: This question does not apply to reservoirs with water levels controlled by dams, such as the reservoirs on the Columbia and Snake Rivers)</p> <p style="text-align: center;">YES = - 5 points <input checked="" type="radio"/> NO = 0 points</p>	<p>Points will be subtracted</p> <p>0</p>
<p>Total Score for Habitat Functions – add the points for H 1, H 2, and H 3 and record the result on p. 1</p>	
<p>12</p>	

Comments

<p>SC 5.0 Forested Wetlands (see p. 85)</p> <p>Does the wetland unit have an area of forest (<i>you should have identified a forested class, if present, in question H 1.1</i>) rooted within its boundary that meet at least one of the following three criteria?</p> <ul style="list-style-type: none"> — The wetland is within the “100 year” floodplain of a river or stream — aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant of the “woody” vegetation. (<i>Dominants means it represents at least 50% of the cover of woody species, co-dominant means it represents at least 20% of the total cover of woody species</i>) — There is at least ¼ acre of trees (even in wetlands smaller than 2.5 acres) that are “mature” or “old-growth” according to the definitions for these priority habitats developed by WDFW (<i>see p. 83</i>) <p>YES = go to SC 5.1 NO – <i>not a forested wetland with special characteristics</i></p>	
<p>SC 5.1 Does the wetland unit have a forest canopy where more than 50% of the tree species (by cover) are slow growing native trees</p> <p>Slow growing trees are: western red cedar (<i>Thuja plicata</i>), Alaska yellow cedar (<i>Chamaecyparis nootkatensis</i>), pine spp. mostly “white” pine (<i>Pinus monticola</i>), western hemlock (<i>Tsuga heterophylla</i>), Englemann spruce (<i>Picea engelmannii</i>).</p> <p>YES = Category I NO = go to SC 5.2</p>	<p>Cat. I</p>
<p>SC 5.2 Does the unit have areas where aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant species?</p> <p>YES = Category I NO = go to SC 5.3</p>	<p>Cat. I</p>
<p>SC 5.3 Does the wetland unit have areas with a forest canopy where more than 50% of the tree species (by cover) are fast growing species.</p> <p>Fast growing species are:</p> <p>Alders – red (<i>Alnus rubra</i>), thin-leaf (<i>A. tenuifolia</i>)</p> <p>Cottonwoods – narrow-leaf (<i>Populus angustifolia</i>), black (<i>P. balsamifera</i>)</p> <p>Willows- peach-leaf (<i>Salix amygdaloides</i>), Sitka (<i>S. sitchensis</i>), Pacific (<i>S. lasiandra</i>), Aspen - (<i>Populus tremuloides</i>), Water Birch (<i>Betula occidentalis</i>)</p> <p>YES = Category II NO = go to SC 5.5</p>	<p>Cat. II</p>
<p>SC 5.5 Is the forested component of the wetland within the “100 year floodplain” of a river or stream?</p> <p>YES = Category II</p>	<p>Cat. II</p>
<p>Category of wetland based on Special Characteristics</p> <p><i>Choose the “highest” rating if wetland falls into several categories.</i></p> <p>If you answered NO for all types enter “Not Applicable” on p.1</p>	<p>NA</p>

Wetland name or number W9

WETLAND RATING FORM – EASTERN WASHINGTON

Version 2 - Updated June 2006 to increase accuracy and reproducibility among users
Updated Oct 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): W9 Date of site visit: 6/10/09

Rated by Forrest Parsons/Joel Shaich Trained by Ecology? Yes ___ No X Date of training _____

SEC: 22 TOWNSHIP: 20N RANGE: 16E Is S/T/R in Appendix D? Yes ___ No X

Map of wetland unit: Figure _____ Estimated size 0.013 acre

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I ___ II ___ III X IV ___

Category I = Score >=70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for "Water Quality" Functions	9
Score for Hydrologic Functions	20
Score for Habitat Functions	11
TOTAL score for functions	40

Category based on SPECIAL CHARACTERISTICS of wetland

I ___ II ___ III ___ Does not Apply X

Final Category (choose the "highest" category from above)

3

Summary of basic information about the wetland unit

Wetland Type		Wetland Class	
Vernal Pool		Depressional	X
Alkali		Riverine	
Natural Heritage Wetland		Lake-fringe	
Bog		Slope	
Forest			
None of the above	X	Check if unit has multiple HGM classes present	

Does the wetland being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That Need Special Protection, and That Are Not Included in the Rating	YES	NO
<p>SP1. <i>Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered animal or plant species (T/E species)?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.</p>		X
<p>SP2. <i>Has the wetland unit been documented as habitat for any State listed Threatened or Endangered animal species?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands (see p. 19 of data form).</p>		X
<p>SP3. <i>Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?</i></p>		X
<p>SP4. <i>Does the wetland unit have a local significance in addition to its functions?</i> For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.</p>		X

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 20 for more detailed instructions on classifying wetlands.

Classification of Vegetated Wetlands for Eastern Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Does the entire wetland unit **meet both** of the following criteria?

The vegetated part of the wetland is on the shores of a body of open water (without any vegetation on the surface) at least 20 acres (8 ha) in size;

At least 30% of the open water area is deeper than 3 m (10 ft)?

NO - go to Step 2

YES - The wetland class is **Lake-fringe (lacustrine fringe)**

2. Does the entire wetland unit **meet all** of the following criteria?

The wetland is on a slope (*slope can be very gradual*),

The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.

The water leaves the wetland **without being impounded**?

NOTE: *Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a foot deep).*

NO - go to Step 3

YES - The wetland class is **Slope**

3. Is the entire wetland unit in a valley or stream channel where it gets inundated by overbank flooding from that stream or river? In general, the flooding should occur at least once every ten years to answer "yes." *The wetland can contain depressions that are filled with water when the river is not flooding.*

NO - go to Step 4

YES - The wetland class is **Riverine**

4. Is the entire wetland unit in a topographic depression, outside areas that are inundated by overbank flooding, in which water ponds, or is saturated to the surface, at some time of the year. *This means that any outlet, if present, is higher than the interior of the wetland.*

NO - go to Step 5

YES - The wetland class is **Depressional**

5. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

Wetland name or number W9

HGM Classes Within One Delineated Wetland Boundary	Class to Use for Rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine (riverine is within boundary of depression)	Depressional
Depressional + Lake-fringe	Depressional

If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

D Depressional Wetlands		Points
WATER QUALITY FUNCTIONS - Indicators that the wetland functions to improve water quality		(only 1 score per box)
D	D 1.0 Does the wetland unit have the <u>potential</u> to improve water quality?	(see p. 38)
D	D 1.1 Characteristics of surface water flows out of the wetland unit: Wetland has no surface water outlet - points = 5 Wetland has an intermittently flowing outlet points = 3 Wetland has a highly constricted permanently flowing outlet points = 3 Wetland has a permanently flowing surface outlet points = 1	3
D	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (<i>use NRCS definitions of soil types</i>) YES points = 3 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class) Wetland has persistent, ungrazed, vegetation for > 2/3 of area points = 5 Wetland has persistent, ungrazed, vegetation from 1/3 to 2/3 of area points = 3 Wetland has persistent, ungrazed vegetation from 1/10 to < 1/3 of area points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area points = 0 Map of Cowardin vegetation classes	Figure 6 3
D	D 1.4 Characteristics of seasonal ponding or inundation. <i>This is the area of ponding that fluctuates every year. Do not count the area that is permanently ponded.</i> Area seasonally ponded is > 1/2 total area of wetland points = 3 Area seasonally ponded is 1/4 - 1/2 total area of wetland points = 1 Area seasonally ponded is < 1/4 total area of wetland points = 0 NOTE: See text for indicators of seasonal and permanent inundation/flooding. Map of Hydroperiods	Figure 12 3
D	Total for D 1 <i>Add the points in the boxes above</i>	9
D	D 2. Does the wetland unit have the <u>opportunity</u> to improve water quality? Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. <i>Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.</i> — Grazing in the wetland or within 150 ft — Untreated stormwater discharges to wetland — Tilled fields or orchards within 150 ft of wetland — A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging — Residential, urban areas, golf courses are within 150 ft of wetland — Wetland is fed by groundwater high in phosphorus or nitrogen — Other _____ YES multiplier is 2 NO multiplier is 1	multiplier <u>1</u>
D	TOTAL - Water Quality Functions Multiply the score from D1 by the multiplier in D2 <i>Record score on p. 1 of field form</i>	9

These questions apply to wetlands of all HGM classes.		Points (only 1 score per box)								
HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat										
H 1. Does the wetland unit have the <u>potential</u> to provide habitat for many species?										
<p>H 1.1 <u>Categories of vegetation structure</u> (see p.62) <i>Check the vegetation classes (as defined by Cowardin) and heights of emergents present. Size threshold for each class or height category is 1/4 acre or more than 10% of the area if unit is < 2.5 acres.</i></p> <p><input type="checkbox"/> Aquatic bed <input checked="" type="checkbox"/> Emergent plants 0-12 in. (0 – 30 cm) high are the highest layer and have > 30% cover <input type="checkbox"/> Emergent plants >12 – 40 in.(>30 – 100cm) high are the highest layer with >30% cover <input type="checkbox"/> Emergent plants > 40 in.(> 100cm) high are the highest layer with >30% cover <input type="checkbox"/> Scrub/shrub (areas where shrubs have >30% cover) <input type="checkbox"/> Forested (areas where trees have >30% cover)</p> <p><i>Add the number of vegetation types that qualify. If you have:</i></p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td>4-6 types</td> <td>points = 3</td> </tr> <tr> <td>3 types</td> <td>points = 2</td> </tr> <tr> <td>2 types</td> <td>points = 1</td> </tr> <tr> <td>1 type</td> <td>points = 0</td> </tr> </table> <p>Map of Cowardin vegetation classes and areas with different heights of emergents</p>		4-6 types	points = 3	3 types	points = 2	2 types	points = 1	1 type	points = 0	Figure 6 0
4-6 types	points = 3									
3 types	points = 2									
2 types	points = 1									
1 type	points = 0									
<p>H 1.2. Is one of the vegetation types “aquatic bed?” (see p .64) YES = 1 point NO = 0 points</p>		0								
<p>H 1.3. <u>Surface Water</u> (see p.65) H 1.3.1 Does the unit have areas of “open” water (without herbaceous or shrub plants) over at least 1/4 acre or 10% of its area during the spring (March – early June) OR in early fall (August – end of September)? <i>Note: answer YES for Lake-fringe wetlands</i> <input checked="" type="checkbox"/> YES = 3 points & go to H 1.4 NO = go to H 1.3.2 H 1.3.2 Does the unit have an intermittent or permanent stream within its boundaries, or along one side, over at least 1/4 acre or 10% of its area, AND that has an unvegetated bottom (answer yes only if H 1.3.1 is NO)? YES = 3 points NO = 0 points Map showing areas of open water</p>		Figure 12 3								
<p>H 1.4. <u>Richness of Plant Species</u> (see p. 66) Count the number of plant species in the wetland that cover at least 10 ft². (different patches of the same species can be combined to meet the size threshold) You do not have to name the species. Do not include Eurasean Milfoil, reed canarygrass, purple loosestrife, Russian Olive, Phragmites ,Canadian Thistle, Yellow-flag Iris, and Salt Cedar (Tamarisk)</p> <p>If you counted: > 9 species points = 2 4-9 species points = 1 # of species <u>1</u> < 4 species points = 0 points List species below if you wish</p>		 0								

<p>H 1.5. Interspersion of habitats (<i>see p. 67</i>) Decided from the diagrams below whether interspersion between categories of vegetation (described in H 1.1), or categories and un-vegetated areas (can include open water or mudflats) is high, medium, low, or none.</p> <p>None = 0 points Low = 1 point Moderate = 2 points Moderate = 2 points</p> <p>High = 3 points High = 3 points [Riparian braided channel]</p> <p>NOTE: If you have four or more vegetation categories or three vegetation categories and open water the rating is always “high”. Use maps from H1.1 and H1.3</p>	<p>Figure 6</p> <p style="text-align: center; font-size: 2em;">1</p>
<p>H 1.6. Special Habitat Features: (<i>see p. 68</i>) Check the habitat features that are present in the wetland unit. The number of checks is the number of points you put into the next column.</p> <p><input type="checkbox"/> Loose rocks larger than 4" or large, downed, woody debris (>4in. diameter) within the area of surface ponding or in stream.</p> <p><input type="checkbox"/> Cattails or bulrushes are present within the unit.</p> <p><input type="checkbox"/> Standing snags (diameter at the bottom > 4 inches) in the wetland unit or within 30 m (100ft) of the edge.</p> <p><input type="checkbox"/> Emergent or shrub vegetation in areas that are permanently inundated/ponded. <i>The presence of “yellow flag” Iris is a good indicator of vegetation in areas permanently ponded.</i></p> <p><input type="checkbox"/> Stable steep banks of fine material that might be used by beaver or muskrat for denning (>45 degree slope) OR signs of recent beaver activity</p> <p><input type="checkbox"/> Invasive species cover less than 20% in each stratum of vegetation (<i>canopy, sub-canopy, shrubs, herbaceous, moss/ground cover</i>)</p> <p style="text-align: right;"><i>Maximum score possible = 6</i></p>	<p style="text-align: center; font-size: 2em;">0</p>
<p style="text-align: right;">TOTAL Potential to provide habitat <i>Add the scores in the column above</i></p>	<p style="text-align: center; font-size: 2em; border: 2px dashed black;">4</p>

Comments

<p>H 2.0 Does the wetland have the opportunity to provide habitat for many species?</p>	
<p>H 2.1 Buffers (<i>see p. 71</i>) <i>Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of “undisturbed.” Relatively undisturbed also means no grazing, no landscaping, no daily human use, and no structures or paving within undisturbed part of buffer.</i></p> <ul style="list-style-type: none"> — 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference Points = 5 X 330 ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. Points = 4 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. Points = 4 — 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . Points = 3 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. Points = 3 <p style="text-align: center;">If buffer does not meet any of the criteria above</p> <ul style="list-style-type: none"> — No paved areas (except paved trails) or buildings within 80ft (25 m) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — No paved areas or buildings within 170ft (50m) of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — Heavy grazing in buffer. Points = 1 — Vegetated buffers are <6.6ft wide (2m) for more than 95% of the circumference (e.g . tilled fields, paving, basalt bedrock extend to edge of wetland). Points = 0 — Buffer does not meet any of the criteria above. Points = 1 <p style="text-align: center;">Aerial photo showing buffers</p>	<p>Figure 18</p> <p style="text-align: center; font-size: 2em;">4</p>
<p>H 2.2 Wet Corridors (<i>see p. 72</i>)</p> <p>H 2.2.1 Is the wetland unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor at least ¼ mile long with surface water or flowing water throughout most of the year (> 9 months/yr)? (<i>dams, heavily used gravel roads, paved roads, fields tilled to edge of stream, or pasture to edge of stream are considered breaks in the corridor</i>).</p> <p>YES = 4 points (go to H 2.3) (NO) = go to H 2.2.2</p> <p>H 2.2.2 Is the unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor, at least ¼ mile long with water flowing seasonally, OR a lake-fringe wetland without a “wet” corridor, OR a riverine wetland without a surface channel connecting to the stream?</p> <p>YES = 2 points (go to H 2.3) (NO) go to H 2.2.3</p> <p>H 2.2.3 Is the wetland within a 1/2 mile of any permanent stream, seasonal stream, or lake (<i>do not include man-made ditches</i>)?</p> <p>(YES) = 1 point NO = 0 points</p>	<p style="text-align: center; font-size: 2em;">1</p>

<p>H 2.3 <u>Near or adjacent to other priority habitats listed by WDFW (see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report http://wdfw.wa.gov/hab/phslist.htm)</u></p> <p>Which of the following priority habitats are within 330ft (100m) of the wetland unit? <i>NOTE: the connections to the habitats can be disturbed.</i></p> <p><input type="checkbox"/> Aspen Stands: Pure or mixed stands of aspen greater than 0.4 ha (1 acre).</p> <p><input type="checkbox"/> Biodiversity Areas and Corridors: Areas of habitat that are relatively important to various species of native fish and wildlife (<i>full descriptions in WDFW PHS report p. 152</i>).</p> <p><input type="checkbox"/> Eastside Steppe: Non-forested vegetation type dominated by broadleaf herbaceous flora (<i>full description of herbaceous species found here are in WDFW PHS report p. 153</i>).</p> <p><input type="checkbox"/> Old-growth/Mature forests (east of Cascade crest): (<i>full descriptions in WDFW PHS report p. 157</i>). <u>Old-growth:</u> Stands are > 150 yrs in age; may be variable in tree species composition and structural characteristics due to the influence of fire, climate, and soils. <u>Mature:</u> Stands 80 – 160 yrs old. Decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth.</p> <p><input type="checkbox"/> Oregon white Oak: Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (<i>full descriptions in WDFW PHS report p. 158</i>).</p> <p><input type="checkbox"/> Juniper Savannah: All juniper woodlands (<i>SE part of state only; check map</i>)</p> <p><input type="checkbox"/> Shrub-steppe: A nonforested vegetation type consisting of one or more layers of perennial bunchgrasses and a conspicuous but discontinuous layer of shrubs (see Eastside Steppe for sites with little or no shrub cover).</p> <p><input type="checkbox"/> Riparian: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.</p> <p><input type="checkbox"/> Inland Dunes This placeholder is for a new priority habitat that will capture areas known as Inland Dunes. A definition will be developed later in Fall 2008. (<i>check WDFW web site</i>)</p> <p><input type="checkbox"/> Instream: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.</p> <p><input type="checkbox"/> Caves: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.</p> <p><input type="checkbox"/> Cliffs: Greater than 7.6 m (25 ft) high and occurring below 5000 ft.</p> <p><input type="checkbox"/> Talus: Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.</p> <p><input type="checkbox"/> Snags and Logs: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 30 cm (12 in) in eastern Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long.</p> <p style="text-align: right;">If wetland has 2 or more Priority Habitats = 4 points If wetland has 1 Priority Habitat = 2 points No Priority habitats = 0 points</p> <p><i>Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)</i></p>	<p>0</p>
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<p>H 2.4 <u>Landscape</u> (choose the one description of the landscape around the wetland that best fits) (see p. 76)</p> <ul style="list-style-type: none"> — The wetland unit is in an area where annual rainfall is less than 12 inches, and its water regime is not influenced by irrigation practices, dams, or water control structures. (Generally, this means outside boundaries of reclamation areas, irrigation district, or reservoirs) points = 5 — There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing in the connection or an open water connection along a lake shore without heavy boat traffic are OK, but connections should NOT be bisected by paved roads, fill, fields, heavy boat traffic or other development) points = 5 <input checked="" type="checkbox"/> There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed? points = 2 — There is at least 1 wetland within ½ mile. points = 1 — Does not meet any of the four criteria above points = 0 	2
<p>H 2. TOTAL Score - opportunity for providing habitat Add the scores in the column above</p>	7
<p>H 3.0 Does the wetland unit have indicators that its ability to provide habitat is reduced?</p>	
<p>H 3.1 <u>Indicator of reduced habitat functions</u> (see p. 75) Do the areas of open water in the wetland unit have a resident population of carp (see text for indicators of the presence of carp)? (NOTE: This question does not apply to reservoirs with water levels controlled by dams, such as the reservoirs on the Columbia and Snake Rivers)</p> <p style="text-align: center;">YES = - 5 points <input checked="" type="radio"/> NO = 0 points</p>	<p>Points will be subtracted</p> <p>0</p>
<p>Total Score for Habitat Functions – add the points for H 1, H 2, and H 3 and record the result on p. 1</p>	11

Comments

<p>SC 5.0 Forested Wetlands (see p. 85)</p> <p>Does the wetland unit have an area of forest (<i>you should have identified a forested class, if present, in question H 1.1</i>) rooted within its boundary that meet at least one of the following three criteria?</p> <ul style="list-style-type: none"> — The wetland is within the “100 year” floodplain of a river or stream — aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant of the “woody” vegetation. (<i>Dominants means it represents at least 50% of the cover of woody species, co-dominant means it represents at least 20% of the total cover of woody species</i>) — There is at least ¼ acre of trees (even in wetlands smaller than 2.5 acres) that are “mature” or “old-growth” according to the definitions for these priority habitats developed by WDFW (<i>see p. 83</i>) <p>YES = go to SC 5.1 NO <i>not a forested wetland with special characteristics</i></p>	
<p>SC 5.1 Does the wetland unit have a forest canopy where more than 50% of the tree species (by cover) are slow growing native trees</p> <p>Slow growing trees are: western red cedar (<i>Thuja plicata</i>), Alaska yellow cedar (<i>Chamaecyparis nootkatensis</i>), pine spp. mostly “white” pine (<i>Pinus monticola</i>), western hemlock (<i>Tsuga heterophylla</i>), Englemann spruce (<i>Picea engelmannii</i>).</p> <p>YES = Category I NO = go to SC 5.2</p>	Cat. I
<p>SC 5.2 Does the unit have areas where aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant species?</p> <p>YES = Category I NO = go to SC 5.3</p>	Cat. I
<p>SC 5.3 Does the wetland unit have areas with a forest canopy where more than 50% of the tree species (by cover) are fast growing species.</p> <p>Fast growing species are:</p> <p>Alders – red (<i>Alnus rubra</i>), thin-leaf (<i>A. tenuifolia</i>)</p> <p>Cottonwoods – narrow-leaf (<i>Populus angustifolia</i>), black (<i>P. balsamifera</i>)</p> <p>Willows- peach-leaf (<i>Salix amygdaloides</i>), Sitka (<i>S. sitchensis</i>), Pacific (<i>S. lasiandra</i>), Aspen - (<i>Populus tremuloides</i>), Water Birch (<i>Betula occidentalis</i>)</p> <p>YES = Category II NO = go to SC 5.5</p>	Cat. II
<p>SC 5.5 Is the forested component of the wetland within the “100 year floodplain” of a river or stream?</p> <p>YES = Category II</p>	Cat. II
<p>Category of wetland based on Special Characteristics</p> <p><i>Choose the “highest” rating if wetland falls into several categories.</i></p> <p>If you answered NO for all types enter “Not Applicable” on p.1</p>	NA

Wetland name or number W10

WETLAND RATING FORM – EASTERN WASHINGTON

Version 2 - Updated June 2006 to increase accuracy and reproducibility among users
Updated Oct 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): W10 Date of site visit: 6/10/09

Rated by Forrest Parsons/Joel Shaich Trained by Ecology? Yes ___ No X Date of training _____

SEC: 22 TOWNSHIP: 20N RANGE: 16E Is S/T/R in Appendix D? Yes ___ No X

Map of wetland unit: Figure _____ Estimated size 0.019 acre

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I ___ II ___ III X IV ___

Category I = Score >=70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for "Water Quality" Functions	11
Score for Hydrologic Functions	20
Score for Habitat Functions	11
TOTAL score for functions	42

Category based on SPECIAL CHARACTERISTICS of wetland

I ___ II ___ III ___ Does not Apply X

Final Category (choose the "highest" category from above)

3

Summary of basic information about the wetland unit

Wetland Type		Wetland Class	
Vernal Pool		Depressional	X
Alkali		Riverine	
Natural Heritage Wetland		Lake-fringe	
Bog		Slope	
Forest			
None of the above	X	Check if unit has multiple HGM classes present	

Does the wetland being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That Need Special Protection, and That Are Not Included in the Rating	YES	NO
<p>SP1. <i>Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered animal or plant species (T/E species)?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.</p>		X
<p>SP2. <i>Has the wetland unit been documented as habitat for any State listed Threatened or Endangered animal species?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands (see p. 19 of data form).</p>		X
<p>SP3. <i>Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?</i></p>		X
<p>SP4. <i>Does the wetland unit have a local significance in addition to its functions?</i> For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.</p>		X

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 20 for more detailed instructions on classifying wetlands.

Classification of Vegetated Wetlands for Eastern Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Does the entire wetland unit **meet both** of the following criteria?

The vegetated part of the wetland is on the shores of a body of open water (without any vegetation on the surface) at least 20 acres (8 ha) in size;

At least 30% of the open water area is deeper than 3 m (10 ft)?

NO - go to Step 2 **YES** - The wetland class is **Lake-fringe (lacustrine fringe)**

2. Does the entire wetland unit **meet all** of the following criteria?

The wetland is on a slope (*slope can be very gradual*),

The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.

The water leaves the wetland **without being impounded**?

NOTE: *Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a foot deep).*

NO - go to Step 3 **YES** - The wetland class is **Slope**

3. Is the entire wetland unit in a valley or stream channel where it gets inundated by overbank flooding from that stream or river? In general, the flooding should occur at least once every ten years to answer "yes." *The wetland can contain depressions that are filled with water when the river is not flooding.*

NO - go to Step 4 **YES** - The wetland class is **Riverine**

4. Is the entire wetland unit in a topographic depression, outside areas that are inundated by overbank flooding, in which water ponds, or is saturated to the surface, at some time of the year. *This means that any outlet, if present, is higher than the interior of the wetland.*

NO - go to Step 5 **YES** - The wetland class is **Depressional**

5. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

Wetland name or number W10

HGM Classes Within One Delineated Wetland Boundary	Class to Use for Rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine (riverine is within boundary of depression)	Depressional
Depressional + Lake-fringe	Depressional

If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

D Depressional Wetlands		Points
WATER QUALITY FUNCTIONS - Indicators that the wetland functions to improve water quality		(only 1 score per box)
D	D 1.0 Does the wetland unit have the <u>potential</u> to improve water quality?	(see p. 38)
D	D 1.1 Characteristics of surface water flows out of the wetland unit: Wetland has no surface water outlet - points = 5 Wetland has an intermittently flowing outlet points = 3 Wetland has a highly constricted permanently flowing outlet points = 3 Wetland has a permanently flowing surface outlet points = 1	3
D	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (use NRCS definitions of soil types) YES points = 3 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class) Wetland has persistent, ungrazed, vegetation for > 2/3 of area points = 5 Wetland has persistent, ungrazed, vegetation from 1/3 to 2/3 of area points = 3 Wetland has persistent, ungrazed vegetation from 1/10 to < 1/3 of area points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area points = 0 Map of Cowardin vegetation classes	Figure 3 5
D	D 1.4 Characteristics of seasonal ponding or inundation. <i>This is the area of ponding that fluctuates every year. Do not count the area that is permanently ponded.</i> Area seasonally ponded is > 1/2 total area of wetland points = 3 Area seasonally ponded is 1/4 - 1/2 total area of wetland points = 1 Area seasonally ponded is < 1/4 total area of wetland points = 0 NOTE: See text for indicators of seasonal and permanent inundation/flooding. Map of Hydroperiods	Figure 9 3
D	Total for D 1 Add the points in the boxes above	11
D	D 2. Does the wetland unit have the <u>opportunity</u> to improve water quality? Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity. — Grazing in the wetland or within 150 ft — Untreated stormwater discharges to wetland — Tilled fields or orchards within 150 ft of wetland — A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging — Residential, urban areas, golf courses are within 150 ft of wetland — Wetland is fed by groundwater high in phosphorus or nitrogen — Other _____ YES multiplier is 2 NO multiplier is 1	multiplier <u>1</u>
D	TOTAL - Water Quality Functions Multiply the score from D1 by the multiplier in D2 <i>Record score on p. 1 of field form</i>	11

These questions apply to wetlands of all HGM classes.		Points (only 1 score per box)								
HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat										
H 1. Does the wetland unit have the <u>potential</u> to provide habitat for many species?										
<p>H 1.1 <u>Categories of vegetation structure</u> (see p.62) <i>Check the vegetation classes (as defined by Cowardin) and heights of emergents present. Size threshold for each class or height category is 1/4 acre or more than 10% of the area if unit is < 2.5 acres.</i></p> <p><input type="checkbox"/> Aquatic bed <input checked="" type="checkbox"/> Emergent plants 0-12 in. (0 – 30 cm) high are the highest layer and have > 30% cover <input type="checkbox"/> Emergent plants >12 – 40 in. (>30 – 100cm) high are the highest layer with >30% cover <input type="checkbox"/> Emergent plants > 40 in. (> 100cm) high are the highest layer with >30% cover <input type="checkbox"/> Scrub/shrub (areas where shrubs have >30% cover) <input type="checkbox"/> Forested (areas where trees have >30% cover)</p> <p><i>Add the number of vegetation types that qualify. If you have:</i></p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td>4-6 types</td> <td>points = 3</td> </tr> <tr> <td>3 types</td> <td>points = 2</td> </tr> <tr> <td>2 types</td> <td>points = 1</td> </tr> <tr> <td>1 type</td> <td>points = 0</td> </tr> </table> <p>Map of Cowardin vegetation classes and areas with different heights of emergents</p>		4-6 types	points = 3	3 types	points = 2	2 types	points = 1	1 type	points = 0	Figure 3 0
4-6 types	points = 3									
3 types	points = 2									
2 types	points = 1									
1 type	points = 0									
<p>H 1.2. Is one of the vegetation types “aquatic bed?” (see p .64) YES = 1 point NO = 0 points</p>		0								
<p>H 1.3. <u>Surface Water</u> (see p.65)</p> <p>H 1.3.1 Does the unit have areas of “open” water (without herbaceous or shrub plants) over at least 1/4 acre or 10% of its area during the spring (March – early June) OR in early fall (August – end of September)? <i>Note: answer YES for Lake-fringe wetlands</i> YES = 3 points & go to H 1.4 NO = go to H 1.3.2</p> <p>H 1.3.2 Does the unit have an intermittent or permanent stream within its boundaries, or along one side, over at least 1/4 acre or 10% of its area, AND that has an unvegetated bottom (answer yes only if H 1.3.1 is NO)? YES = 3 points NO = 0 points</p> <p style="text-align: center;">Map showing areas of open water</p>		Figure 9 0								
<p>H 1.4. <u>Richness of Plant Species</u> (see p. 66) Count the number of plant species in the wetland that cover at least 10 ft². (different patches of the same species can be combined to meet the size threshold) You do not have to name the species. Do not include Eurasean Milfoil, reed canarygrass, purple loosestrife, Russian Olive, Phragmites ,Canadian Thistle, Yellow-flag Iris, and Salt Cedar (Tamarisk)</p> <p>If you counted: > 9 species points = 2 4-9 species points = 1 # of species <u>3</u> < 4 species points = 0 points</p> <p><i>List species below if you wish</i></p>		 0								

<p>H 1.5. Interspersion of habitats (see p. 67) Decided from the diagrams below whether interspersion between categories of vegetation (described in H 1.1), or categories and un-vegetated areas (can include open water or mudflats) is high, medium, low, or none.</p> <p>None = 0 points Low = 1 point Moderate = 2 points Moderate = 2 points</p> <p>High = 3 points High = 3 points [Riparian braided channel]</p> <p>NOTE: If you have four or more vegetation categories or three vegetation categories and open water the rating is always "high". Use maps from H1.1 and H1.3</p>	<p>Figure 3</p> <p style="text-align: center; font-size: 2em;">0</p>
<p>H 1.6. Special Habitat Features: (see p. 68) Check the habitat features that are present in the wetland unit. The number of checks is the number of points you put into the next column.</p> <p><input type="checkbox"/> Loose rocks larger than 4" or large, downed, woody debris (>4in. diameter) within the area of surface ponding or in stream.</p> <p><input type="checkbox"/> Cattails or bulrushes are present within the unit.</p> <p><input type="checkbox"/> Standing snags (diameter at the bottom > 4 inches) in the wetland unit or within 30 m (100ft) of the edge.</p> <p><input type="checkbox"/> Emergent or shrub vegetation in areas that are permanently inundated/ponded. <i>The presence of "yellow flag" Iris is a good indicator of vegetation in areas permanently ponded.</i></p> <p><input type="checkbox"/> Stable steep banks of fine material that might be used by beaver or muskrat for denning (>45 degree slope) OR signs of recent beaver activity</p> <p><input type="checkbox"/> Invasive species cover less than 20% in each stratum of vegetation (<i>canopy, sub-canopy, shrubs, herbaceous, moss/ground cover</i>)</p> <p style="text-align: right;">Maximum score possible = 6</p>	<p style="text-align: center; font-size: 2em;">0</p>
<p style="text-align: right;">TOTAL Potential to provide habitat Add the scores in the column above</p>	<p style="text-align: center; font-size: 2em; border: 2px dashed black;">0</p>

Comments

<p>H 2.0 Does the wetland have the opportunity to provide habitat for many species?</p>	
<p>H 2.1 Buffers (<i>see p. 71</i>) <i>Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of “undisturbed.” Relatively undisturbed also means no grazing, no landscaping, no daily human use, and no structures or paving within undisturbed part of buffer.</i></p> <ul style="list-style-type: none"> — 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference Points = 5 X 330 ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. Points = 4 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. Points = 4 — 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . Points = 3 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. Points = 3 <p style="text-align: center;">If buffer does not meet any of the criteria above</p> <ul style="list-style-type: none"> — No paved areas (except paved trails) or buildings within 80ft (25 m) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — No paved areas or buildings within 170ft (50m) of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — Heavy grazing in buffer. Points = 1 — Vegetated buffers are <6.6ft wide (2m) for more than 95% of the circumference (e.g . tilled fields, paving, basalt bedrock extend to edge of wetland). Points = 0 — Buffer does not meet any of the criteria above. Points = 1 <p style="text-align: center;">Aerial photo showing buffers</p>	<p>Figure 15</p> <p style="text-align: center; font-size: 2em;">4</p>
<p>H 2.2 Wet Corridors (<i>see p. 72</i>)</p> <p>H 2.2.1 Is the wetland unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor at least ¼ mile long with surface water or flowing water throughout most of the year (> 9 months/yr)? (<i>dams, heavily used gravel roads, paved roads, fields tilled to edge of stream, or pasture to edge of stream are considered breaks in the corridor</i>).</p> <p>YES = 4 points (go to H 2.3) (NO) = go to H 2.2.2</p> <p>H 2.2.2 Is the unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor, at least ¼ mile long with water flowing seasonally, OR a lake-fringe wetland without a “wet” corridor, OR a riverine wetland without a surface channel connecting to the stream?</p> <p>YES = 2 points (go to H 2.3) (NO) go to H 2.2.3</p> <p>H 2.2.3 Is the wetland within a 1/2 mile of any permanent stream, seasonal stream, or lake (<i>do not include man-made ditches</i>)?</p> <p>(YES) = 1 point NO = 0 points</p>	<p style="text-align: center; font-size: 2em;">1</p>

H 2.3 Near or adjacent to other priority habitats listed by WDFW (see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report <http://wdfw.wa.gov/hab/phslist.htm>)

Which of the following priority habitats are within 330ft (100m) of the wetland unit? *NOTE: the connections to the habitats can be disturbed.*

- Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acre).
- Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report p. 152*).
- Eastside Steppe:** Non-forested vegetation type dominated by broadleaf herbaceous flora (*full description of herbaceous species found here are in WDFW PHS report p. 153*).
- Old-growth/Mature forests (east of Cascade crest):** (*full descriptions in WDFW PHS report p. 157*). **Old-growth:** Stands are > 150 yrs in age; may be variable in tree species composition and structural characteristics due to the influence of fire, climate, and soils. **Mature:** Stands 80 – 160 yrs old. Decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth.
- Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158*).
- Juniper Savannah:** All juniper woodlands (*SE part of state only; check map*)
- Shrub-steppe:** A nonforested vegetation type consisting of one or more layers of perennial bunchgrasses and a conspicuous but discontinuous layer of shrubs (see Eastside Steppe for sites with little or no shrub cover).
- Riparian:** The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- Inland Dunes** This placeholder is for a new priority habitat that will capture areas known as Inland Dunes. A definition will be developed later in Fall 2008. (*check WDFW web site*)
- Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
- Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
- Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft.
- Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 30 cm (12 in) in eastern Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long.

If wetland has **2 or more** Priority Habitats = **4 points**
 If wetland has **1** Priority Habitat = **2 points**
 No Priority habitats = **0 points**

4

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)

<p>H 2.4 <u>Landscape</u> (choose the one description of the landscape around the wetland that best fits) (see p. 76)</p> <ul style="list-style-type: none"> — The wetland unit is in an area where annual rainfall is less than 12 inches, and its water regime is not influenced by irrigation practices, dams, or water control structures. (Generally, this means outside boundaries of reclamation areas, irrigation district, or reservoirs) points = 5 — There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing in the connection or an open water connection along a lake shore without heavy boat traffic are OK, but connections should NOT be bisected by paved roads, fill, fields, heavy boat traffic or other development) points = 5 <input checked="" type="checkbox"/> There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed? points = 2 — There is at least 1 wetland within ½ mile. points = 1 — Does not meet any of the four criteria above points = 0 	2
<p>H 2. TOTAL Score - opportunity for providing habitat Add the scores in the column above</p>	11
<p>H 3.0 Does the wetland unit have indicators that its ability to provide habitat is reduced?</p>	
<p>H 3.1 <u>Indicator of reduced habitat functions</u> (see p. 75) Do the areas of open water in the wetland unit have a resident population of carp (see text for indicators of the presence of carp)? (NOTE: This question does not apply to reservoirs with water levels controlled by dams, such as the reservoirs on the Columbia and Snake Rivers)</p> <p style="text-align: center;">YES = - 5 points <input checked="" type="radio"/> NO = 0 points</p>	<p>Points will be subtracted</p> <p>0</p>
<p>Total Score for Habitat Functions – add the points for H 1, H 2, and H 3 and record the result on p. 1</p>	11

Comments

<p>SC 5.0 Forested Wetlands (see p. 85)</p> <p>Does the wetland unit have an area of forest (<i>you should have identified a forested class, if present, in question H 1.1</i>) rooted within its boundary that meet at least one of the following three criteria?</p> <ul style="list-style-type: none"> — The wetland is within the “100 year” floodplain of a river or stream — aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant of the “woody” vegetation. (<i>Dominants means it represents at least 50% of the cover of woody species, co-dominant means it represents at least 20% of the total cover of woody species</i>) — There is at least ¼ acre of trees (even in wetlands smaller than 2.5 acres) that are “mature” or “old-growth” according to the definitions for these priority habitats developed by WDFW (<i>see p. 83</i>) <p>YES = go to SC 5.1 NO – <i>not a forested wetland with special characteristics</i></p>	
<p>SC 5.1 Does the wetland unit have a forest canopy where more than 50% of the tree species (by cover) are slow growing native trees</p> <p>Slow growing trees are: western red cedar (<i>Thuja plicata</i>), Alaska yellow cedar (<i>Chamaecyparis nootkatensis</i>), pine spp. mostly “white” pine (<i>Pinus monticola</i>), western hemlock (<i>Tsuga heterophylla</i>), Englemann spruce (<i>Picea engelmannii</i>).</p> <p>YES = Category I NO = go to SC 5.2</p>	<p>Cat. I</p>
<p>SC 5.2 Does the unit have areas where aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant species?</p> <p>YES = Category I NO = go to SC 5.3</p>	<p>Cat. I</p>
<p>SC 5.3 Does the wetland unit have areas with a forest canopy where more than 50% of the tree species (by cover) are fast growing species.</p> <p>Fast growing species are:</p> <p>Alders – red (<i>Alnus rubra</i>), thin-leaf (<i>A. tenuifolia</i>)</p> <p>Cottonwoods – narrow-leaf (<i>Populus angustifolia</i>), black (<i>P. balsamifera</i>)</p> <p>Willows- peach-leaf (<i>Salix amygdaloides</i>), Sitka (<i>S. sitchensis</i>), Pacific (<i>S. lasiandra</i>), Aspen - (<i>Populus tremuloides</i>), Water Birch (<i>Betula occidentalis</i>)</p> <p>YES = Category II NO = go to SC 5.5</p>	<p>Cat. II</p>
<p>SC 5.5 Is the forested component of the wetland within the “100 year floodplain” of a river or stream?</p> <p>YES = Category II</p>	<p>Cat. II</p>
<p>Category of wetland based on Special Characteristics</p> <p><i>Choose the “highest” rating if wetland falls into several categories.</i></p> <p>If you answered NO for all types enter “Not Applicable” on p.1</p>	<p>NA</p>

Wetland name or number W11

WETLAND RATING FORM – EASTERN WASHINGTON

Version 2 - Updated June 2006 to increase accuracy and reproducibility among users
Updated Oct 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): W11 Date of site visit: 6/10/09

Rated by Forrest Parsons/Joel Shaich Trained by Ecology? Yes ___ No X Date of training _____

SEC: 22 TOWNSHIP: 20N RANGE: 16E Is S/T/R in Appendix D? Yes ___ No X

Map of wetland unit: Figure _____ Estimated size 0.006 acre

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I ___ II ___ III X IV ___

Category I = Score >=70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for "Water Quality" Functions	11
Score for Hydrologic Functions	20
Score for Habitat Functions	8
TOTAL score for functions	39

Category based on SPECIAL CHARACTERISTICS of wetland

I ___ II ___ III ___ Does not Apply X

Final Category (choose the "highest" category from above)

3

Summary of basic information about the wetland unit

Wetland Type		Wetland Class	
Vernal Pool		Depressional	X
Alkali		Riverine	
Natural Heritage Wetland		Lake-fringe	
Bog		Slope	
Forest			
None of the above	X	Check if unit has multiple HGM classes present	

Does the wetland being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That Need Special Protection, and That Are Not Included in the Rating	YES	NO
<p>SP1. <i>Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered animal or plant species (T/E species)?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.</p>		X
<p>SP2. <i>Has the wetland unit been documented as habitat for any State listed Threatened or Endangered animal species?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands (see p. 19 of data form).</p>		X
<p>SP3. <i>Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?</i></p>		X
<p>SP4. <i>Does the wetland unit have a local significance in addition to its functions?</i> For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.</p>		X

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 20 for more detailed instructions on classifying wetlands.

Classification of Vegetated Wetlands for Eastern Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Does the entire wetland unit **meet both** of the following criteria?

The vegetated part of the wetland is on the shores of a body of open water (without any vegetation on the surface) at least 20 acres (8 ha) in size;

At least 30% of the open water area is deeper than 3 m (10 ft)?

NO - go to Step 2

YES - The wetland class is **Lake-fringe (lacustrine fringe)**

2. Does the entire wetland unit **meet all** of the following criteria?

The wetland is on a slope (*slope can be very gradual*),

The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.

The water leaves the wetland **without being impounded**?

NOTE: *Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a foot deep).*

NO - go to Step 3

YES - The wetland class is **Slope**

3. Is the entire wetland unit in a valley or stream channel where it gets inundated by overbank flooding from that stream or river? In general, the flooding should occur at least once every ten years to answer "yes." *The wetland can contain depressions that are filled with water when the river is not flooding.*

NO - go to Step 4

YES - The wetland class is **Riverine**

4. Is the entire wetland unit in a topographic depression, outside areas that are inundated by overbank flooding, in which water ponds, or is saturated to the surface, at some time of the year. *This means that any outlet, if present, is higher than the interior of the wetland.*

NO - go to Step 5

YES - The wetland class is **Depressional**

5. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

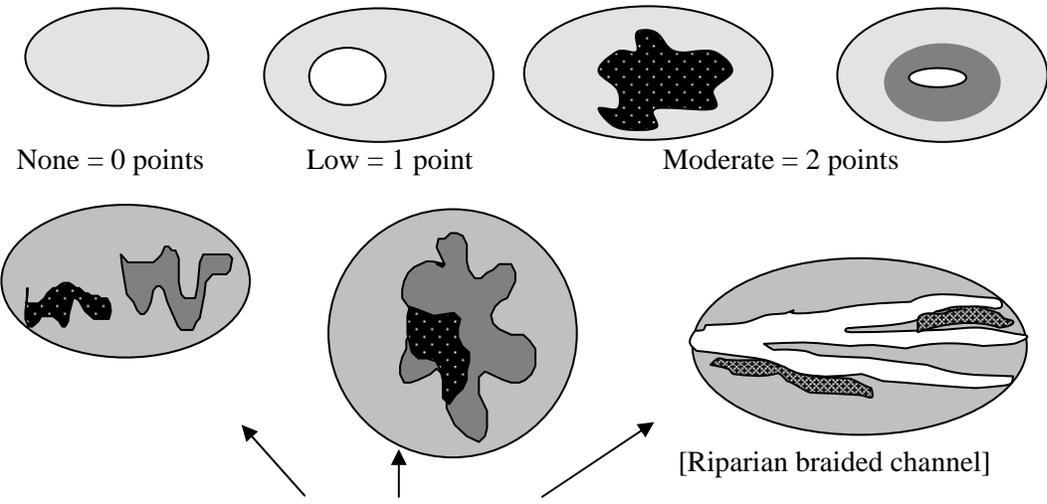
Wetland name or number W11

HGM Classes Within One Delineated Wetland Boundary	Class to Use for Rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine (riverine is within boundary of depression)	Depressional
Depressional + Lake-fringe	Depressional

If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

D Depressional Wetlands		Points
WATER QUALITY FUNCTIONS - Indicators that the wetland functions to improve water quality		(only 1 score per box)
D	D 1.0 Does the wetland unit have the <u>potential</u> to improve water quality?	(see p. 38)
D	D 1.1 Characteristics of surface water flows out of the wetland unit: Wetland has no surface water outlet - points = 5 Wetland has an intermittently flowing outlet points = 3 Wetland has a highly constricted permanently flowing outlet points = 3 Wetland has a permanently flowing surface outlet points = 1	3
D	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (use NRCS definitions of soil types) YES points = 3 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class) Wetland has persistent, ungrazed, vegetation for > 2/3 of area points = 5 Wetland has persistent, ungrazed, vegetation from 1/3 to 2/3 of area points = 3 Wetland has persistent, ungrazed vegetation from 1/10 to < 1/3 of area points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area points = 0 Map of Cowardin vegetation classes	Figure 6 5
D	D 1.4 Characteristics of seasonal ponding or inundation. <i>This is the area of ponding that fluctuates every year. Do not count the area that is permanently ponded.</i> Area seasonally ponded is > 1/2 total area of wetland points = 3 Area seasonally ponded is 1/4 - 1/2 total area of wetland points = 1 Area seasonally ponded is < 1/4 total area of wetland points = 0 NOTE: See text for indicators of seasonal and permanent inundation/flooding. Map of Hydroperiods	Figure 12 3
D	Total for D 1 Add the points in the boxes above	11
D	D 2. Does the wetland unit have the <u>opportunity</u> to improve water quality? Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity. — Grazing in the wetland or within 150 ft — Untreated stormwater discharges to wetland — Tilled fields or orchards within 150 ft of wetland — A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging — Residential, urban areas, golf courses are within 150 ft of wetland — Wetland is fed by groundwater high in phosphorus or nitrogen — Other _____ YES multiplier is 2 NO multiplier is 1	multiplier <u>1</u>
D	TOTAL - Water Quality Functions Multiply the score from D1 by the multiplier in D2 <i>Record score on p. 1 of field form</i>	11

These questions apply to wetlands of all HGM classes.		Points (only 1 score per box)								
HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat										
H 1. Does the wetland unit have the <u>potential</u> to provide habitat for many species?										
<p>H 1.1 <u>Categories of vegetation structure</u> (see p.62) <i>Check the vegetation classes (as defined by Cowardin) and heights of emergents present. Size threshold for each class or height category is 1/4 acre or more than 10% of the area if unit is < 2.5 acres.</i></p> <p><input type="checkbox"/> Aquatic bed <input checked="" type="checkbox"/> Emergent plants 0-12 in. (0 – 30 cm) high are the highest layer and have > 30% cover <input type="checkbox"/> Emergent plants >12 – 40 in. (>30 – 100cm) high are the highest layer with >30% cover <input type="checkbox"/> Emergent plants > 40 in. (> 100cm) high are the highest layer with >30% cover <input type="checkbox"/> Scrub/shrub (areas where shrubs have >30% cover) <input type="checkbox"/> Forested (areas where trees have >30% cover)</p> <p><i>Add the number of vegetation types that qualify. If you have:</i></p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td>4-6 types</td> <td>points = 3</td> </tr> <tr> <td>3 types</td> <td>points = 2</td> </tr> <tr> <td>2 types</td> <td>points = 1</td> </tr> <tr> <td>1 type</td> <td>points = 0</td> </tr> </table> <p>Map of Cowardin vegetation classes and areas with different heights of emergents</p>		4-6 types	points = 3	3 types	points = 2	2 types	points = 1	1 type	points = 0	<p>Figure 6</p> <p style="text-align: center; font-size: 2em;">0</p>
4-6 types	points = 3									
3 types	points = 2									
2 types	points = 1									
1 type	points = 0									
<p>H 1.2. Is one of the vegetation types “aquatic bed?” (see p .64) YES = 1 point NO = 0 points</p>		0								
<p>H 1.3. <u>Surface Water</u> (see p.65)</p> <p>H 1.3.1 Does the unit have areas of “open” water (without herbaceous or shrub plants) over at least 1/4 acre or 10% of its area during the spring (March – early June) OR in early fall (August – end of September)? <i>Note: answer YES for Lake-fringe wetlands</i> YES = 3 points & go to H 1.4 NO = go to H 1.3.2</p> <p>H 1.3.2 Does the unit have an intermittent or permanent stream within its boundaries, or along one side, over at least 1/4 acre or 10% of its area, AND that has an unvegetated bottom (answer yes only if H 1.3.1 is NO)? YES = 3 points NO = 0 points</p> <p style="text-align: center;">Map showing areas of open water</p>		<p>Figure 12</p> <p style="text-align: center; font-size: 2em;">0</p>								
<p>H 1.4. <u>Richness of Plant Species</u> (see p. 66) Count the number of plant species in the wetland that cover at least 10 ft². (different patches of the same species can be combined to meet the size threshold) You do not have to name the species. Do not include Eurasean Milfoil, reed canarygrass, purple loosestrife, Russian Olive, Phragmites ,Canadian Thistle, Yellow-flag Iris, and Salt Cedar (Tamarisk)</p> <p>If you counted: > 9 species points = 2 4-9 species points = 1 # of species <u>2</u> < 4 species points = 0 points</p> <p><i>List species below if you wish</i></p>		0								

<p>H 1.5. Interspersion of habitats (<i>see p. 67</i>) Decided from the diagrams below whether interspersion between categories of vegetation (described in H 1.1), or categories and un-vegetated areas (can include open water or mudflats) is high, medium, low, or none.</p>  <p>None = 0 points Low = 1 point Moderate = 2 points</p> <p>High = 3 points</p> <p>[Riparian braided channel]</p> <p>NOTE: If you have four or more vegetation categories or three vegetation categories and open water the rating is always "high". Use maps from H1.1 and H1.3</p>	<p>Figure 6</p> <p style="text-align: center; font-size: 2em;">0</p>
<p>H 1.6. Special Habitat Features: (<i>see p. 68</i>) Check the habitat features that are present in the wetland unit. The number of checks is the number of points you put into the next column.</p> <p><input type="checkbox"/> Loose rocks larger than 4" or large, downed, woody debris (>4in. diameter) within the area of surface ponding or in stream.</p> <p><input type="checkbox"/> Cattails or bulrushes are present within the unit.</p> <p><input type="checkbox"/> Standing snags (diameter at the bottom > 4 inches) in the wetland unit or within 30 m (100ft) of the edge.</p> <p><input type="checkbox"/> Emergent or shrub vegetation in areas that are permanently inundated/ponded. <i>The presence of "yellow flag" Iris is a good indicator of vegetation in areas permanently ponded.</i></p> <p><input type="checkbox"/> Stable steep banks of fine material that might be used by beaver or muskrat for denning (>45 degree slope) OR signs of recent beaver activity</p> <p><input checked="" type="checkbox"/> Invasive species cover less than 20% in each stratum of vegetation (<i>canopy, sub-canopy, shrubs, herbaceous, moss/ground cover</i>)</p> <p style="text-align: right;"><i>Maximum score possible = 6</i></p>	<p style="text-align: center; font-size: 2em;">1</p>
<p style="text-align: right;">TOTAL Potential to provide habitat <i>Add the scores in the column above</i></p>	<p style="text-align: center; font-size: 2em; border: 2px dashed black;">1</p>

Comments

<p>H 2.0 Does the wetland have the opportunity to provide habitat for many species?</p>	
<p>H 2.1 Buffers (<i>see p. 71</i>) <i>Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of “undisturbed.” Relatively undisturbed also means no grazing, no landscaping, no daily human use, and no structures or paving within undisturbed part of buffer.</i></p> <ul style="list-style-type: none"> — 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference Points = 5 X 330 ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. Points = 4 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. Points = 4 — 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . Points = 3 — 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. Points = 3 <p style="text-align: center;">If buffer does not meet any of the criteria above</p> <ul style="list-style-type: none"> — No paved areas (except paved trails) or buildings within 80ft (25 m) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — No paved areas or buildings within 170ft (50m) of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — Heavy grazing in buffer. Points = 1 — Vegetated buffers are <6.6ft wide (2m) for more than 95% of the circumference (e.g . tilled fields, paving, basalt bedrock extend to edge of wetland). Points = 0 — Buffer does not meet any of the criteria above. Points = 1 <p style="text-align: center;">Aerial photo showing buffers</p>	<p>Figure 18</p> <p style="text-align: center; font-size: 2em;">4</p>
<p>H 2.2 Wet Corridors (<i>see p. 72</i>)</p> <p>H 2.2.1 Is the wetland unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor at least ¼ mile long with surface water or flowing water throughout most of the year (> 9 months/yr)? (<i>dams, heavily used gravel roads, paved roads, fields tilled to edge of stream, or pasture to edge of stream are considered breaks in the corridor</i>).</p> <p>YES = 4 points (go to H 2.3) (NO) = go to H 2.2.2</p> <p>H 2.2.2 Is the unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor, at least ¼ mile long with water flowing seasonally, OR a lake-fringe wetland without a “wet” corridor, OR a riverine wetland without a surface channel connecting to the stream?</p> <p>YES = 2 points (go to H 2.3) (NO) go to H 2.2.3</p> <p>H 2.2.3 Is the wetland within a 1/2 mile of any permanent stream, seasonal stream, or lake (<i>do not include man-made ditches</i>)?</p> <p>(YES) = 1 point NO = 0 points</p>	<p style="text-align: center; font-size: 2em;">1</p>

H 2.3 Near or adjacent to other priority habitats listed by WDFW (see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report <http://wdfw.wa.gov/hab/phslist.htm>)

Which of the following priority habitats are within 330ft (100m) of the wetland unit? *NOTE: the connections to the habitats can be disturbed.*

- Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acre).
- Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report p. 152*).
- Eastside Steppe:** Non-forested vegetation type dominated by broadleaf herbaceous flora (*full description of herbaceous species found here are in WDFW PHS report p. 153*).
- Old-growth/Mature forests (east of Cascade crest):** (*full descriptions in WDFW PHS report p. 157*). **Old-growth:** Stands are > 150 yrs in age; may be variable in tree species composition and structural characteristics due to the influence of fire, climate, and soils. **Mature:** Stands 80 – 160 yrs old. Decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth.
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- Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 30 cm (12 in) in eastern Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long.

If wetland has **2 or more** Priority Habitats = **4 points**
 If wetland has **1** Priority Habitat = **2 points**
 No Priority habitats = **0 points**

0

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)

<p>H 2.4 <u>Landscape</u> (choose the one description of the landscape around the wetland that best fits) (see p. 76)</p> <ul style="list-style-type: none"> — The wetland unit is in an area where annual rainfall is less than 12 inches, and its water regime is not influenced by irrigation practices, dams, or water control structures. (Generally, this means outside boundaries of reclamation areas, irrigation district, or reservoirs) points = 5 — There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing in the connection or an open water connection along a lake shore without heavy boat traffic are OK, but connections should NOT be bisected by paved roads, fill, fields, heavy boat traffic or other development) points = 5 <input checked="" type="checkbox"/> There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed? points = 2 — There is at least 1 wetland within ½ mile. points = 1 — Does not meet any of the four criteria above points = 0 	2
<p>H 2. TOTAL Score - opportunity for providing habitat Add the scores in the column above</p>	7
<p>H 3.0 Does the wetland unit have indicators that its ability to provide habitat is reduced?</p>	
<p>H 3.1 <u>Indicator of reduced habitat functions</u> (see p. 75) Do the areas of open water in the wetland unit have a resident population of carp (see text for indicators of the presence of carp)? (NOTE: This question does not apply to reservoirs with water levels controlled by dams, such as the reservoirs on the Columbia and Snake Rivers)</p> <p style="text-align: center;">YES = - 5 points <input checked="" type="radio"/> NO = 0 points</p>	<p>Points will be subtracted</p> <p>0</p>
<p>Total Score for Habitat Functions – add the points for H 1, H 2, and H 3 and record the result on p. 1</p>	8

Comments

<p>SC 5.0 Forested Wetlands (see p. 85)</p> <p>Does the wetland unit have an area of forest (<i>you should have identified a forested class, if present, in question H 1.1</i>) rooted within its boundary that meet at least one of the following three criteria?</p> <ul style="list-style-type: none"> — The wetland is within the “100 year” floodplain of a river or stream — aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant of the “woody” vegetation. (<i>Dominants means it represents at least 50% of the cover of woody species, co-dominant means it represents at least 20% of the total cover of woody species</i>) — There is at least ¼ acre of trees (even in wetlands smaller than 2.5 acres) that are “mature” or “old-growth” according to the definitions for these priority habitats developed by WDFW (<i>see p. 83</i>) <p>YES = go to SC 5.1 NO – <i>not a forested wetland with special characteristics</i></p>	
<p>SC 5.1 Does the wetland unit have a forest canopy where more than 50% of the tree species (by cover) are slow growing native trees</p> <p>Slow growing trees are: western red cedar (<i>Thuja plicata</i>), Alaska yellow cedar (<i>Chamaecyparis nootkatensis</i>), pine spp. mostly “white” pine (<i>Pinus monticola</i>), western hemlock (<i>Tsuga heterophylla</i>), Englemann spruce (<i>Picea engelmannii</i>).</p> <p>YES = Category I NO = go to SC 5.2</p>	<p>Cat. I</p>
<p>SC 5.2 Does the unit have areas where aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant species?</p> <p>YES = Category I NO = go to SC 5.3</p>	<p>Cat. I</p>
<p>SC 5.3 Does the wetland unit have areas with a forest canopy where more than 50% of the tree species (by cover) are fast growing species.</p> <p>Fast growing species are:</p> <p>Alders – red (<i>Alnus rubra</i>), thin-leaf (<i>A. tenuifolia</i>)</p> <p>Cottonwoods – narrow-leaf (<i>Populus angustifolia</i>), black (<i>P. balsamifera</i>)</p> <p>Willows- peach-leaf (<i>Salix amygdaloides</i>), Sitka (<i>S. sitchensis</i>), Pacific (<i>S. lasiandra</i>), Aspen - (<i>Populus tremuloides</i>), Water Birch (<i>Betula occidentalis</i>)</p> <p>YES = Category II NO = go to SC 5.5</p>	<p>Cat. II</p>
<p>SC 5.5 Is the forested component of the wetland within the “100 year floodplain” of a river or stream?</p> <p>YES = Category II</p>	<p>Cat. II</p>
<p>Category of wetland based on Special Characteristics</p> <p><i>Choose the “highest” rating if wetland falls into several categories.</i></p> <p>If you answered NO for all types enter “Not Applicable” on p.1</p>	<p>NA</p>

Wetland name or number W12

WETLAND RATING FORM – EASTERN WASHINGTON

Version 2 - Updated June 2006 to increase accuracy and reproducibility among users
Updated Oct 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): W12 Date of site visit: 6/10/09

Rated by Forrest Parsons/Joel Shaich Trained by Ecology? Yes ___ No X Date of training _____

SEC: 22 TOWNSHIP: 20N RANGE: 16E Is S/T/R in Appendix D? Yes ___ No X

Map of wetland unit: Figure _____ Estimated size 0.312 acre

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I ___ II ___ III X IV ___

Category I = Score >=70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for "Water Quality" Functions	12
Score for Hydrologic Functions	20
Score for Habitat Functions	15
TOTAL score for functions	47

Category based on SPECIAL CHARACTERISTICS of wetland

I ___ II ___ III ___ Does not Apply X

Final Category (choose the "highest" category from above)

3

Summary of basic information about the wetland unit

Wetland Type		Wetland Class	
Vernal Pool		Depressional	
Alkali		Riverine	X
Natural Heritage Wetland		Lake-fringe	
Bog		Slope	
Forest			
None of the above	X	Check if unit has multiple HGM classes present	

Does the wetland being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That Need Special Protection, and That Are Not Included in the Rating	YES	NO
<p>SP1. <i>Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered animal or plant species (T/E species)?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.</p>		X
<p>SP2. <i>Has the wetland unit been documented as habitat for any State listed Threatened or Endangered animal species?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands (see p. 19 of data form).</p>		X
<p>SP3. <i>Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?</i></p>		X
<p>SP4. <i>Does the wetland unit have a local significance in addition to its functions?</i> For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.</p>		X

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. Classifying the wetland first simplifies the questions needed to answer how it functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 20 for more detailed instructions on classifying wetlands.

Classification of Vegetated Wetlands for Eastern Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Does the entire wetland unit **meet both** of the following criteria?

The vegetated part of the wetland is on the shores of a body of open water (without any vegetation on the surface) at least 20 acres (8 ha) in size;

At least 30% of the open water area is deeper than 3 m (10 ft)?

NO - go to Step 2

YES - The wetland class is **Lake-fringe (lacustrine fringe)**

2. Does the entire wetland unit **meet all** of the following criteria?

The wetland is on a slope (*slope can be very gradual*),

The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.

The water leaves the wetland **without being impounded**?

NOTE: *Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than a foot deep).*

NO - go to Step 3

YES - The wetland class is **Slope**

3. Is the entire wetland unit in a valley or stream channel where it gets inundated by overbank flooding from that stream or river? In general, the flooding should occur at least once every ten years to answer "yes." *The wetland can contain depressions that are filled with water when the river is not flooding.*

NO - go to Step 4

YES - The wetland class is **Riverine**

4. Is the entire wetland unit in a topographic depression, outside areas that are inundated by overbank flooding, in which water ponds, or is saturated to the surface, at some time of the year. *This means that any outlet, if present, is higher than the interior of the wetland.*

NO - go to Step 5

YES - The wetland class is **Depressional**

5. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

Wetland name or number W12

HGM Classes Within One Delineated Wetland Boundary	Class to Use for Rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine (riverine is within boundary of depression)	Depressional
Depressional + Lake-fringe	Depressional

If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

<p>H 1.5. Interspersion of habitats (see p. 67) Decided from the diagrams below whether interspersion between categories of vegetation (described in H 1.1), or categories and un-vegetated areas (can include open water or mudflats) is high, medium, low, or none.</p> <p>None = 0 points Low = 1 point Moderate = 2 points Moderate = 2 points</p> <p>High = 3 points High = 3 points [Riparian braided channel]</p> <p>NOTE: If you have four or more vegetation categories or three vegetation categories and open water the rating is always “high”. Use maps from H1.1 and H1.3</p>	<p>Figure 5</p> <p style="text-align: center; font-size: 2em;">1</p>
<p>H 1.6. Special Habitat Features: (see p. 68) Check the habitat features that are present in the wetland unit. The number of checks is the number of points you put into the next column.</p> <p><input type="checkbox"/> Loose rocks larger than 4" or large, downed, woody debris (>4in. diameter) within the area of surface ponding or in stream.</p> <p><input type="checkbox"/> Cattails or bulrushes are present within the unit.</p> <p><input type="checkbox"/> Standing snags (diameter at the bottom > 4 inches) in the wetland unit or within 30 m (100ft) of the edge.</p> <p><input type="checkbox"/> Emergent or shrub vegetation in areas that are permanently inundated/ponded. <i>The presence of “yellow flag” Iris is a good indicator of vegetation in areas permanently ponded.</i></p> <p><input type="checkbox"/> Stable steep banks of fine material that might be used by beaver or muskrat for denning (>45 degree slope) OR signs of recent beaver activity</p> <p><input type="checkbox"/> Invasive species cover less than 20% in each stratum of vegetation (<i>canopy, sub-canopy, shrubs, herbaceous, moss/ground cover</i>)</p> <p style="text-align: right;"><i>Maximum score possible = 6</i></p>	<p style="text-align: center; font-size: 2em;">0</p>
<p style="text-align: right;">TOTAL Potential to provide habitat <i>Add the scores in the column above</i></p>	<p style="text-align: center; font-size: 2em; border: 2px dashed black;">4</p>

Comments

<p>H 2.0 Does the wetland have the opportunity to provide habitat for many species?</p>	
<p>H 2.1 Buffers (<i>see p. 71</i>) <i>Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of “undisturbed.” Relatively undisturbed also means no grazing, no landscaping, no daily human use, and no structures or paving within undisturbed part of buffer.</i></p> <p><input checked="" type="checkbox"/> 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference Points = 5</p> <p>— 330 ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. Points = 4</p> <p>— 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. Points = 4</p> <p>— 330ft (100 m) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . Points = 3</p> <p>— 170ft (50 m) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. Points = 3</p> <p style="text-align: center;">If buffer does not meet any of the criteria above</p> <p>— No paved areas (except paved trails) or buildings within 80ft (25 m) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. Points = 2</p> <p>— No paved areas or buildings within 170ft (50m) of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. Points = 2</p> <p>— Heavy grazing in buffer. Points = 1</p> <p>— Vegetated buffers are <6.6ft wide (2m) for more than 95% of the circumference (e.g . tilled fields, paving, basalt bedrock extend to edge of wetland). Points = 0</p> <p>— Buffer does not meet any of the criteria above. Points = 1</p> <p style="text-align: center;"><u>Aerial photo showing buffers</u></p>	<p>Figure 17</p> <p style="text-align: center; font-size: 2em;">5</p>
<p>H 2.2 Wet Corridors (<i>see p. 72</i>)</p> <p>H 2.2.1 Is the wetland unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor at least ¼ mile long with surface water or flowing water throughout most of the year (> 9 months/yr)? (<i>dams, heavily used gravel roads, paved roads, fields tilled to edge of stream, or pasture to edge of stream are considered breaks in the corridor</i>).</p> <p>YES = 4 points (go to H 2.3) <input checked="" type="radio"/> NO = go to H 2.2.2</p> <p>H 2.2.2 Is the unit part of a relatively undisturbed and unbroken, > 30 ft wide, vegetated corridor, at least ¼ mile long with water flowing seasonally, OR a lake-fringe wetland without a “wet” corridor, OR a riverine wetland without a surface channel connecting to the stream?</p> <p><input checked="" type="radio"/> YES = 2 points (go to H 2.3) NO go to H 2.2.3</p> <p>H 2.2.3 Is the wetland within a 1/2 mile of any permanent stream, seasonal stream, or lake (<i>do not include man-made ditches</i>)?</p> <p>YES = 1 point NO = 0 points</p>	<p style="text-align: center; font-size: 2em;">2</p>

H 2.3 Near or adjacent to other priority habitats listed by WDFW (see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report <http://wdfw.wa.gov/hab/phslist.htm>)

Which of the following priority habitats are within 330ft (100m) of the wetland unit? *NOTE: the connections to the habitats can be disturbed.*

- Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acre).
- Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report p. 152*).
- Eastside Steppe:** Non-forested vegetation type dominated by broadleaf herbaceous flora (*full description of herbaceous species found here are in WDFW PHS report p. 153*).
- Old-growth/Mature forests (east of Cascade crest):** (*full descriptions in WDFW PHS report p. 157*). **Old-growth:** Stands are > 150 yrs in age; may be variable in tree species composition and structural characteristics due to the influence of fire, climate, and soils. **Mature:** Stands 80 – 160 yrs old. Decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth.
- Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158*).
- Juniper Savannah:** All juniper woodlands (*SE part of state only; check map*)
- Shrub-steppe:** A nonforested vegetation type consisting of one or more layers of perennial bunchgrasses and a conspicuous but discontinuous layer of shrubs (see Eastside Steppe for sites with little or no shrub cover).
- Riparian:** The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- Inland Dunes** This placeholder is for a new priority habitat that will capture areas known as Inland Dunes. A definition will be developed later in Fall 2008. (*check WDFW web site*)
- Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
- Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
- Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft.
- Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 30 cm (12 in) in eastern Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long.

If wetland has **2 or more** Priority Habitats = **4 points**

If wetland has **1** Priority Habitat = **2 points**

No Priority habitats = **0 points**

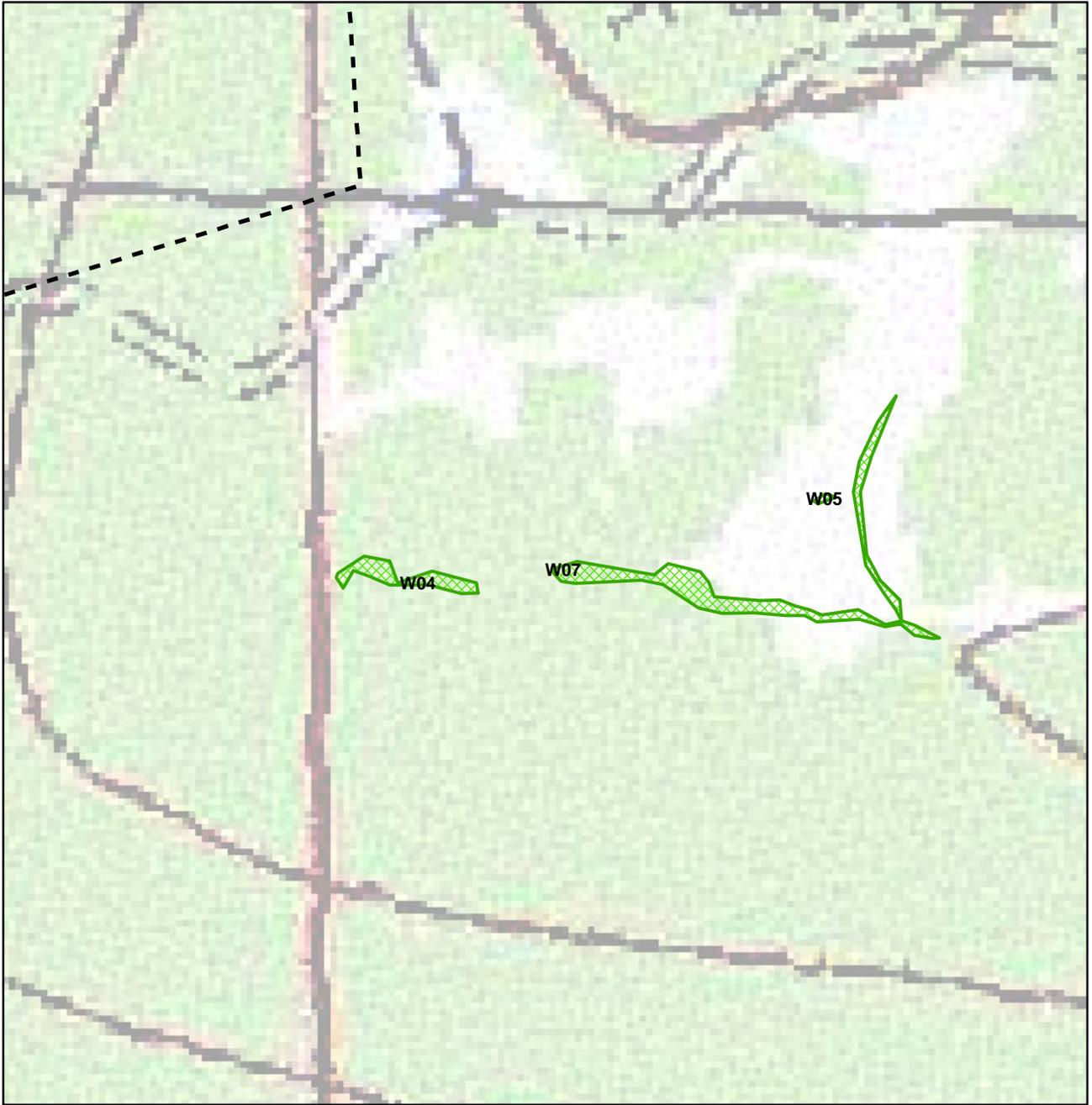
Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)

2

<p>H 2.4 <u>Landscape</u> (choose the one description of the landscape around the wetland that best fits) (see p. 76)</p> <ul style="list-style-type: none"> — The wetland unit is in an area where annual rainfall is less than 12 inches, and its water regime is not influenced by irrigation practices, dams, or water control structures. (Generally, this means outside boundaries of reclamation areas, irrigation district, or reservoirs) points = 5 — There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing in the connection or an open water connection along a lake shore without heavy boat traffic are OK, but connections should NOT be bisected by paved roads, fill, fields, heavy boat traffic or other development) points = 5 <input checked="" type="checkbox"/> There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed? points = 2 — There is at least 1 wetland within ½ mile. points = 1 — Does not meet any of the four criteria above points = 0 	2
<p>H 2. TOTAL Score - opportunity for providing habitat Add the scores in the column above</p>	11
<p>H 3.0 Does the wetland unit have indicators that its ability to provide habitat is reduced?</p>	
<p>H 3.1 <u>Indicator of reduced habitat functions</u> (see p. 75) Do the areas of open water in the wetland unit have a resident population of carp (see text for indicators of the presence of carp)? (NOTE: This question does not apply to reservoirs with water levels controlled by dams, such as the reservoirs on the Columbia and Snake Rivers)</p> <p style="text-align: center;">YES = - 5 points NO = 0 points</p>	<p>Points will be subtracted</p> <p>0</p>
<p>Total Score for Habitat Functions – add the points for H 1, H 2, and H 3 and record the result on p. 1</p>	
<p>15</p>	

Comments

<p>SC 5.0 Forested Wetlands (see p. 85)</p> <p>Does the wetland unit have an area of forest (<i>you should have identified a forested class, if present, in question H 1.1</i>) rooted within its boundary that meet at least one of the following three criteria?</p> <ul style="list-style-type: none"> — The wetland is within the “100 year” floodplain of a river or stream — aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant of the “woody” vegetation. (<i>Dominants means it represents at least 50% of the cover of woody species, co-dominant means it represents at least 20% of the total cover of woody species</i>) — There is at least ¼ acre of trees (even in wetlands smaller than 2.5 acres) that are “mature” or “old-growth” according to the definitions for these priority habitats developed by WDFW (<i>see p. 83</i>) <p>YES = go to SC 5.1 NO <i>not a forested wetland with special characteristics</i></p>	
<p>SC 5.1 Does the wetland unit have a forest canopy where more than 50% of the tree species (by cover) are slow growing native trees</p> <p>Slow growing trees are: western red cedar (<i>Thuja plicata</i>), Alaska yellow cedar (<i>Chamaecyparis nootkatensis</i>), pine spp. mostly “white” pine (<i>Pinus monticola</i>), western hemlock (<i>Tsuga heterophylla</i>), Englemann spruce (<i>Picea engelmannii</i>).</p> <p>YES = Category I NO = go to SC 5.2</p>	<p>Cat. I</p>
<p>SC 5.2 Does the unit have areas where aspen (<i>Populus tremuloides</i>) are a dominant or co-dominant species?</p> <p>YES = Category I NO = go to SC 5.3</p>	<p>Cat. I</p>
<p>SC 5.3 Does the wetland unit have areas with a forest canopy where more than 50% of the tree species (by cover) are fast growing species.</p> <p>Fast growing species are:</p> <p>Alders – red (<i>Alnus rubra</i>), thin-leaf (<i>A. tenuifolia</i>)</p> <p>Cottonwoods – narrow-leaf (<i>Populus angustifolia</i>), black (<i>P. balsamifera</i>)</p> <p>Willows- peach-leaf (<i>Salix amygdaloides</i>), Sitka (<i>S. sitchensis</i>), Pacific (<i>S. lasiandra</i>), Aspen - (<i>Populus tremuloides</i>), Water Birch (<i>Betula occidentalis</i>)</p> <p>YES = Category II NO = go to SC 5.5</p>	<p>Cat. II</p>
<p>SC 5.5 Is the forested component of the wetland within the “100 year floodplain” of a river or stream?</p> <p>YES = Category II</p>	<p>Cat. II</p>
<p>Category of wetland based on Special Characteristics</p> <p><i>Choose the “highest” rating if wetland falls into several categories.</i></p> <p>If you answered NO for all types enter “Not Applicable” on p.1</p>	<p>NA</p>

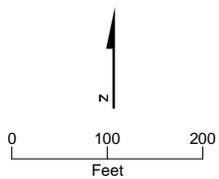


LEGEND

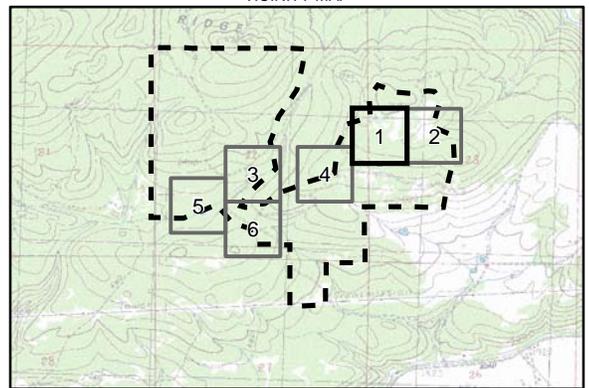
-  Stream
-  Wetland Boundary
-  Emergent Wetland
-  Wetland Survey Area

Note:

1. USGS 24K Quadrangle: Teanaway.

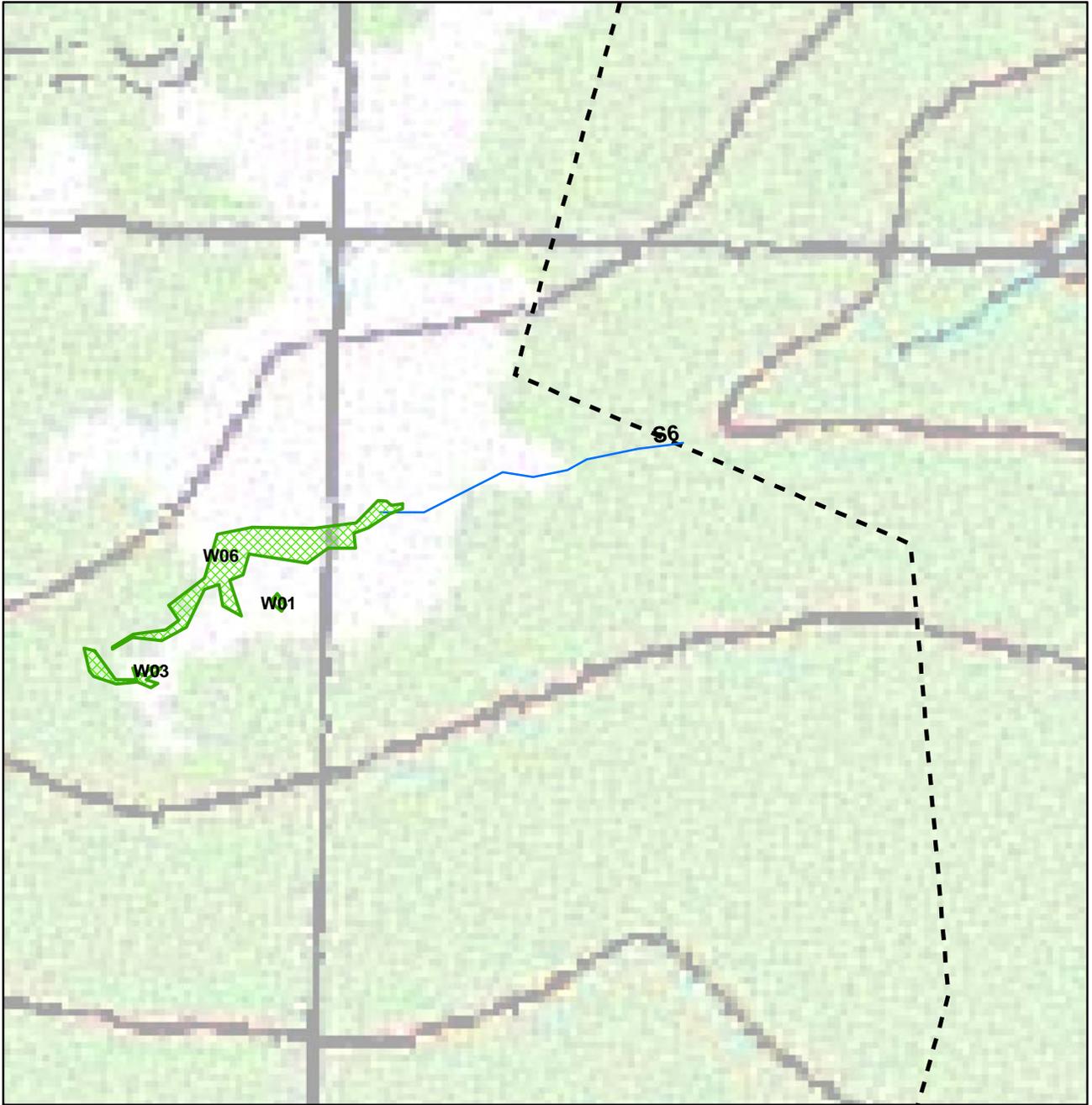


VICINITY MAP



**Appendix D Figure 1
Cowardin Vegetation Classes**

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



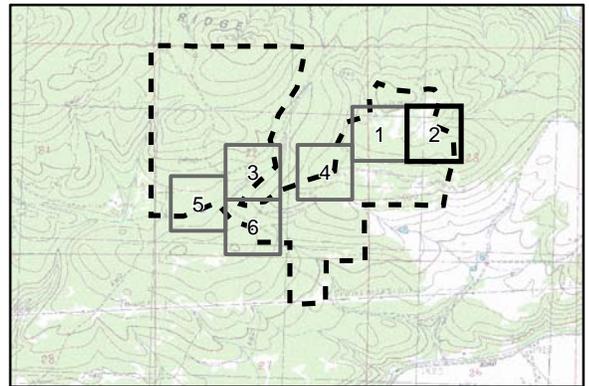
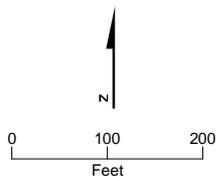
VICINITY MAP

LEGEND

-  Stream
-  Wetland Boundary
-  Emergent Wetland
-  Wetland Survey Area

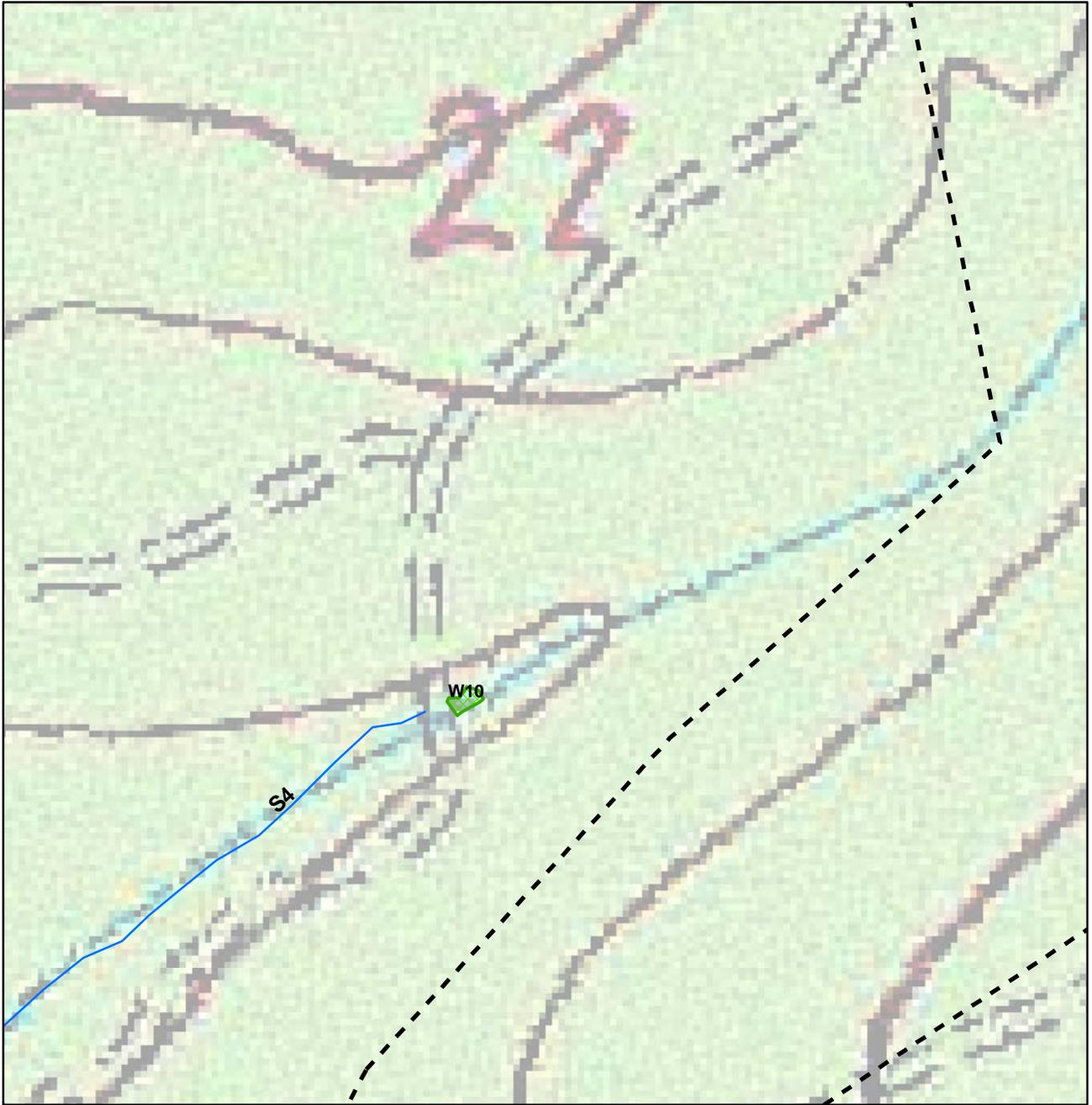
Note:

1. USGS 24K Quadrangle: Teanaway.



**Appendix D Figure 2
Cowardin Vegetation Classes**

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



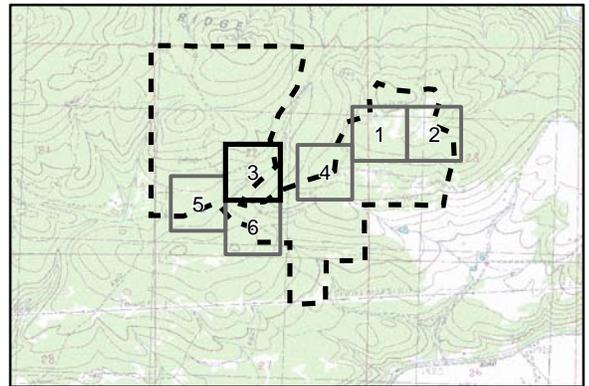
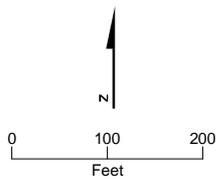
VICINITY MAP

LEGEND

-  Stream
-  Wetland Boundary
-  Emergent Wetland
-  Wetland Survey Area

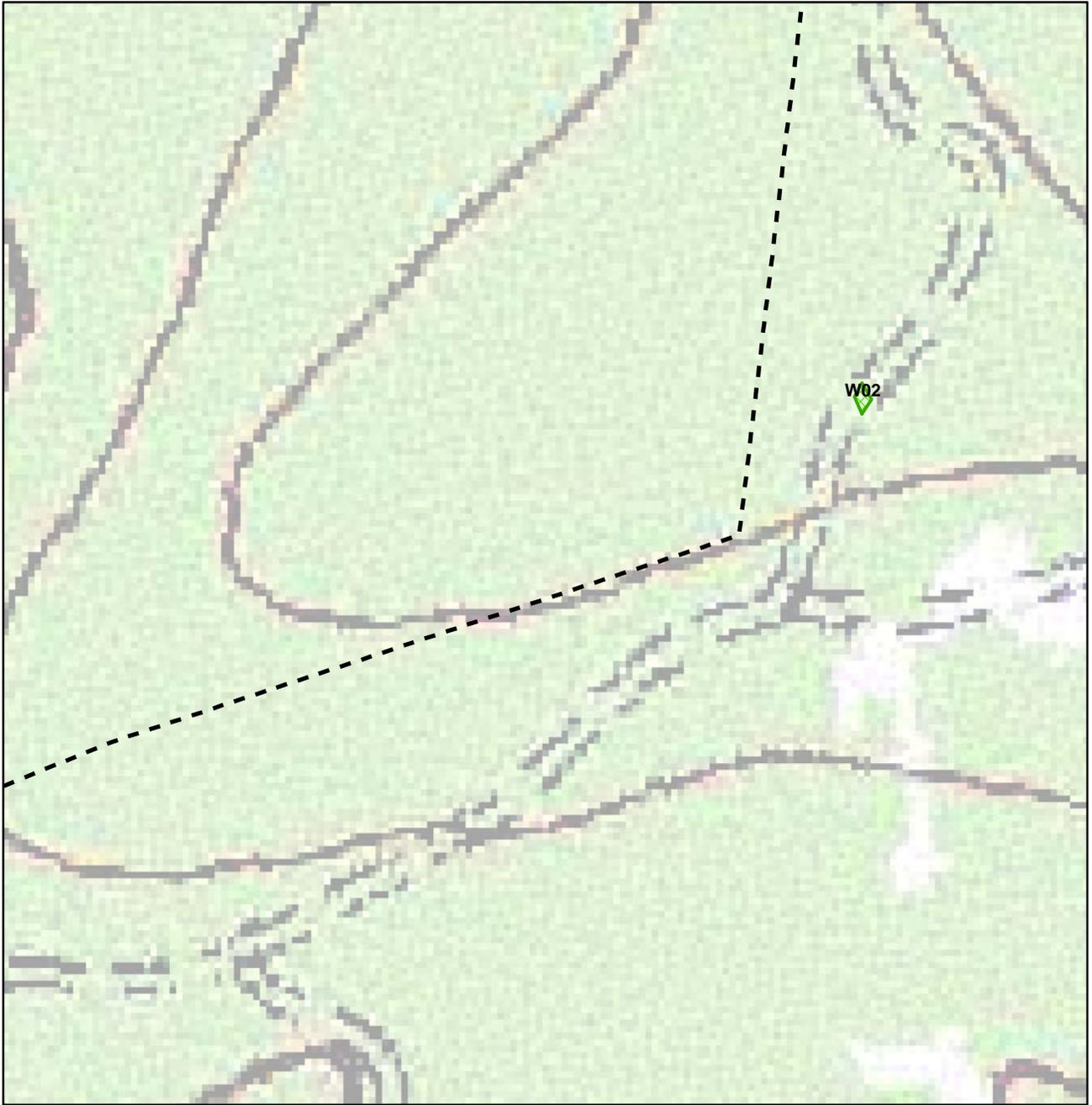
Note:

1. USGS 24K Quadrangle: Teanaway.



**Appendix D Figure 3
Cowardin Vegetation Classes**

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



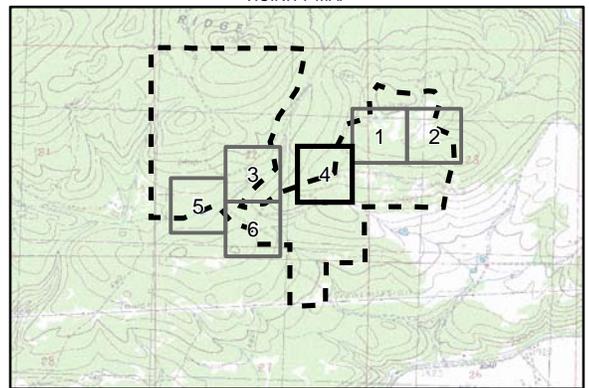
VICINITY MAP

LEGEND

-  Stream
-  Wetland Boundary
-  Emergent Wetland
-  Wetland Survey Area

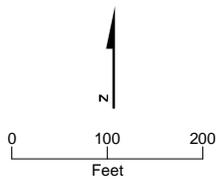
Note:

- 1. USGS 24K Quadrangle: Teanaway.



**Appendix D Figure 4
Cowardin Vegetation Classes**

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington





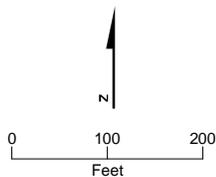
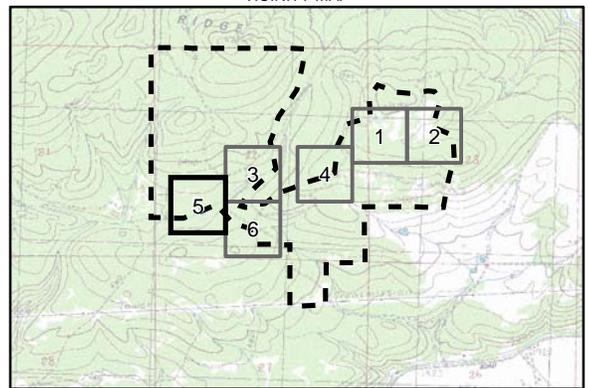
VICINITY MAP

LEGEND

-  Stream
-  Wetland Boundary
-  Emergent Wetland
-  Wetland Survey Area

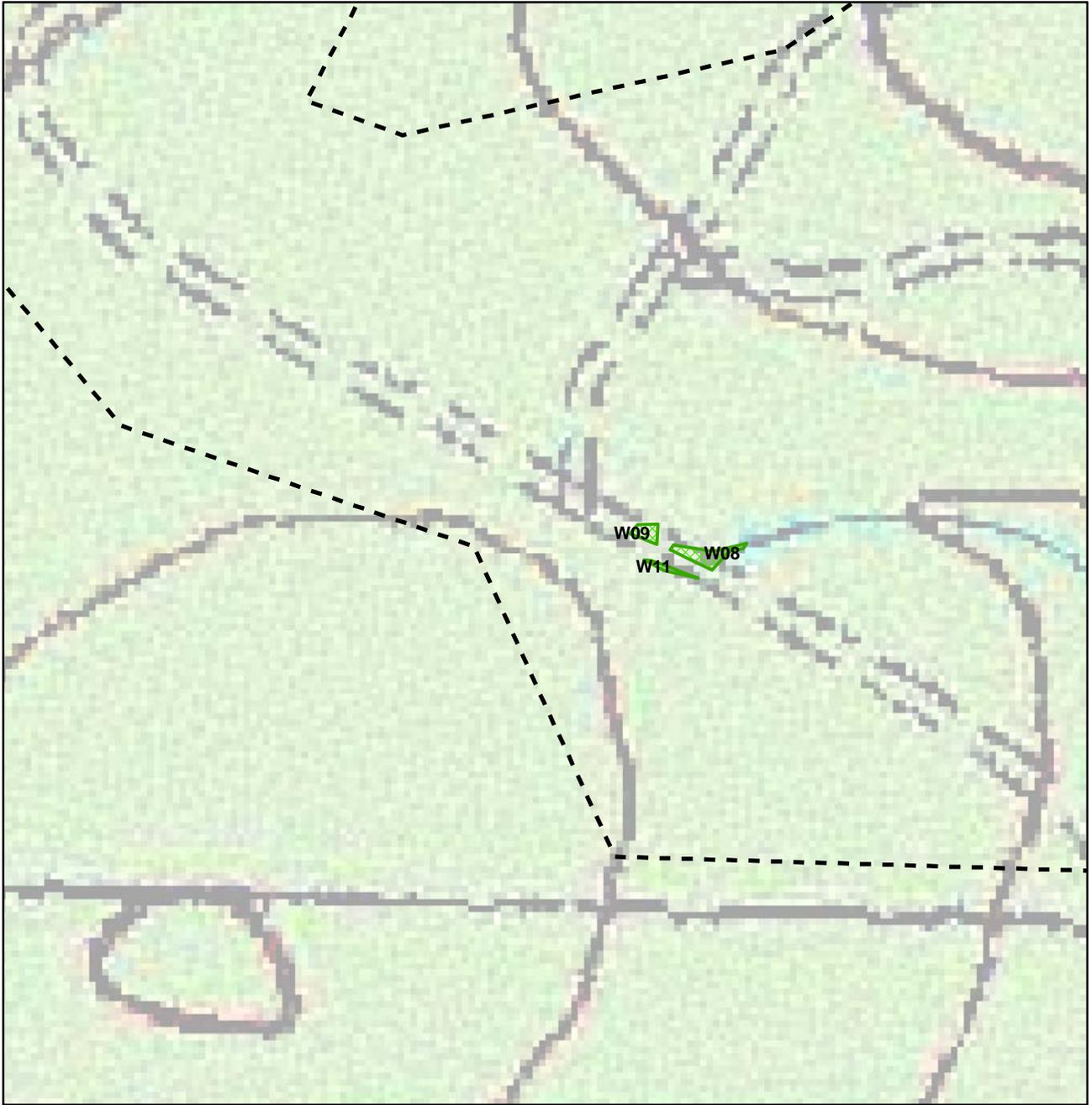
Note:

1. USGS 24K Quadrangle: Teanaway.



**Appendix D Figure 5
Cowardin Vegetation Classes**

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



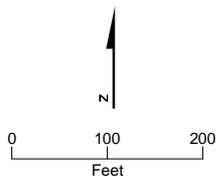
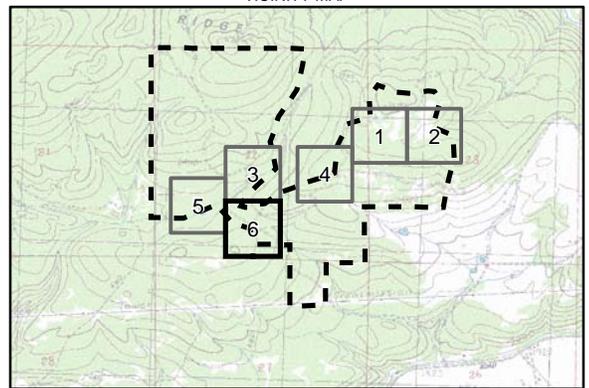
VICINITY MAP

LEGEND

-  Stream
-  Wetland Boundary
-  Emergent Wetland
-  Wetland Survey Area

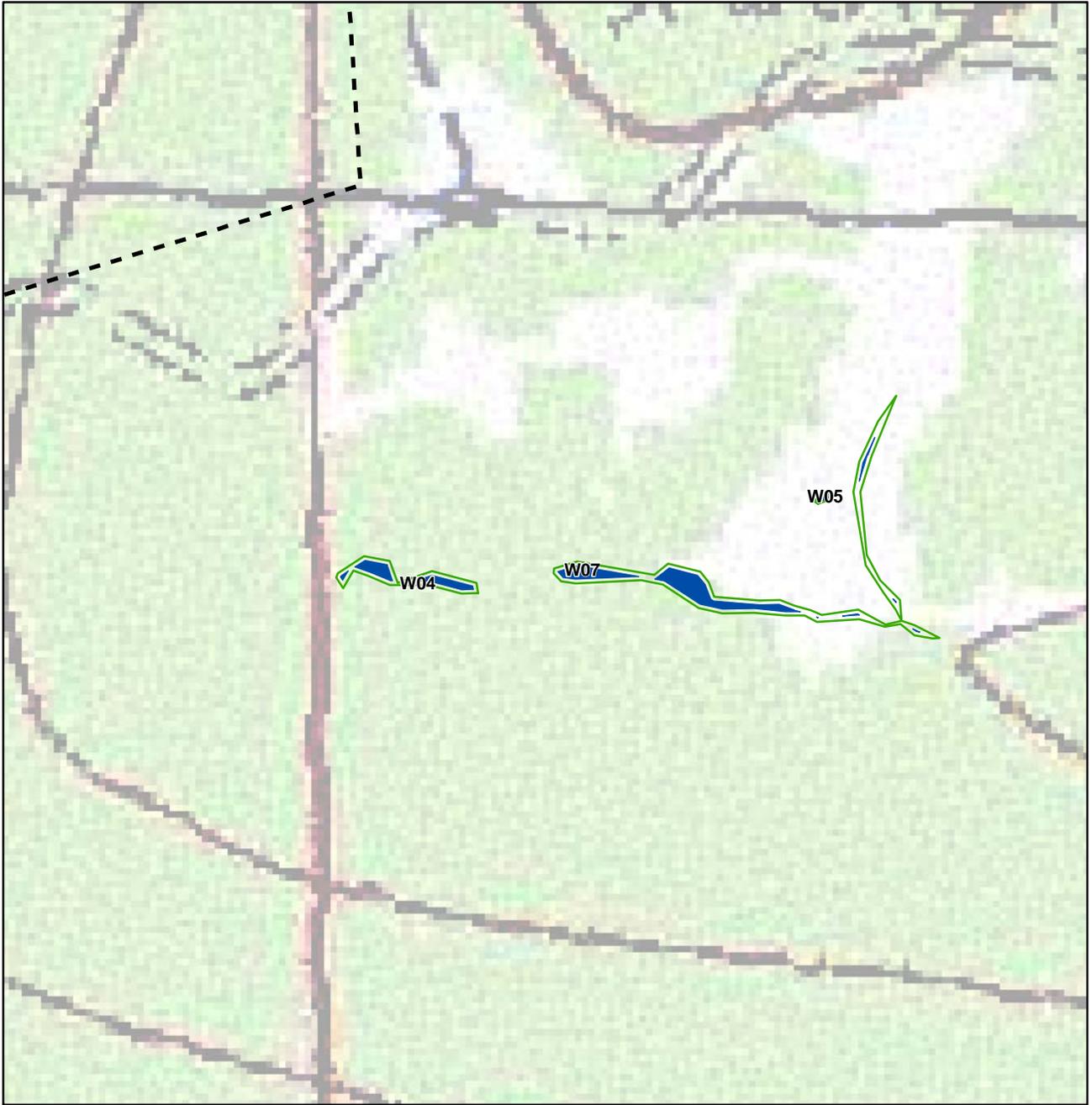
Note:

1. USGS 24K Quadrangle: Teanaway.



**Appendix D Figure 6
Cowardin Vegetation Classes**

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington

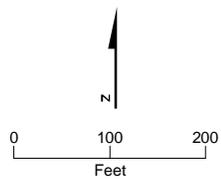


LEGEND

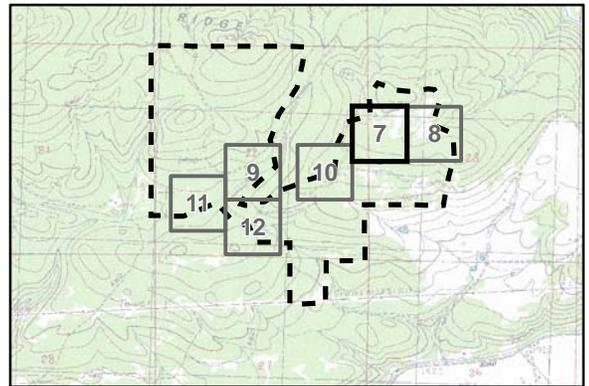
-  Stream
-  Wetland Boundary
-  Seasonally Flooded or Inundated
-  Wetland Survey Area

Note:

1. USGS 24K Quadrangle: Teanaway.

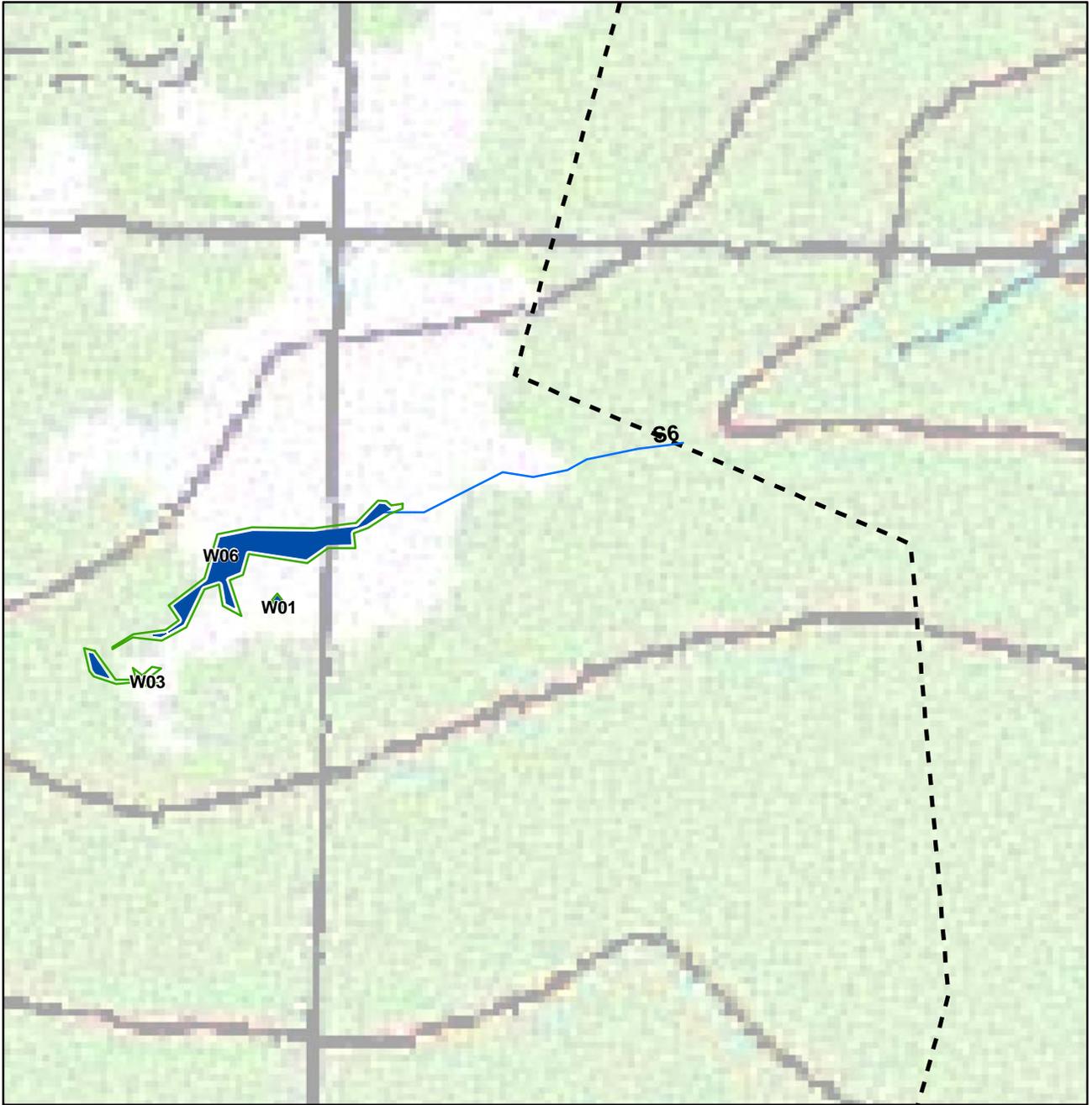


VICINITY MAP



**Appendix D Figure 7
Hydroperiods**

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



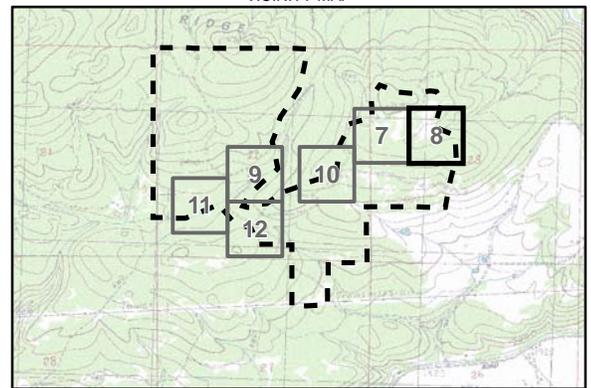
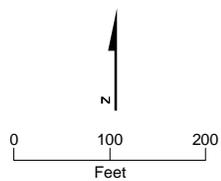
VICINITY MAP

LEGEND

-  Stream
-  Wetland Boundary
-  Seasonally Flooded or Inundated
-  Wetland Survey Area

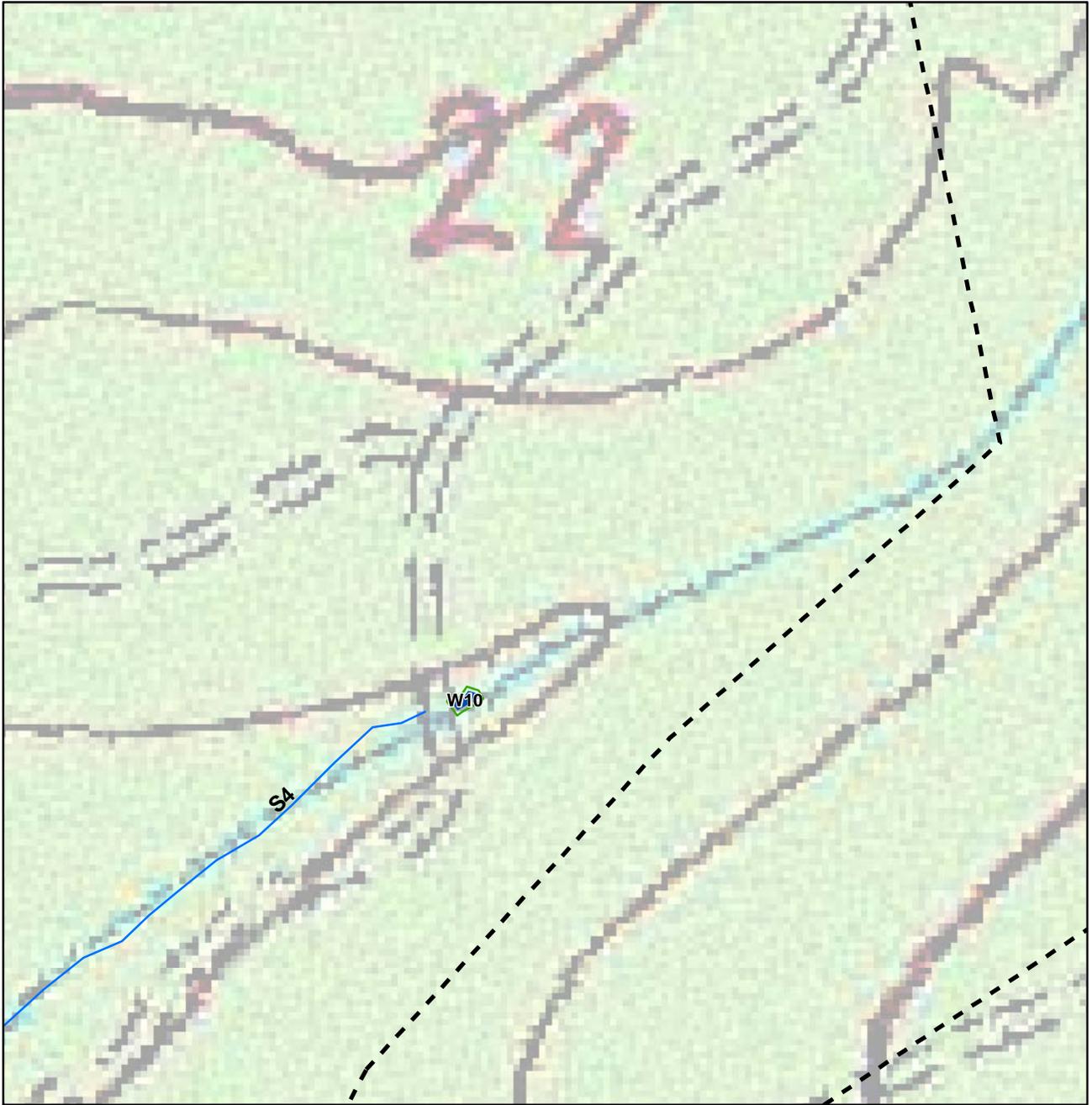
Note:

1. USGS 24K Quadrangle: Teanaway.



**Appendix D Figure 8
Hydroperiods**

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



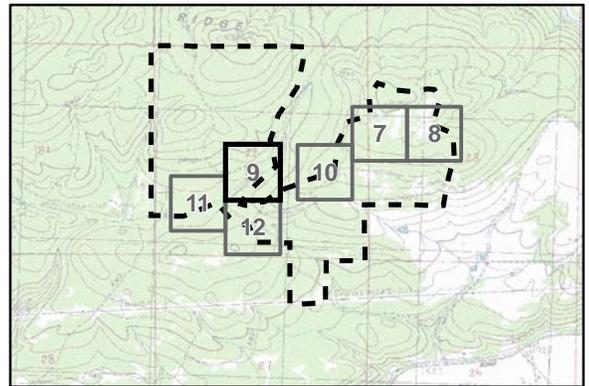
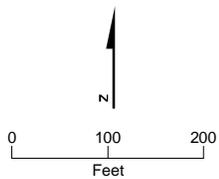
VICINITY MAP

LEGEND

-  Stream
-  Wetland Boundary
-  Seasonally Flooded or Inundated
-  Wetland Survey Area

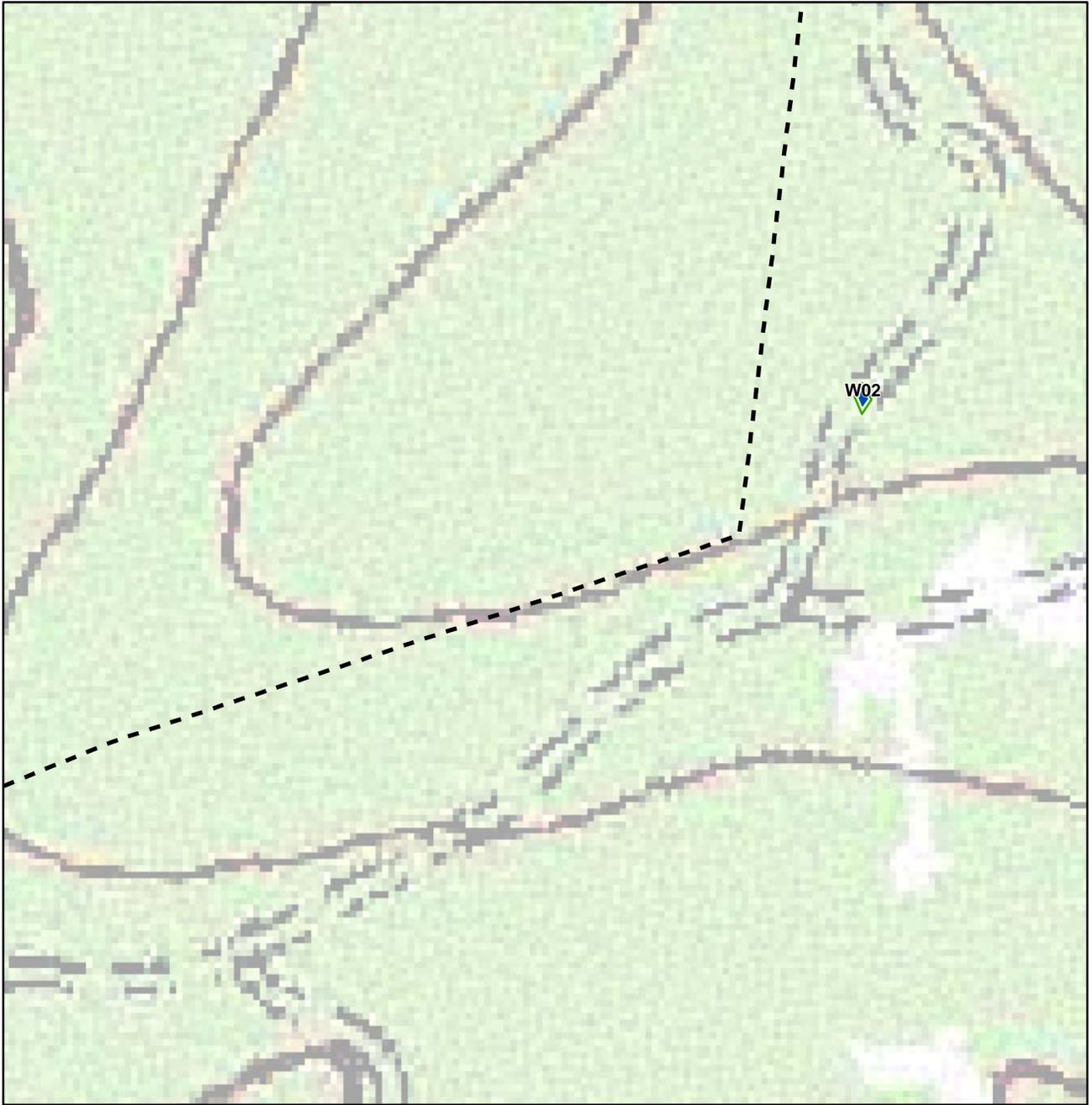
Note:

1. USGS 24K Quadrangle: Teanaway.



**Appendix D Figure 9
Hydroperiods**

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



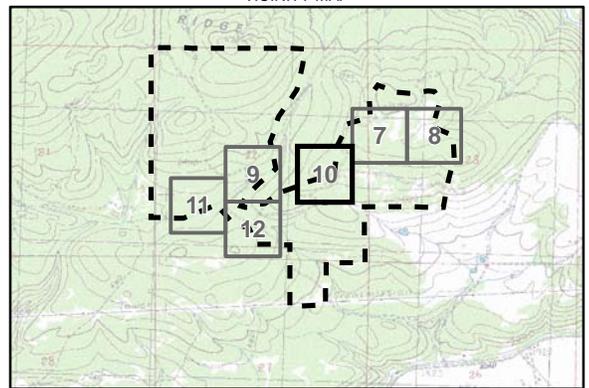
VICINITY MAP

LEGEND

-  Stream
-  Wetland Boundary
-  Seasonally Flooded or Inundated
-  Wetland Survey Area

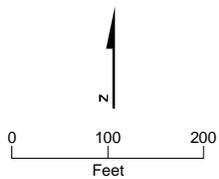
Note:

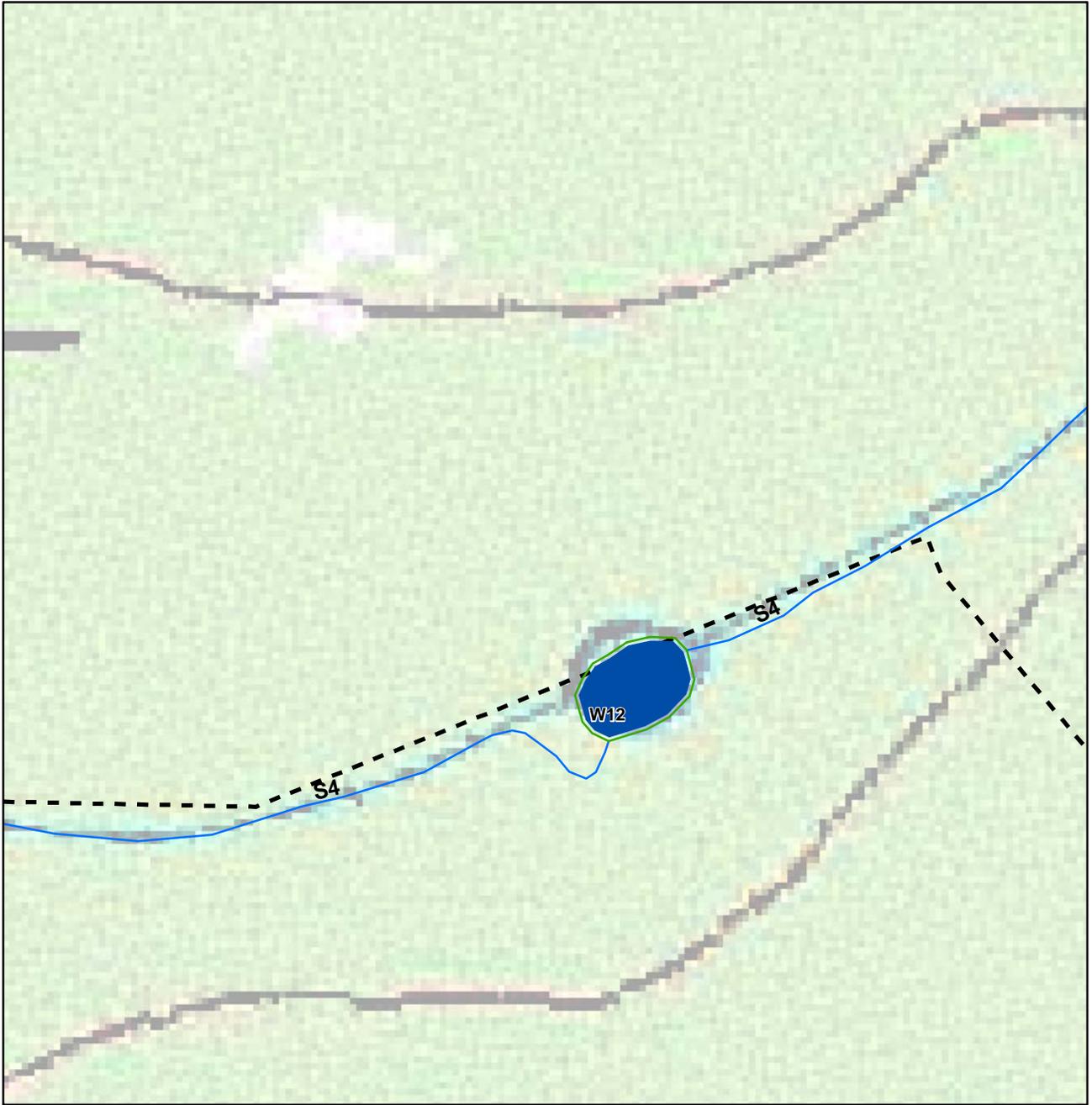
1. USGS 24K Quadrangle: Teanaway.



**Appendix D Figure 10
Hydroperiods**

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington





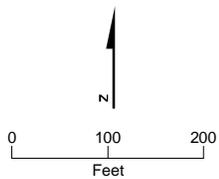
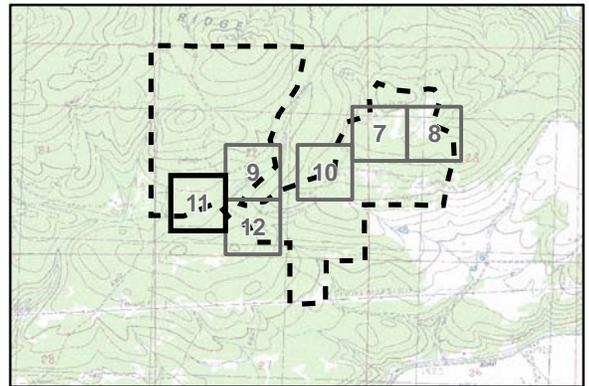
VICINITY MAP

LEGEND

-  Stream
-  Wetland Boundary
-  Seasonally Flooded or Inundated
-  Wetland Survey Area

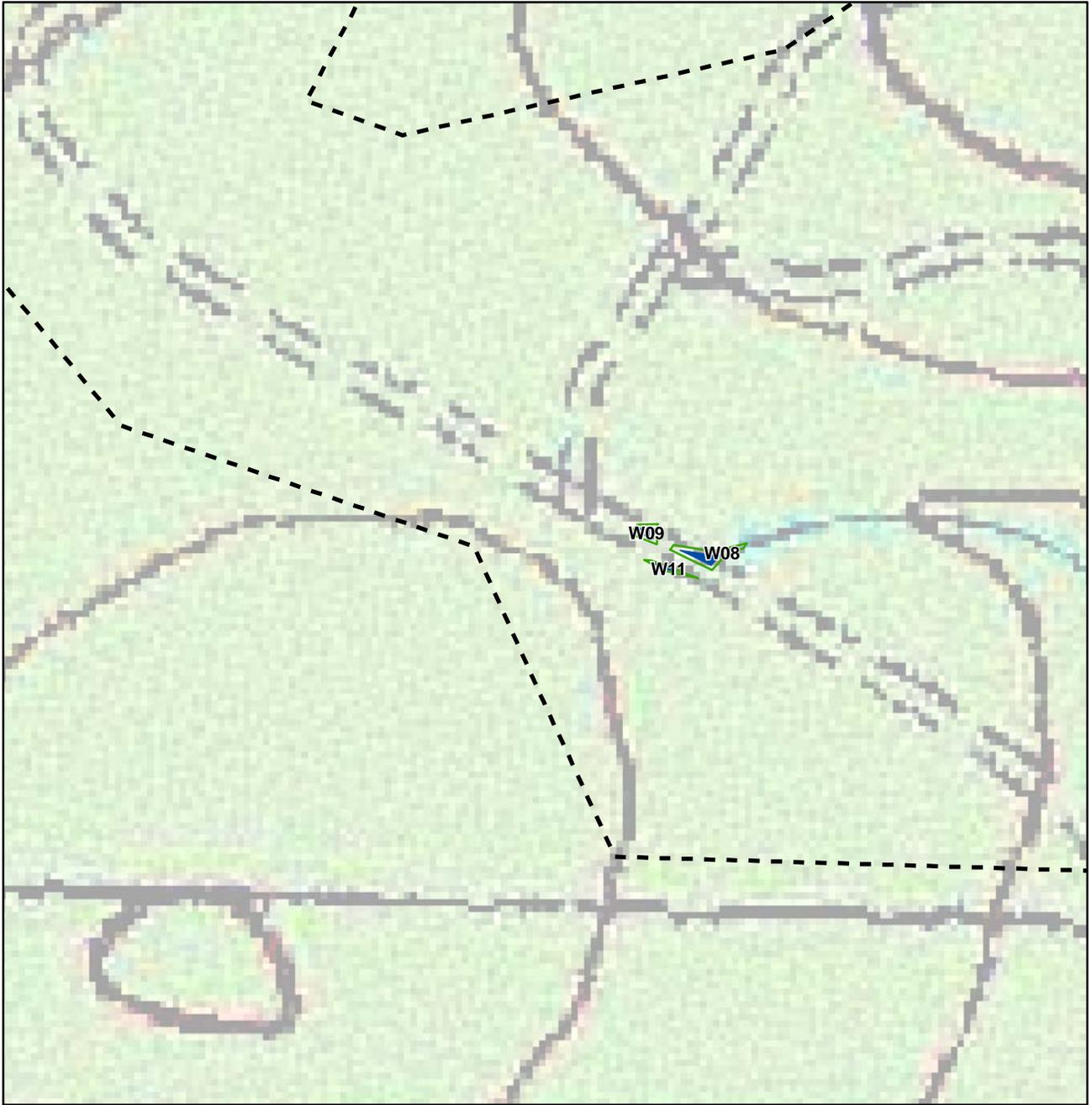
Note:

1. USGS 24K Quadrangle: Teanaway.



**Appendix D Figure 11
Hydroperiods**

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



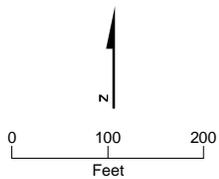
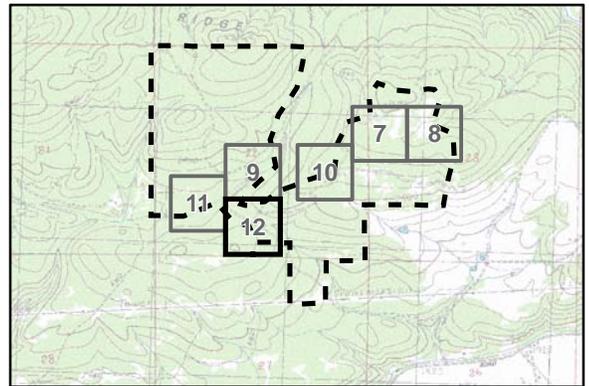
VICINITY MAP

LEGEND

-  Stream
-  Wetland Boundary
-  Seasonally Flooded or Inundated
-  Wetland Survey Area

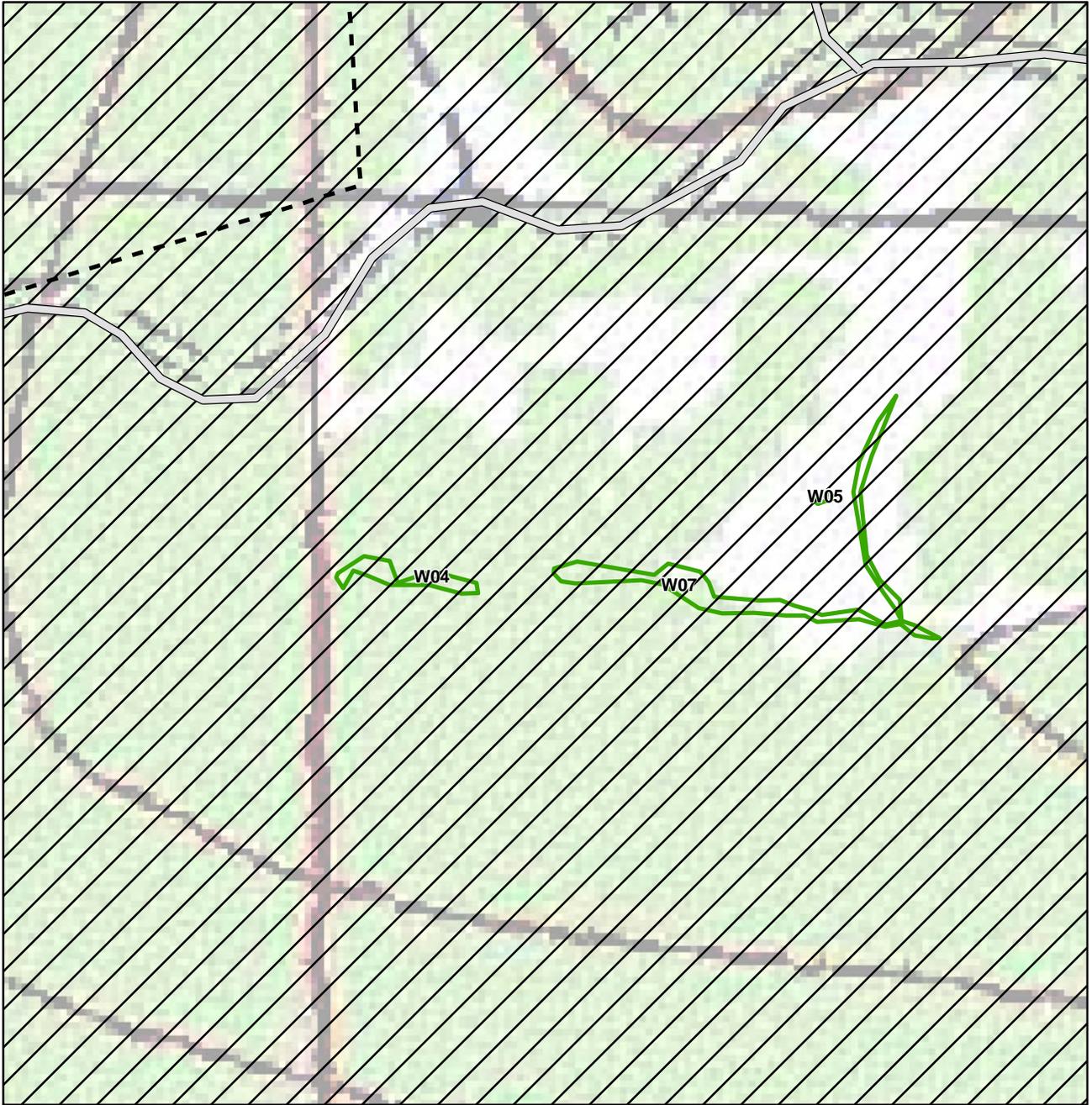
Note:

1. USGS 24K Quadrangle: Teanaway.



**Appendix D Figure 12
Hydroperiods**

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



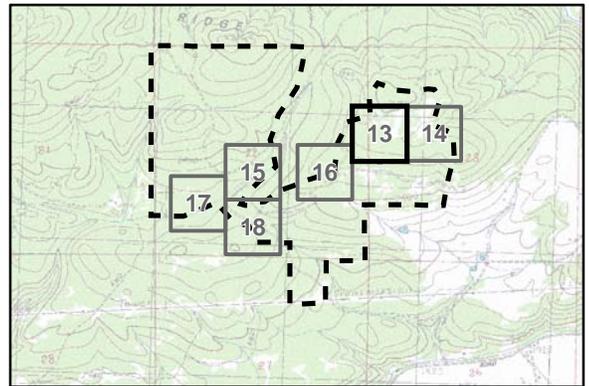
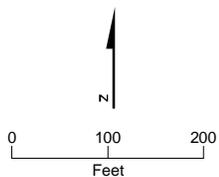
VICINITY MAP

LEGEND

-  Stream
-  Road
-  Relatively Undisturbed Buffer
-  Wetland Boundary
-  Wetland Survey Area

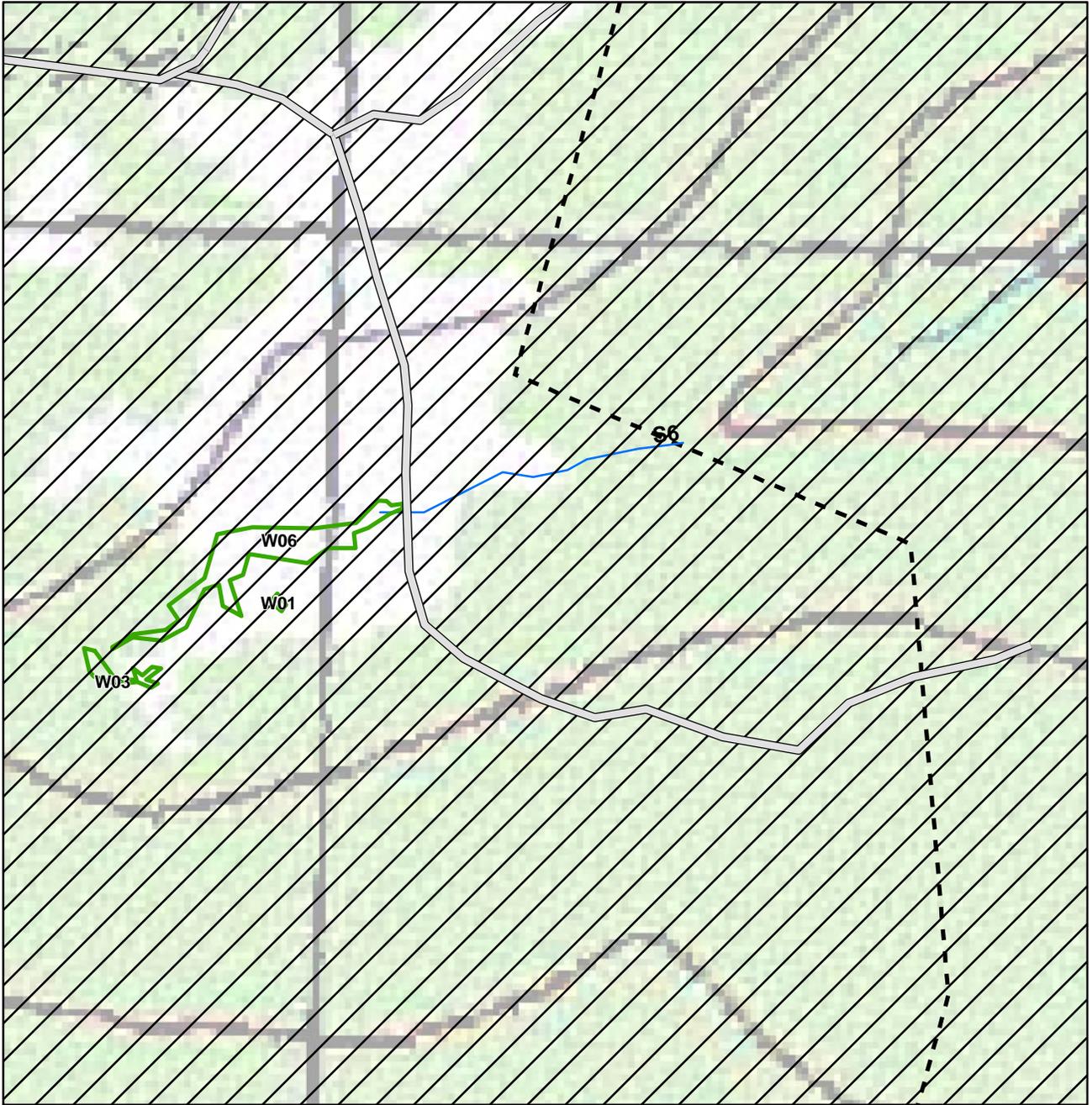
Note:

1. USGS 24K Quadrangle: Teanaway.



**Appendix D Figure 13
Wetland Buffers**

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



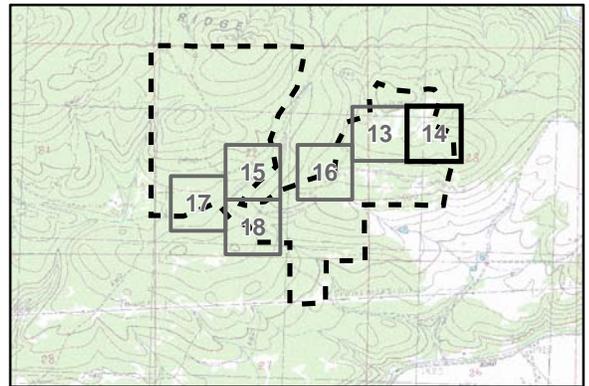
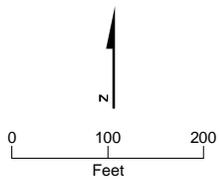
VICINITY MAP

LEGEND

-  Stream
-  Road
-  Relatively Undisturbed Buffer
-  Wetland Boundary
-  Wetland Survey Area

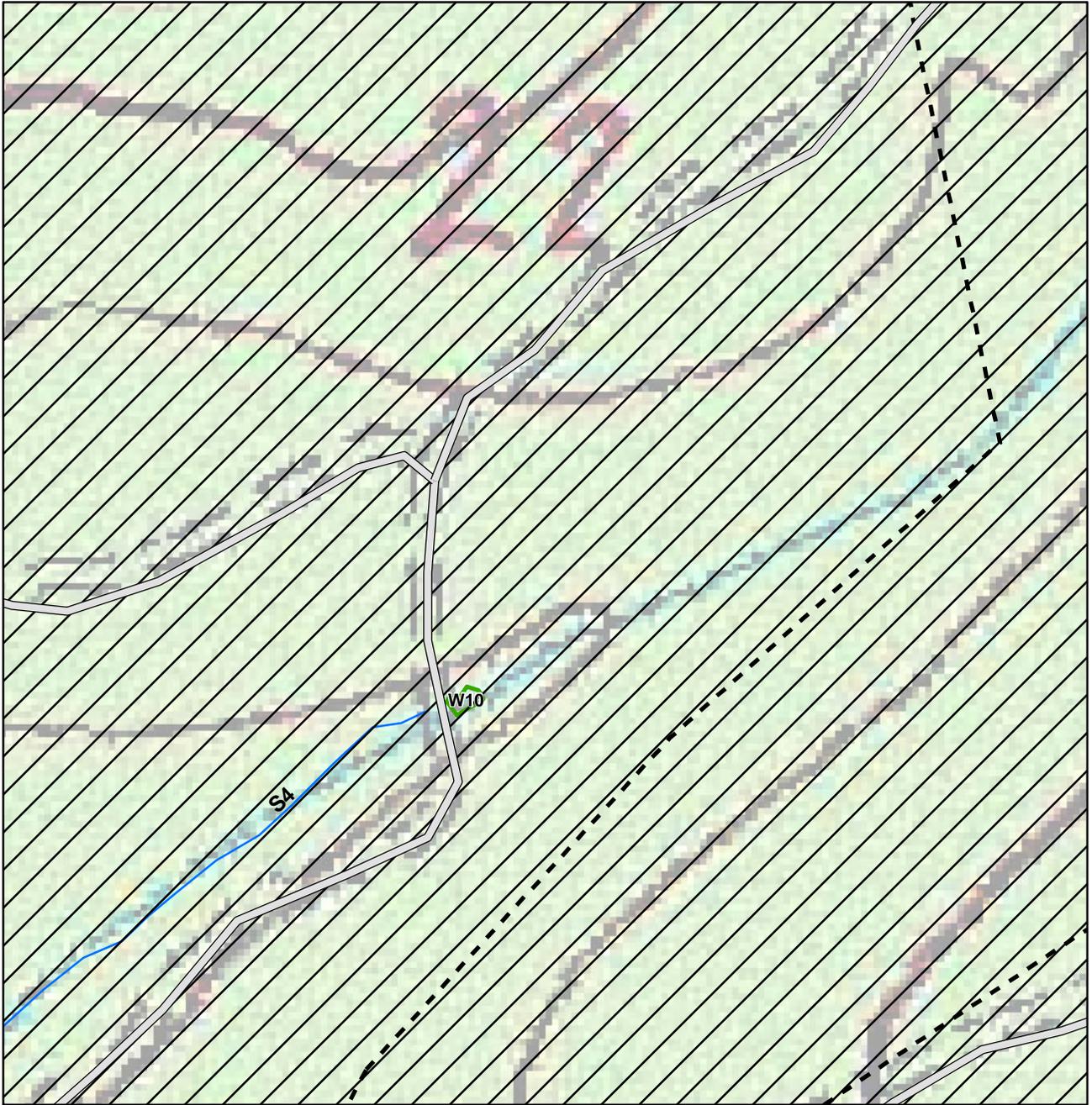
Note:

1. USGS 24K Quadrangle: Teanaway.



**Appendix D Figure 14
Wetland Buffers**

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



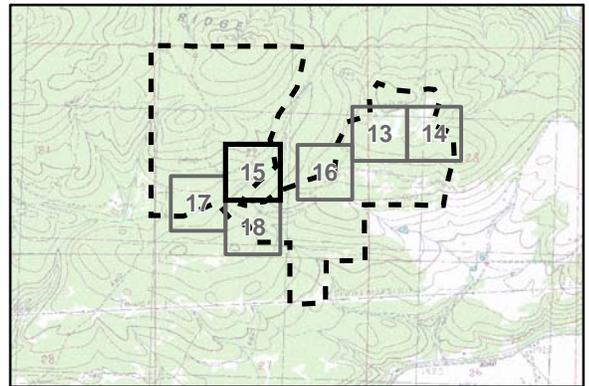
VICINITY MAP

LEGEND

-  Stream
-  Road
-  Relatively Undisturbed Buffer
-  Wetland Boundary
-  Wetland Survey Area

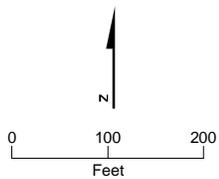
Note:

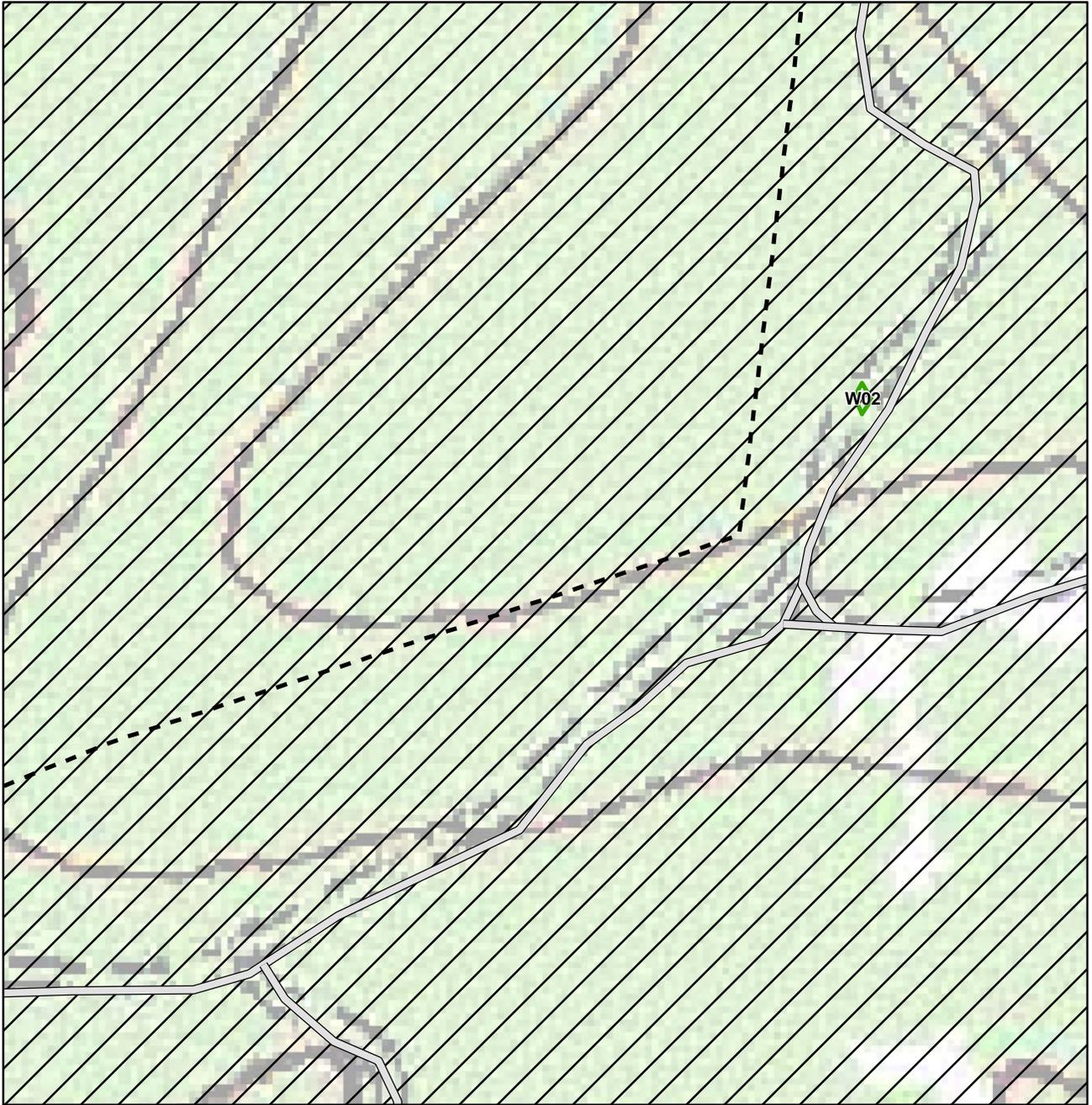
1. USGS 24K Quadrangle: Teanaway.



**Appendix D Figure 15
Wetland Buffers**

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington





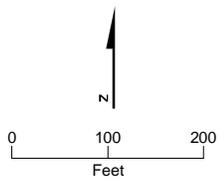
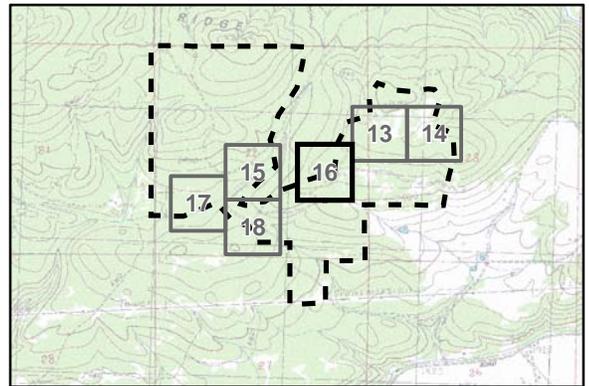
VICINITY MAP

LEGEND

-  Stream
-  Road
-  Relatively Undisturbed Buffer
-  Wetland Boundary
-  Wetland Survey Area

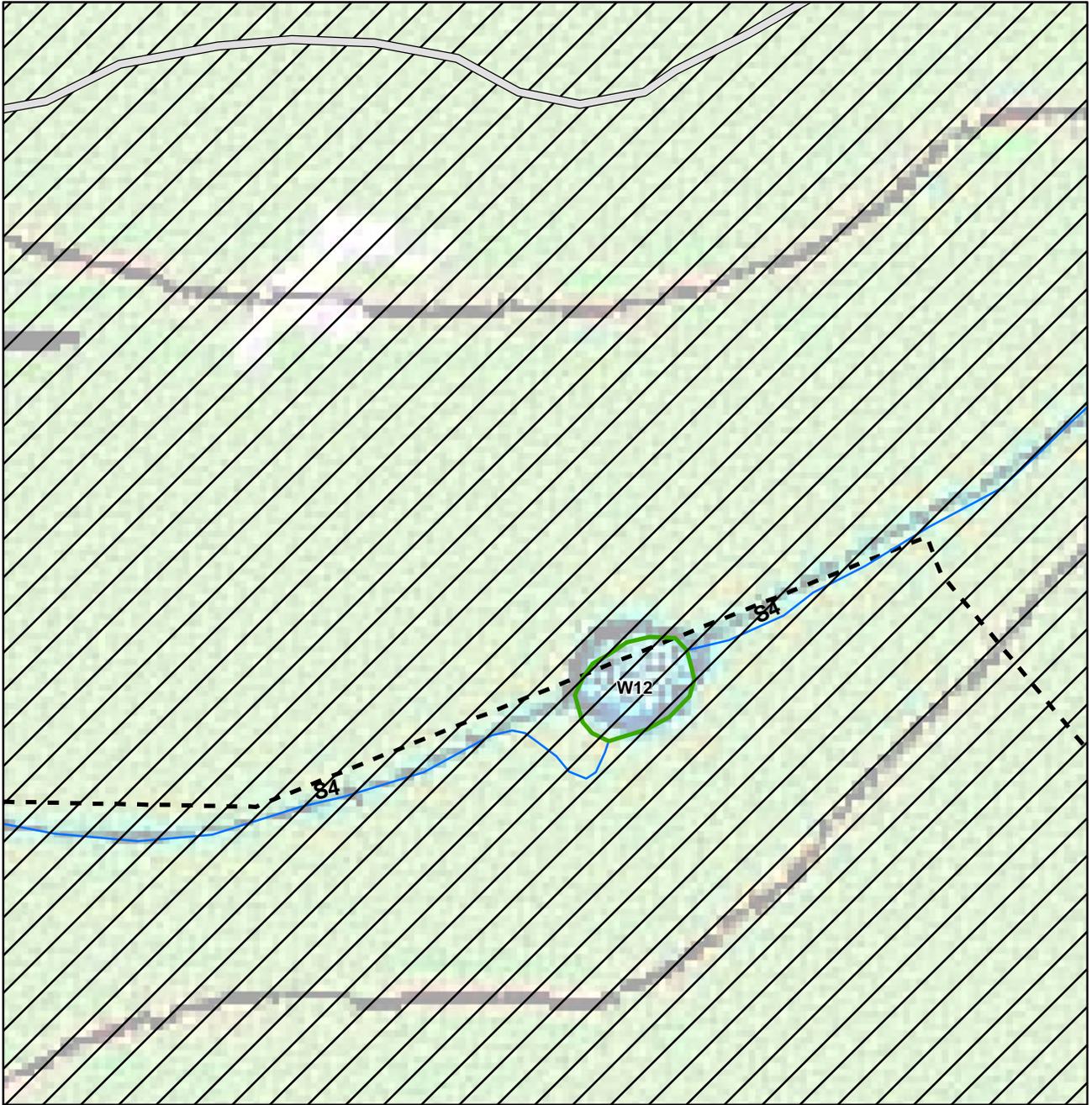
Note:

1. USGS 24K Quadrangle: Teanaway.



**Appendix D Figure 16
Wetland Buffers**

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



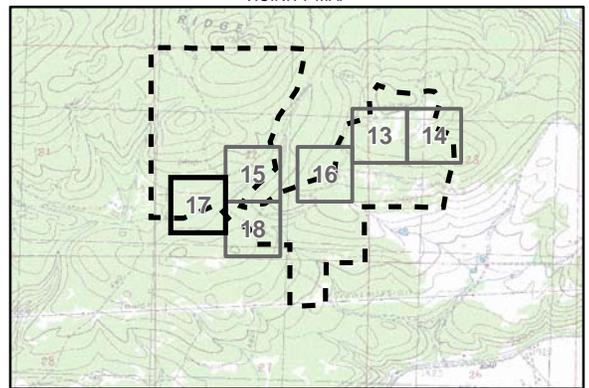
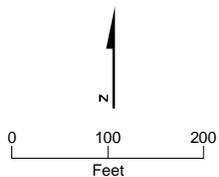
VICINITY MAP

LEGEND

-  Stream
-  Road
-  Relatively Undisturbed Buffer
-  Wetland Boundary
-  Wetland Survey Area

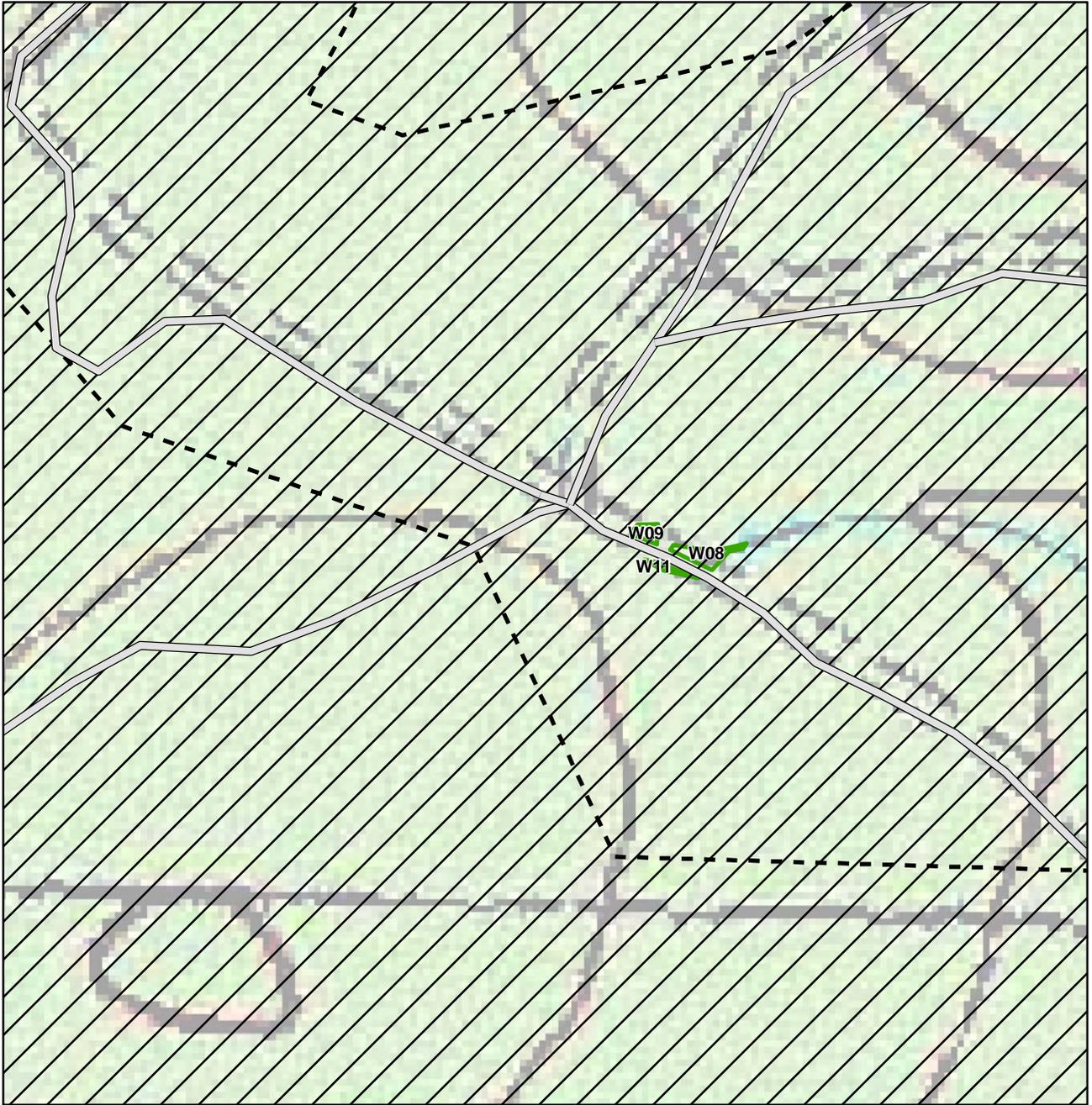
Note:

1. USGS 24K Quadrangle: Teanaway.



**Appendix D Figure 17
Wetland Buffers**

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington



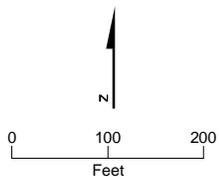
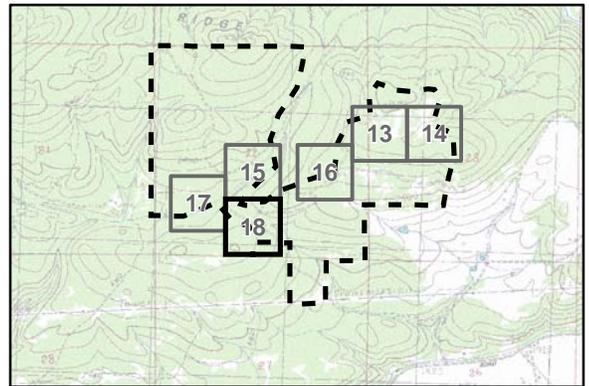
VICINITY MAP

LEGEND

-  Stream
-  Road
-  Relatively Undisturbed Buffer
-  Wetland Boundary
-  Wetland Survey Area

Note:

1. USGS 24K Quadrangle: Teanaway.



**Appendix D Figure 18
Wetland Buffers**

Wetland Delineation Report
Teanaway Solar Reserve
Kittitas County, Washington

APPENDIX E

**Washington State Department of
Ecology Function Assessment Forms**

Summary of Function Assessments

Wetland Name: W1-W7 **AU ID#:** W1-W7 (patchwork of wetlands)
Date: 6/9/09 - 6/10/09 **T/S/R:** 20W522/16E
Investigator Name: Forrest Parsons / Sel Shaich **Size of AU:** 0.6 acre
Katrina Kapanais

Wetland Classification:

Depressional Long-duration Depressional Short-duration
 When box is shaded, then index or rating is not required

Function	Index For Potential/Suitability	Index For Opportunity
<i>Water Quality Functions</i>		
Removing Sediment	8	2
Removing Nutrients/Nitrogen	5	1
Removing Nutrients/Phosphorous	7	1
Removing Metals & Toxic Organics	6	0
<i>Water Quantity Functions</i>		
Reducing Downstream Erosion and Flooding	4	<i>Use Qualitative Rating (High, Moderate, Low) since opportunity could not be modeled</i> LOW
Recharging Groundwater	9	No opportunity rating required for long and short-duration All wetlands were judged to have high opportunity

Function	Index For Potential	Index For Opportunity
<i>Habitat Functions</i>		
General Habitat	5	8
Habitat for Invertebrates	9	8
Habitat for Amphibians	4	8
Habitat for Aquatic Birds	3	<i>Use Qualitative Rating (High, Moderate, Low) since opportunity could not be modeled</i> LOW
Habitat for Aquatic Mammals Enter index for Long-duration Wetlands	Short-duration wetlands were judged as unsuitable year round habitat	7
Richness of Native Plants	2	No model developed since all wetlands were judged to have same opportunity
Supporting Food Webs	8	5

Rationale for dividing wetland into multiple assessment units

Does not apply

Information of special note in the AU (such as endangered/threatened species, local significance, etc.):

Does not apply

Description of areas that were not directly observed and explanation as to why:

Does not apply

General Comments:

Refer to wetland report for maps and photos
Refer to wetland rating forms for hydroperiods.

Summary of Function Assessments

Wetland Name: W8, W9, W11 **AU ID#:** W8, W9, W11 (patchwork of wetlands)
Date: 6/9/09, 6/10/09, 6/16/09, 6/17/09 **T/S/R:** ZON/522/16E
Investigator Name: Forrest Parsons / Joel Shaich **Size of AU:** 0.05 acre
Rahim Kapantau

Wetland Classification:

Depressional Long-duration Depressional Short-duration
 When box is shaded, then index or rating is not required

Function	Index For Potential/Suitability	Index For Opportunity
<i>Water Quality Functions</i>		
Removing Sediment	8	3
Removing Nutrients/Nitrogen	5	1
Removing Nutrients/Phosphorous	8	2
Removing Metals & Toxic Organics	7	3
<i>Water Quantity Functions</i>		
Reducing Downstream Erosion and Flooding	1	<i>Use Qualitative Rating (High, Moderate, Low) since opportunity could not be modeled</i> LOW
Recharging Groundwater	9	No opportunity rating required for long and short-duration All wetlands were judged to have high opportunity

Function	Index For Potential	Index For Opportunity
<i>Habitat Functions</i>		
General Habitat	3	7
Habitat for Invertebrates	8	8
Habitat for Amphibians	4	8
Habitat for Aquatic Birds	2	<i>Use Qualitative Rating (High, Moderate, Low) since opportunity could not be modeled</i> LOW
Habitat for Aquatic Mammals Enter index for Long-duration Wetlands	Short-duration wetlands were judged as unsuitable year round habitat	7
Richness of Native Plants	2	No model developed since all wetlands were judged to have same opportunity
Supporting Food Webs	8	5

Rationale for dividing wetland into multiple assessment units

Does not apply

Information of special note in the AU (such as endangered/threatened species, local significance, etc.):

Does not apply

Description of areas that were not directly observed and explanation as to why:

Does not apply

General Comments:

Refer to wetland report for maps and photos.
Refer to wetland rating forms (Appendix D) for hydro periods

Summary of Function Assessments

Wetland Name: W10 **AU ID#:** W10
Date: 6/9/09, 6/10/09, 6/17/09, 6/16/09 **T/S/R:** 20N/S22/R16E
Investigator Name: Forrest Parsons/Joel Shaich/Kathryn Kapanais **Size of AU:** 0.02 acre

Wetland Classification:

Depressional Long-duration Depressional Short-duration
 When box is shaded, then index or rating is not required

Function	Index For Potential/Suitability	Index For Opportunity
<i>Water Quality Functions</i>		
Removing Sediment	8	5
Removing Nutrients/Nitrogen	5	1
Removing Nutrients/Phosphorous	8	5
Removing Metals & Toxic Organics	7	7
<i>Water Quantity Functions</i>		
Reducing Downstream Erosion and Flooding	1	<i>Use Qualitative Rating (High, Moderate, Low) since opportunity could not be modeled</i> LOW
Recharging Groundwater	9	No opportunity rating required for long and short-duration All wetlands were judged to have high opportunity

Function	Index For Potential	Index For Opportunity
<i>Habitat Functions</i>		
General Habitat	6	7
Habitat for Invertebrates	9	8
Habitat for Amphibians	6	8
Habitat for Aquatic Birds	3	<i>Use Qualitative Rating (High, Moderate, Low) since opportunity could not be modeled</i> LOW
Habitat for Aquatic Mammals Enter index for Long-duration Wetlands	Short-duration wetlands were judged as unsuitable year round habitat	7
Richness of Native Plants	4	No model developed since all wetlands were judged to have same opportunity
Supporting Food Webs	8	5

Rationale for dividing wetland into multiple assessment units

N/A

Information of special note in the AU (such as endangered/threatened species, local significance, etc.):

N/A

Description of areas that were not directly observed and explanation as to why:

N/A

General Comments:

Summary of Function Assessments

Wetland Name: W12 **AU ID#:** W12
Date: 7/9/09 **T/S/R:** 20N/523/R16E
Investigator Name: Peggy O'Neill / Nichole Seidell **Size of AU:** 0.3 acre

Wetland Classification:

Depressional Long-duration Depressional Short-duration
 When box is shaded, then index or rating is not required

Function	Index For Potential/Suitability	Index For Opportunity
<i>Water Quality Functions</i>		
Removing Sediment	8	1
Removing Nutrients/Nitrogen	3	0
Removing Nutrients/Phosphorous	7	0
Removing Metals & Toxic Organics	4	0
<i>Water Quantity Functions</i>		
Reducing Downstream Erosion and Flooding	6	<i>Use Qualitative Rating (High, Moderate, Low) since opportunity could not be modeled</i> Moderate
Recharging Groundwater	7	No opportunity rating required for long and short-duration All wetlands were judged to have high opportunity

Function	Index For Potential	Index For Opportunity
<i>Habitat Functions</i>		
General Habitat	7	9
Habitat for Invertebrates	7	10
Habitat for Amphibians	6	9
Habitat for Aquatic Birds	7	<i>Use Qualitative Rating (High, Moderate, Low) since opportunity could not be modeled</i> <i>Moderate</i>
Habitat for Aquatic Mammals Enter index for Long-duration Wetlands	Short-duration wetlands were judged as unsuitable year round habitat	8
	17	
Richness of Native Plants	7	No model developed since all wetlands were judged to have same opportunity
Supporting Food Webs	7	5

Rationale for dividing wetland into multiple assessment units

N/A

Information of special note in the AU (such as endangered/threatened species, local significance, etc.):

N/A

Description of areas that were not directly observed and explanation as to why:

N/A

General Comments:

Refer to wetland report and wetland rating forms for photographs and maps.

ATTACHMENT C

Cultural Resources Report
*(privileged and confidential: restricted
distribution)*

ATTACHMENT D

Geology and Soil Hazards Evaluation

Report

**Teanaway Solar Reserve
Geology and Soils Hazards
Evaluation
Kittitas County, Washington**

Prepared for
Teanaway Solar Reserve, LLC

February 2010

Prepared by
CH2MHILL

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2	Soil Index Properties (NRCS Data)	3
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- 1 Vicinity Map
- 2 Proposed Site Layout
- 3 Soils and Slopes Map
- 4 Observed Geologic Features and Soil Sample Locations

1.0 Introduction

The proposed project site is located approximately 4 miles northeast of Cle Elum, Washington, in Township 20N, Range 16E, within Sections 22, 23, and 27 (see Figure 1 in Appendix A for site location). The site is located on the eastern slopes of the Cascade Mountains on Cle Elum Ridge, which runs generally from east to west at elevations ranging from approximately 2,200 to 2,600 feet. The Teanaway River is approximately 1 mile to the northeast of Cle Elum Ridge. The site is accessed from Highway 970 by way of county roads such as Red Bridge Road, private roads such as Loping Lane, and Wiehl Road, which is a dedicated public road that is maintained privately and not by the County.

The proposed project area consists of 982 acres. Based on site surveys, the project will utilize approximately 477 acres within the proposed project area. Solar arrays will occupy approximately 399 acres. The remaining acres are currently undeveloped open space, which will be preserved as part of the Wildlife Mitigation Plan (see Attachment H). An open corridor will be maintained to allow for wildlife migration through the site. Figure 2 (see Appendix A) shows the proposed site layout.

Data from the Washington Department of Natural Resources (WDNR), the U. S. Geological Survey, the Web Soil Survey provided by the Natural Resources Conservation Service (NRCS), and aerial photograph base maps were reviewed for information on geology, soil characteristics, and potential geologic hazards in the vicinity of the site. A limited site reconnaissance was conducted to observe general site conditions, presence of geologic hazards, existing erosional features, evidence of slope instability, and collect soil samples to confirm NRCS classification and evaluate soil erodibility potential.

The following section presents an overview of the site geologic setting and soil characteristics, and discusses potential hazards and impacts.

1.1 Geologic Setting and Soil Properties

Surficial geologic units at the site include glacial till that is capped by loess (windblown silt). The till is known as the Swauk Prairie Subdrift of the Kittitas drift (Tabor et al., 1982). This unit is described as “boulder diamicton...capped by as much as 3 m (10 feet) of loess”. Based on observations at the site, this unit consists primarily of silty loess containing volcanic ash, with numerous rounded cobbles and boulders scattered across the surface. Some of the boulders observed on the site are up to 5 feet in diameter, which suggests glacial origin. No bedrock outcrops were observed on the site.

The predominant surficial soils present on the site that would underlie project facilities include the Teanaway Loam, 3 to 10 percent slopes, and the Teanaway Loam, 25 to 50 percent slopes (NRCS, 2009). These two soil units have identical characteristics, and are distinguished by slope angles. These soils are formed in loess that overlies glacial till or outwash, with an influence of volcanic ash at the surface. These soils are described as moderately well-drained, moderately low to moderately high permeability, high available water capacity, and no flooding or ponding frequency.

The NRCS provides a large amount of soil data for each soil series. The data include physical properties, engineering properties, and suitability of the soils for certain uses.

These include erosion potential and suitability for roads on forestlands, excavations, etc. However, the NRCS (2009) cautions that “onsite investigations may be needed to validate the interpretations...and to confirm the identity of the soil on a given site.” To confirm the NRCS data for the site, eight soil samples were collected. These samples were collected from shallow, hand-dug pits, from depths between approximately 6 and 18 inches. These depths were selected to represent the zone where the most disturbance is anticipated to occur, such as during road construction. These samples were analyzed for soil index properties in a laboratory in order to compare their properties and confirm the NRCS classifications. In addition, because the soil units are based on slope angles (percent), onsite slopes were measured in the field to confirm that the slope angles assigned to the soil classes are accurate.

Figure 3 (see Appendix A) shows the distribution of soils and slopes in the project area, based on NRCS and USGS data.

Table 1 summarizes the physical properties of the predominant soils that underlie the proposed facility, based on NRCS data. Table 2 summarizes the index properties of the onsite soils, based on NRCS data. Table 3 summarizes the index properties of the soil samples collected from the site for comparison to NRCS data.

The laboratory data for the soils collected onsite confirm the NRCS soil data. The soils collected onsite (upper 6 to 18 inches) consist primarily of very low-plasticity to non-plastic sandy silt and have similar laboratory data as presented by the NRCS.

TABLE 1
 Summary of Surficial Soils and their Physical Properties (NRCS Data)

Soil Series	Depth (inches)	USDA Soil Texture	Slopes (percent)	Soil Erodibility Factor (K) ^a	Saturated Hydraulic conductivity (K _{sat}) (um/sec) ^b	Organic Matter (percent)
Teaway Loam, 3 to 10 percent slopes	3 – 22	Loam, Silt Loam	3 – 10	0.43	4.00 – 14.00	0.5 – 3.0
	22 – 60	Loam, Silt Loam, Clay Loam	3 – 10	0.43	1.40 – 4.00	0.0 – 1.0
Teaway Loam, 25 to 50 percent slopes	3 – 22	Loam, Silt Loam	25 – 50	0.43	1.4 – 14.00	0.5 – 3.0
	22 – 60	Loam, Silt Loam, Clay Loam	25 – 50	0.43	1.40 – 4.00	0.0 – 1.0

Notes:

^a Erodibility Factor (K) = susceptibility of a soil to sheet and rill erosion by water

^b Saturated Hydraulic Conductivity (K_{sat}) = the ease with which pores in a saturated soil transmit water (i.e. the rate at which water moves through soil)

TABLE 2
Soil Index Properties (NRCS Data)

Soil Name	Depth (inches)	USCS Classification	Bulk Density (lbs/ft ³)	Percent Passing Sieve #200 ^a	Liquid Limit ^b	Plasticity Index ^b	Clay Percent
Teanaway Loam, 3 to 10 percent slopes	3 – 22	Sandy Silt (ML)	75 – 97	55 – 75	15 - 25	NP - 5	10 – 13
	22 – 60	Lean Clay (CL)	97 – 106	45 - 75	25 - 40	10 - 20	17 - 30
Teanaway Loam, 25 to 50 percent slopes	3 – 22	Sandy Silt (ML)	75 – 97	55 – 75	15 - 25	NP - 5	10 – 13
	22 – 60	Lean Clay (CL)	97 – 106	45 - 75	25 - 40	10 - 20	17 - 30

Notes:

^a #200 Sieve is Sand/Silt Boundary

^b Liquid Limit and Plasticity Index define if the soil will behave plastically based on moisture content

NP = Non-Plastic

TABLE 3
Soil Laboratory Data (Index Properties) – Onsite Soil Samples

Soil Name	Depth (inches)	USCS Classification	Bulk Density (lbs/ft ³)	In Situ Moisture (%)	Percent Passing #200 Sieve ^a	Liquid Limit ^b	Plasticity Index ^b
SS – 1	6 – 18	Silty Sand (SM)		12.7	44	17	NP
SS – 2	6 – 18	Sandy Silt (ML)		13.4	67	21	2
SS – 5	6 – 18	Sandy Silt (ML)	110	15.2	61	16	NP
SS – 6	6 – 18	Sandy Silt (ML)		17.4	57	19	NP
SS – 7	6 – 18	Sandy Silt (ML)		18.4	54	20	NP
SS – 8	6 – 18	Sandy Silt (ML)	100	16.1	36	19	NP

Notes:

^a #200 Sieve is Sand/Silt Boundary

^b Liquid Limit and Plasticity Index define if the soil will behave plastically based on moisture content

NP = Non-Plastic

2.0 Potential Soil Impacts and Geologic Hazards

The following section describes the potential soil impacts and geologic hazards based on review of existing literature and geologic mapping, as well as the geologic site reconnaissance. Figure 4 (see Appendix A) shows areas of observed geologic features, slope angles measured on the site, and soil sample locations. The Photo Log in Appendix B shows site photographs of observed features that are described below. Mitigation measures to

avoid or minimize the potential impacts and hazards are described in Section 3.0, BMPs and Controls, Mitigation, and Monitoring Measures.

2.1 Soil Limitations

The rate and magnitude of soil erosion by water are controlled by rainfall intensity and runoff, soil erodibility, and vegetation cover. The erosion factor (K) indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water. The Teanaway Loam soils on the site have an erosion factor K of 0.43, which indicates moderate erosion potential.

Changes in soil moisture cause certain clay minerals in soils to either expand or contract. The amount and type of clay minerals in the soil influence the change in volume. Structures or roads built on shrinking or swelling soils could be damaged by the change in volume of the soil. Linear extensibility (shrink-swell potential) refers to the change in length of an unconfined clod as its moisture content is decreased from a moist state to a dry state. The volume change is reported as percent change for the soil. The uppermost soils on the site have a linear extensibility (i.e. swelling potential) between 0.0 and 1.5 percent, indicating no to very low swell potential (NRCS, 2009). Therefore, shrinking/swelling soils are not expected on the site, and will not impact project facilities.

Existing two-track roads on the site showed occasional shallow, localized erosion and rills in a few locations. These features were localized and not severe; and in general the on-site roads were in good condition, especially considering these roads are primitive, non-surfaced roads that are typically just a bladed surface of native soils and compacted by vehicular traffic. One area along the existing road near the south side of the western portion of the site showed a small area of erosion in the roadway and sediment transport off the edge of the road.

The onsite soils are rated as “somewhat limited” to “very limited” for local roads and streets (NRCS, 2009). These ratings are based on the soil properties that affect the ease of excavation and grading and the traffic-supporting capacity. A rating of “somewhat limited” indicates the soil has features that are moderately favorable for the specified use, and the limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. A rating of “very limited” indicates the soil has one or more features that are unfavorable for the specified use. The limitations can be overcome with soil reclamation, and sound design and installation procedures. The Teanaway Loam (25 to 50 percent slopes) is classified as “very limited” ranking for local roads and streets, primarily based on the relatively steep slope angles as shown in the NRCS database (Figure 3).

Figure 3 shows the distribution of slope angles steeper than 33 percent, as requested by Kittitas County Community Development Services in a letter dated December 4, 2009. This slope map is based on a USGS Digital Elevation Model. Based on this data, slopes steeper

than 33 percent are primarily present along the edges of the Teanaway River valley, outside the project boundaries. This map shows very small, localized areas with slopes steeper than 33 percent within the site boundaries.

In order to confirm the onsite slope angles and conditions and verify the USGS and NRCS data, the actual slope angles were measured during the field reconnaissance. Figure 4 (see Appendix A) shows geologic features and slope angles, based on the field measurements and observations. The slope angles measured in the field contrast the slope angles assigned to the soil units by the NRCS, and also the USGS slope data. The soils mapped by the NRCS as “Teanaway Loam, 25 to 50 percent slopes” (see Figure 3) actually overlie slopes between 10 and 20 percent, based on measurements conducted on site. Based on the field measurements, no roads would be constructed on slopes steeper than 33 percent. Therefore, because the true slope angles are not as steep as shown in the NRCS and USGS databases, it is not anticipated that slopes will pose a potential hazard nor interfere with the performance of new roads or structures.

The road design for the Teanaway Solar Reserve (TSR) project includes a 20-foot-wide gravel road designed to carry construction and traffic loads. A final design geotechnical investigation will be conducted to confirm the characteristics of the soil, determine the soil properties related to road building, and design proper roadways to overcome any soil limitations. In addition, future access road design will incorporate drainage facilities and erosion protection on slopes and culverts to pass runoff.

2.2 Stream Erosion/Gullying

No major areas of surficial soil erosion or gullying were observed. One, small drainage on the western side of the site has a small incised gully within the bottom of the drainage, but this was relatively shallow (1 foot deep by 1 to 2 feet wide) and was not continuous (see Figure 4). This is typical of a drainage bottom and did not exhibit large-scale erosion or gullying.

The site was well-vegetated at the time of the site visit in November 2009. Old scrapes and surficial skid furrows from logging activities have revegetated and not eroded further. These logging furrows were typically linear and many were oriented parallel to the fall of the slope and yet did not show signs of catalyzing into larger erosional features.

2.3 Volcanoes

The Pacific Northwest region is home to several active volcanoes along the Cascade Mountain Range. The closest ones to the project area are provided below, with distances from each mountain to the project site:

- Mount St. Helens – 90 miles
- Mount Rainier – 50 miles
- Mount Adams – 80 miles
- Mount Hood – 135 miles

Mount St. Helens has experienced the most recent eruption, which occurred in May 1980. Impacts to the project from volcanic activity can be either direct or indirect. Direct impacts include the effects of lava flows, blast, ash fall, and avalanches of volcanic debris. Indirect

effects include ash and debris accumulation, flooding, and sedimentation. Depending on the prevailing wind direction at the time of an eruption and the source of the eruption; ash fallout in the region surrounding the project may occur.

2.4 Landslides

No existing landslides have been mapped within the site boundaries on existing geologic maps (Tabor, et al., 1982; WDNR, 2010). These geologic maps show landslides to the north and east side of the site, on steep slopes adjacent to the Teanaway River valley. These landslides formed in oversteepened slopes along the river canyon, and are outside of the site boundaries. No areas of irregular or hummocky slopes indicative of mass movement were observed during the geologic reconnaissance. Given the lack of existing landslides stable slopes based on site observations, and relatively low slope angles; the landslide hazard on the site is low.

Slope angles measured during the site visit ranged from flat (zero percent) up to approximately 20 percent in areas of proposed facilities and roads. A few localized steeper slopes were observed in drainage areas. A few low (<6-foot high) road cuts were observed along existing roads. These cuts are stable with only very minor areas of erosion observed. Onsite slope angle measurements are shown on Figure 4.

2.5 Faults/Seismicity

No potentially seismically active faults have been mapped within the project site boundary. According to the U. S. Geological Survey's Quaternary Fault and Fold database (USGS, 2008a) and the Quaternary Faults map (WDNR, 2010), the closest mapped potentially active fault is the Kittitas Valley Faults, mapped within approximately 10 miles to the southeast of the site. This fault system is inferred to have the latest movement between 3.7 million and 130,000 years ago. This fault is considered a "Class B" Quaternary-age fault with a slip rate estimated to be less than 0.2 millimeters (mm) per year.

The seismic potential for the site is low to moderate, due to the potential for regional earthquakes. For new construction, the facilities' tower foundations will be designed according to the International Building Code and the site will be assigned a seismic site class based on soil properties in the upper 100 feet of the subsurface. Seismic design issues will be fully addressed in a geotechnical report prepared for final design.

3.0 BMPs and Controls, Mitigation, and Monitoring Measures

Proper Best Management Practices (BMPs) will be implemented to minimize or eliminate the potential for increased erosion and protect the project facilities. BMPs are listed throughout the SEPA checklist, including BMPs for reducing dust generation and stormwater runoff. However, due to potential soil constraints such as slopes and potentially erodible soils, the following mitigation measures should also be employed, based on final design and site layout. Complete erosion and sediment control guidelines and BMPs are outlined in Washington State Department of Transportation (WSDOT) Highway Runoff Manual M 31-16 (WSDOT, 2008).

- TSR will obtain a Washington State Department of Ecology Individual National Pollutant Discharge Elimination System (NPDES) Permit prior to construction. TSR will

develop a Stormwater Pollution Prevention Plan (SWPPP) that meets the requirements of the Permit.

- As part of the SWPPP, TSR will prepare a temporary erosion and sediment control (TESC) plan. The TESC plan will address excavation, grading, and erosion control measures, both during construction and restoration of temporarily disturbed areas. On completion of the construction activities, all work areas, except any permanent access roads will be regraded so that all surfaces drain naturally, blend with the natural terrain, and are left in a condition that will facilitate natural revegetation, provide for proper drainage, and prevent erosion. Revegetation will be implemented for all areas temporarily disturbed by the construction of the facility in accordance with the terms of the Vegetation Plan (see Attachment G).
- Construction zones and areas to be disturbed will be well-defined, limited in extent, and managed by onsite inspectors and construction managers.
- Periodic inspection will be made of erosion control measures, and as required after precipitation events. Erosion control measures will be repaired or replaced as necessary.
- Berms and other water-channeling measures will be used to direct stormwater runoff to appropriate detention ponds, where necessary.
- Barriers and other measures including hay bales, silt fences, and straw mulches will be used to minimize and control soil erosion.
- Cut slope design for roads will not exceed the soil strength limits. Potentially unstable areas will be identified in the design process and avoided during construction. Site grading will be implemented to achieve stable, non-erosive slopes.
- The seismic site class according to the International Building Code will be determined during subsequent geotechnical investigations. Structures and tower foundations will be designed to withstand anticipated seismic loads.
- For the final design phase, a detailed geotechnical investigation and testing program will be conducted to evaluate the engineering properties of the soil.
- In the event of a volcanic eruption that could damage or impact project facilities, the project facilities would be shut down until safe operating conditions return. If an eruption occurred during construction, a temporary shutdown would likely be required to protect equipment and human health.

Geotechnical Investigation for Final Design

The subsurface conditions and engineering properties of the soils across the site can influence the engineering design and construction. Each of the components of the facility requires specific design calculations, drawings, and final engineering design for successful construction and future operation. Therefore, during final design of the facility a detailed geotechnical investigation and testing program will be conducted to evaluate the engineering properties of the soils. The information from the geotechnical investigation will be used to design the foundations securing the solar modules, inverter pads, and substation;

and design proper roadway sections to carry the anticipated traffic loads, as well as applicable portions of the Kittitas County Code.

The geotechnical investigation will consist of a combination of soil borings and test pits. Shallow sampling (upper 5 feet of soil) is typically targeted for access roads. Soil samples at the anticipated bearing layers of the solar modules (between 5 and 10 feet deep) will be collected to evaluate foundation conditions and soil strength. Samples collected during the investigation will be tested for engineering properties including compressive strength, Atterberg limits, grain size, moisture content, and compaction. Based on the soil properties, geotechnical analyses will be used to calculate bearing capacity for proper foundation and access road design.

The foundations and structures will be designed to withstand high winds, snow loads, and earthquake shaking. The site may have multiple foundation types to match the ground conditions and type of mounting structure used. The embedment will be to a depth of approximately 8 feet. The foundation design will depend on the engineering soil properties as determined by the geotechnical engineering analysis.

4.0 Conclusions

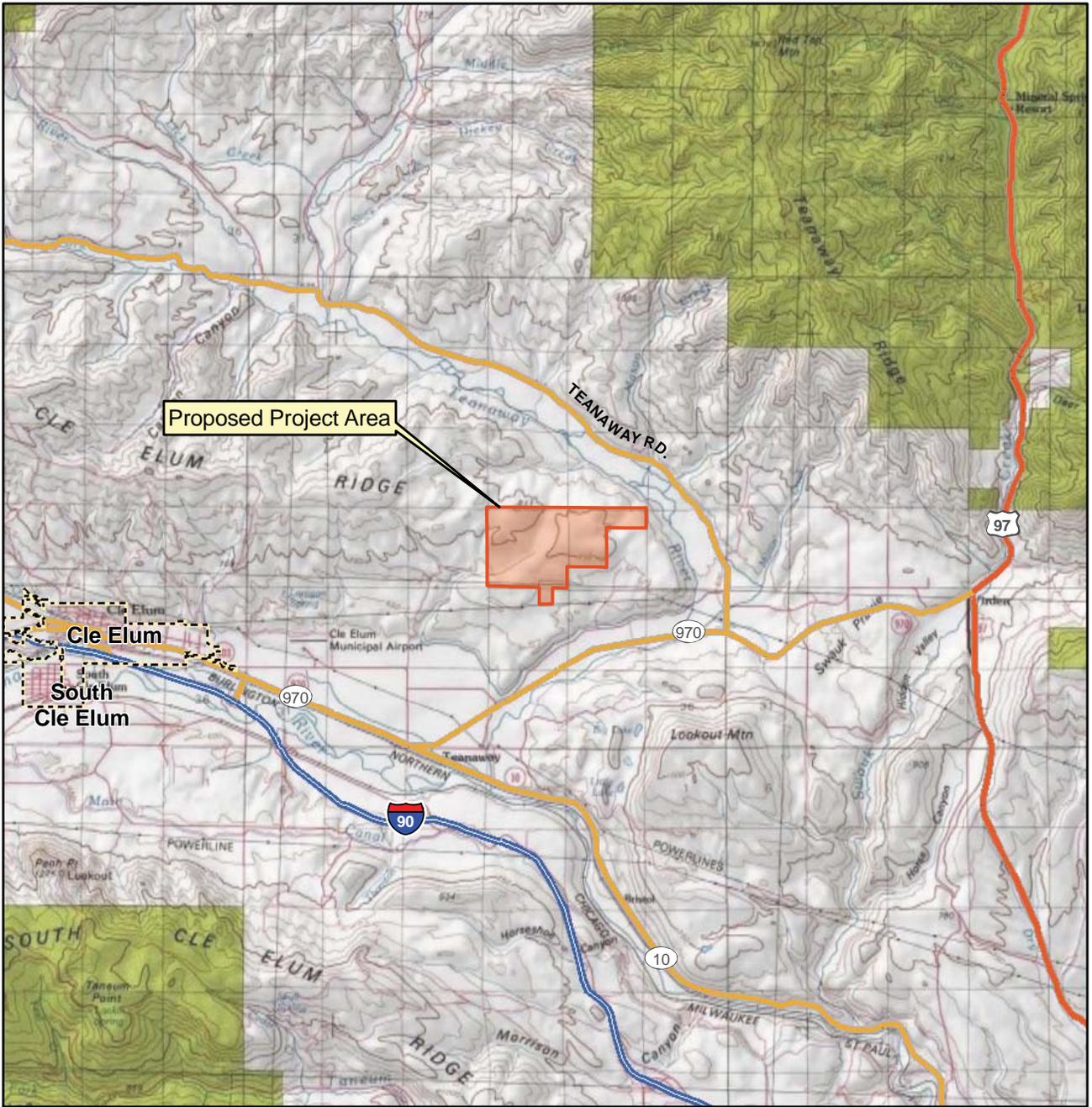
Based on the information presented in this document, the project can be designed, constructed, and operated safely to minimize or avoid adverse geologic and soil impacts to the environment. The potential for soil erosion during project construction and operation is low and will be further minimized by adherence to an erosion control plan, BMPs, and the mitigation measures described above. Areas of vegetation removal due to construction activities will be reclaimed through reseeded of appropriate vegetation to protect against loss of soil to wind and water erosion. Site grading, roads, and stable cut slopes will be incorporated into final design to minimize or avoid potential impacts that could endanger the project. No direct impacts from geologic hazards such as landslides are anticipated from design, construction, and operation of the project.

5.0 References

- Tabor, R.W., R.B. Waitt Jr., V.A. Frizzell Jr., D.A. Swanson, G.R. Byerly, and R.D. Bentley. 1982. Geologic Map of the Wenatchee 1:100,000 Quadrangle, Central Washington. U.S. Geological Survey Map I-1311.
- U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS), Soil Survey Staff. 2009. Web Soil Survey. Available online at <http://websoilsurvey.nrcs.usda.gov/>. Accessed December 2009.
- U. S. Geological Survey (USGS). 2008. *Quaternary Fault and Fold Database*, <http://earthquake.usgs.gov/regional/qfaults/>. Accessed December 2009.
- Washington State Department of Transportation (WSDOT). 2008. Highway Runoff Manual M31-16.

Washington State Department of Natural Resources (WDNR). 2010. Washington Interactive Geologic map/Quaternary faults; landslides <http://wigm.dnr.wa.gov/> Accessed January 2010.

APPENDIX A
Figures



VICINITY MAP

LEGEND

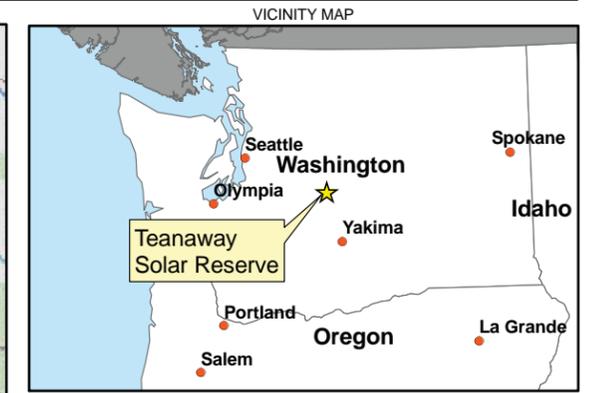
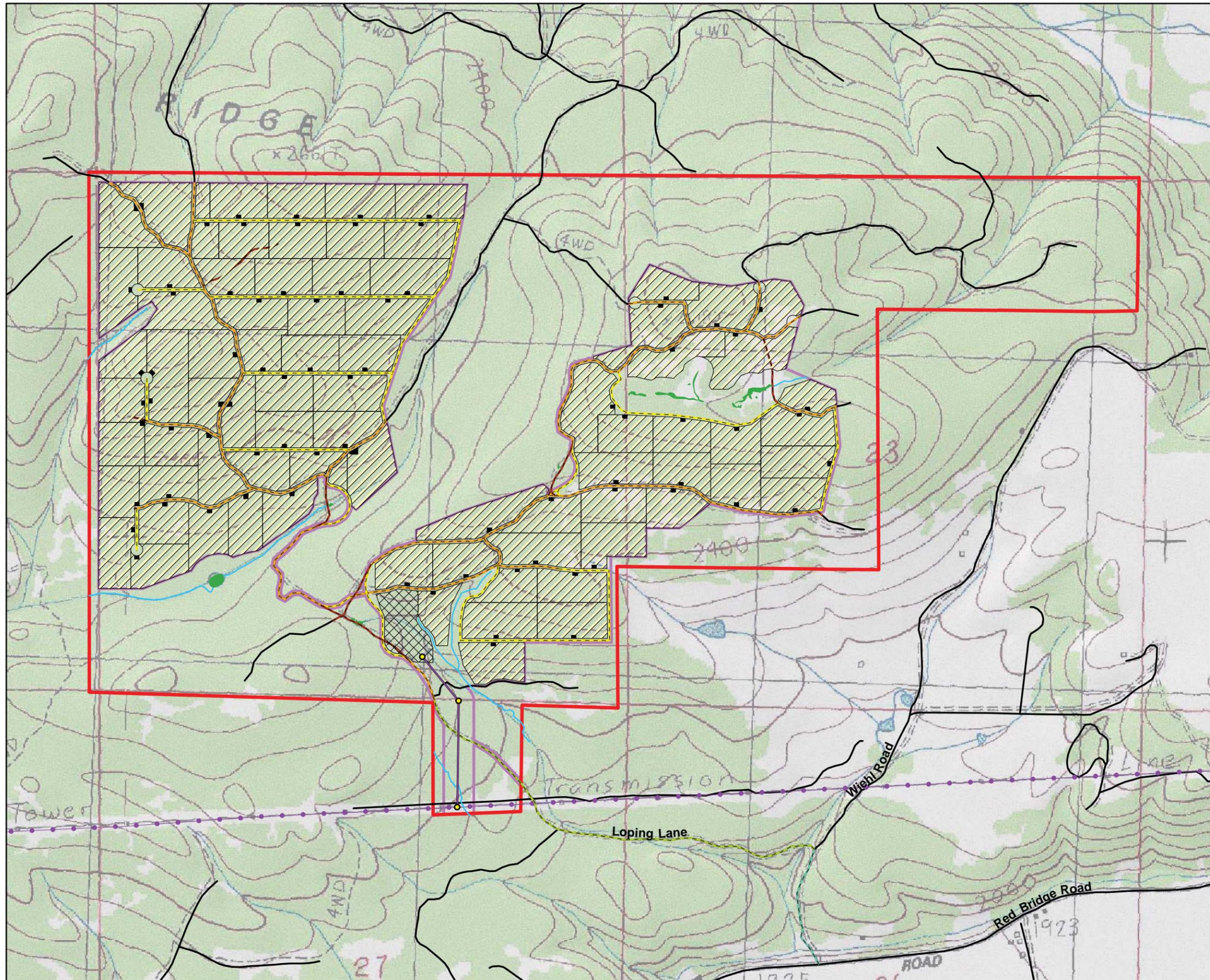
-  Proposed Project Area
-  City Boundary
-  Interstate
-  Highway
-  Major Road

Note:
1. USGS 100K Quadrangle: Wenatchee.



FIGURE 1
Vicinity Map

Geo Hazard Report
Teanaway Solar Reserve
Kittitas County, Washington



- LEGEND**
- Proposed Project Features**
- Proposed Project Area (982 Acres)
 - Proposed Project Site (477 acres)
 - Proposed PV Array Block
 - Proposed Field Inverter and Field Transformer
 - Proposed Substation/O&M Facility
 - Proposed Transmission Line
 - Proposed Transmission Structure
 - Proposed Maintenance Road
 - Proposed Improved Maintenance Road
 - Existing Maintenance Road (Planned Decommissioning)
 - Proposed Improved County Access Road
 - Proposed Improved Private Access Road
- Existing Features**
- Existing BPA Transmission Line and ROW
 - Existing Road
 - Stream
 - Wetland
- Note:
1. USGS 24K Quadrangle: Teanaway.

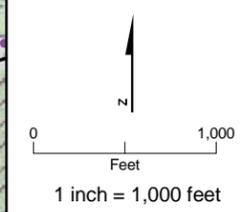
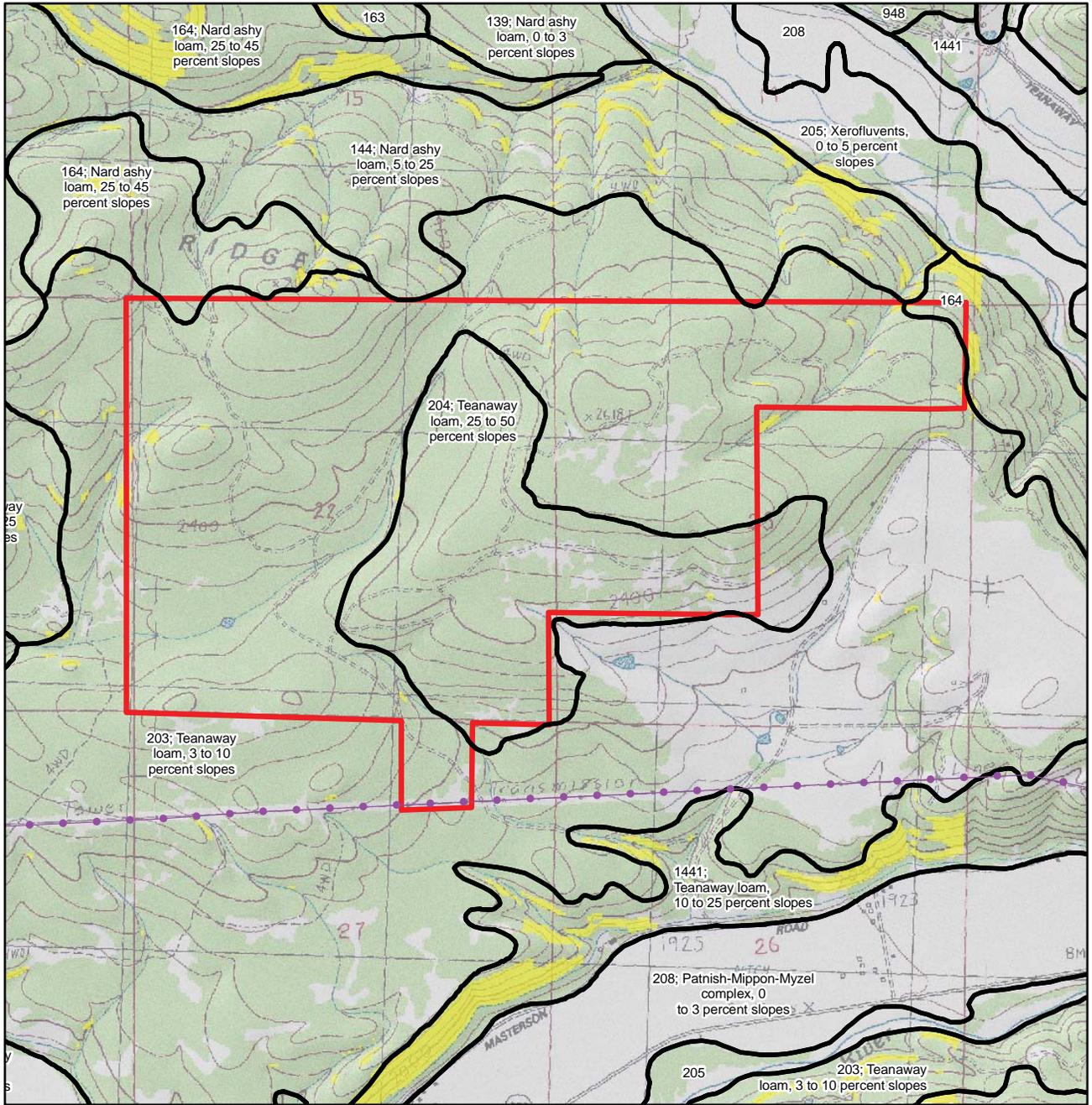


FIGURE 2
Proposed Site Layout
 Geo Hazard Report
 Teanaway Solar Reserve
 Kittitas County, Washington



VICINITY MAP

LEGEND

Proposed Project Area (982 Acres)

Existing BPA Transmission Line

Soil Unit

Slope

0 - 33% (not symbolized)

33%+

Notes:

1. USGS 24K Quadrangle: Teanaway.
2. Soils Data: Soil Survey Geographic (SSURGO) Database. MUSYM; MUNAME labeled.
3. Slope Date Derived from USGS 10m Digital Elevation Model

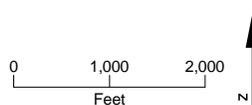
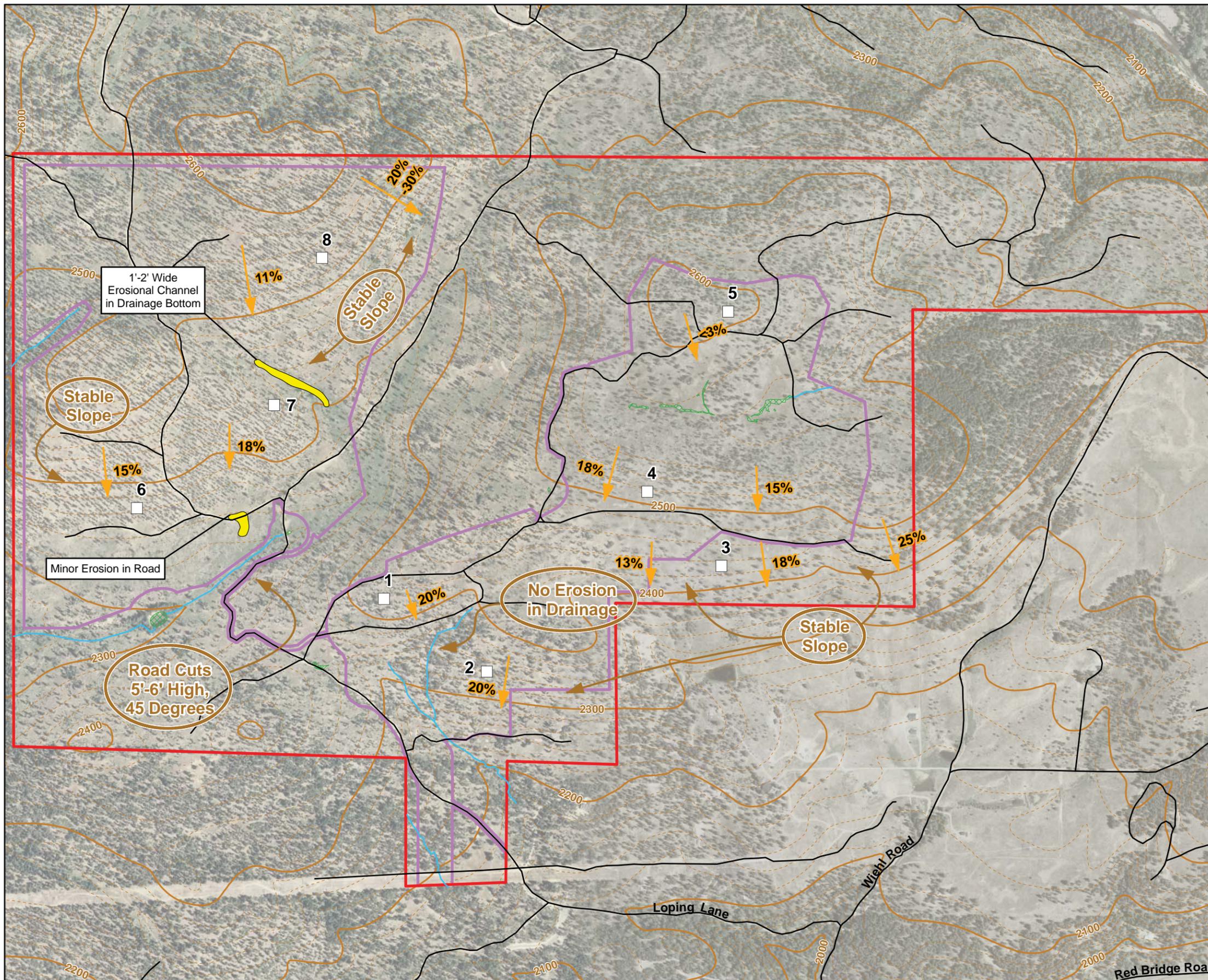


FIGURE 3
Soils & Slopes Map

Geo Hazard Report
Teanaway Solar Reserve
Kittitas County, Washington



- LEGEND**
- Soil Sample Location
 - ↘ Slope Angle Measured in Field
 - 🟡 Erosion Areas
 - 🌊 Stream
 - 🌿 Wetland
 - ⚡ Existing Road
 - 20 Feet
 - 100 Feet
 - 📐 Proposed Project Area (982 Acres)
 - 📐 Proposed Project Site (477 acres)

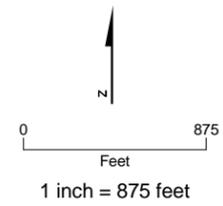


FIGURE 4
Observed Geologic Features and Soil Sample Locations
 Geo Hazard Report
 Teanaway Solar Reserve
 Kittitas County, Washington

APPENDIX B
Photo Log



Photo 1: Stable slope and terrain, east side of proposed project facility location.



Photo 2: Minor rill erosion on existing unimproved road, east side of proposed project facility location.



Photo 3: Stable slopes and terrain, east side of proposed project facility location.



Photo 4: Stable slopes and terrain, east side of proposed project facility location.



Photo 5: Stable slopes and unimproved road on east side of proposed project facility location.



Photo 6: Drainage bottom, east of proposed project facility location. Note lack of erosion in drainage bottom.



Photo 7: Road cut between east and west portions of proposed project facility location. Note lack of erosion and stable cut slope.



Photo 8: Stable slopes and terrain, west side of proposed project facility location.



Photo 9: Stable slopes and terrain, west side of proposed project facility location.



Photo 10: Stable slopes and terrain, west side of proposed project facility location.



Photo 11: Minor rill erosion in existing unimproved road, west side of proposed project facility location.



Photo 12: Sediment transport at low road crossing on unimproved road.



Photo 13: Minor, inactive stream erosional channel, west side of proposed project facility location. Culverts will be placed where access roads cross drainages.

ATTACHMENT E

Fugitive Dust Control Plan

Report

Teanaway Solar Reserve Fugitive Dust Control Plan Kittitas County, Washington

Prepared for
Teanaway Solar Reserve, LLC

February 2010

Prepared by
CH2MHILL



**Printed on
Recycled and
Recyclable
Paper**

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Appendices

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C	Eastern Washington Stormwater Management Manual, BMP C140 and BMP C126
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E	Self-Inspection Checklists

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Figures (*Provided in Appendix A*)

1	Vicinity Map
2	Proposed Site Layout

1.0 Introduction

The following Fugitive Dust Control Plan is for the proposed Teanaway Solar Reserve in Kittitas County, Washington. Teanaway Solar Reserve, LLC proposes to construct and operate the Teanaway Solar Reserve (project), a solar farm capable of generating up to 75 direct current megawatts (MWdc) of photovoltaic (PV) solar energy. This plan has been prepared in response to public and agency comments and for additional information as part of the addendum to the SEPA Expanded Checklist, originally submitted in August 2009.

2.0 Project Contacts

Table 1 provides the current project contacts for the project site during business hours, after hours, and weekend control when necessary.

TABLE 1
 Project Contact List

Description	Name	Address	Work Phone	Other Phone
Project Owner	Howard Trott	218 E. First Street, Suite B Cle Elum, WA 98922	(206) 972-3800	
General Contractor or Builder	TBD			
Site Developer or Excavator	TBD			
24-Hour Contact Person	TBD			

3.0 Project Description

3.1 Projection Location

The proposed project site is located approximately 4 miles northeast of Cle Elum, Washington, in Township 20N, Range 16E, within Sections 22, 23, and 27 (see Figure 1 in Appendix A for site location). The site is located on the eastern slopes of the Cascade Mountains on Cle Elum Ridge, which runs generally from east to west at elevations ranging from approximately 2,200 to 2,600 feet. The Teanaway River is approximately 1 mile to the northeast of Cle Elum Ridge. The site is accessed from Highway 970 by way of county roads such as Red Bridge Road, private roads such as Loping Lane, and Wiehl Road, which is a dedicated public road that is maintained privately and not by the County.

The proposed project area consists of 982 acres. Based on site surveys, the project will utilize approximately 477 acres within the proposed project area. Solar arrays will be placed on approximately 399 acres. The undeveloped acres will remain as open space and be

preserved as part of the Wildlife Mitigation Plan (see Attachment H). An open corridor will be maintained to allow for wildlife migration through the site.

3.2 Soil Conditions

Soils on the proposed project site include the Teanaway Loam, 3 to 10 percent slopes, and the Teanaway Loam, 25 to 50 percent slopes (NRCS, 2008). These soils are formed in loess that overlies glacial till or outwash, with an influence of volcanic ash at the surface. These soils are described as moderately well-drained, moderately low to moderately high permeability, high available water capacity, and no flooding or ponding frequency. The Teanaway Loam is assigned to wind erodibility group (WEG) 5. The WEG consists of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to WEG 1 are the most susceptible to wind erosion, and those assigned to WEG 8 are the least susceptible. Therefore, the wind erosion potential of the soils onsite is considered low to moderate.

Based on observations at the site made during the geologic field reconnaissance (November 2009), the site soils consist primarily of silty to silty sand loess with volcanic ash, with numerous rounded cobbles and boulders scattered across the surface. Site slopes are typically less than 20 percent in steepness, with a few areas of slopes up to 30 percent. The slopes on the site are relatively planar or exhibit a drainage pattern typical of fluvial processes (i.e. surficial runoff) rather than mass movement.

No major areas of surficial soil erosion or gullying were observed during the geologic field reconnaissance. The erosional features present at the project site are typical of precipitation runoff.

3.3 Prevailing Wind Direction

A wind rose plot for Yakima, Washington, approximately an hour away from the project site, was used to estimate the prevailing wind direction for the project site. According to the Office of the Washington State Climatologist, the prevailing wind direction near the project site is to the east. Winds typically blow to the east at average speed of 6.51 knots (OWSC, 2010).

4.0 Potential Dust Sources

The following potential dust sources will exist at the project area. These dust sources are shown on Figure 2 (see Appendix A).

- Construction of a 6-acre electrical substation and associated facilities
- Construction of a 345-kilovolt (kV) transmission line and associated 300-foot corridor (TSR has delineated a 300-foot area within which the BPA transmission line could be sited. Of this 300-foot area, a maximum of 200 feet will be cleared for the placement of the BPA transmission line. Final design and placement will be determined by BPA.)
- Access and maintenance roads
- Installation of solar arrays
- Clearing and grading the site

5.0 Best Management Practices: Fugitive Dust Control Methods

The best management practices (BMPs) for this project were selected from two regional guidance documents (1) the Associated General Contractors (AGC) of Washington in the publication, *Guide to Handling Fugitive Dust From Construction Projects* (see Appendix B), and (2) the Eastern Washington Stormwater Management Manual. The following is a list of BMPs compiled by the AGC for control of fugitive dust. Copies of this publication can also be requested from WSDOT and Puget Sound Clean Air Agency. The Eastern Washington Stormwater Management Manual provides additional guidance for dust control: BMP C140 and BMP C126 (see Appendix C). The following is a list of commonly employed fugitive dust management practices for various construction related dust sources.

- Covering – Fabric/Other for Erosion Control
- Road Dust Suppressants
- Erosion Controls
- Flocculating Agent
- Minimize Disrupted Surface Area
- Schedule Work: Reschedule work around especially windy days
- Speed Reduction

Table 2 shows the selected methods to be used to control dust at the project sources. The Fugitive Dust Control Plan should be considered in conjunction with the overall construction Stormwater Pollution Prevention Plan (SWPPP), which is required as part of the National Pollutant Discharge Elimination System (NPDES) Permit, administered by the Washington State Department of Ecology.

TABLE 2
 Dust Activities and Applicable Dust Control Measures

Activity	Applicable Dust Control Measures
Unpaved Roads and Lots	Applying dust suppressants Graveling Reducing vehicle speed Minimizing disrupted surface areas Erosion control

TABLE 2
 Dust Activities and Applicable Dust Control Measures

Activity	Applicable Dust Control Measures
Construction and Landscaping	Graveling areas early Applying road dust suppressants Reducing vehicle speed Minimizing disrupted surface areas Restricting dust-causing activities during high wind periods Limiting vehicle traffic Using chutes and covered dumpsters Revegetating disturbed areas in accordance with the Revegetation Plan as soon as practical
Material Storage, Handling, and Transportation	Applying road dust suppressants Using wind impervious covers Minimizing truck load size Stabilized rock construction entrance

6.0 Best Management Practices: Contingency Measures

Although water can be one of the main control agents for dust, it is important to plan ahead for water shortages and consider the use of other measures. When water will not be available, exposed soils will be sprayed with a dust palliative. Chemical dust suppressant application will follow guidelines outlined in BMP C126 in Appendix C. Kittitas County staff have also recommended the use of chemical dust suppressants. Additional consideration will be given to alternative chemical dust suppressants listed in the Washington State Department of Transportation *Environmental Procedures Manual* (see Appendix D).

7.0 Self-Inspection Checklist

A self-inspection checklist will be used for each source of fugitive dust emissions to help incorporate routine tasks of fugitive dust control into daily schedule. The checklist will serve as a job reminder on a daily basis and as a record of efforts to keep dust problems to a minimum. Additionally, a separate checklist will be used to document weather conditions. These checklists are anticipated to be modified once the construction begins and as needed throughout the construction process. Self-inspection checklists are in Appendix E. These checklists will be incorporated into the weekly storm water inspections sheets required as part of SWPPP. Inspections will be conducted by personnel trained in all parts of the Fugitive Dust Control Plan as well as the SWPPP.

8.0 References

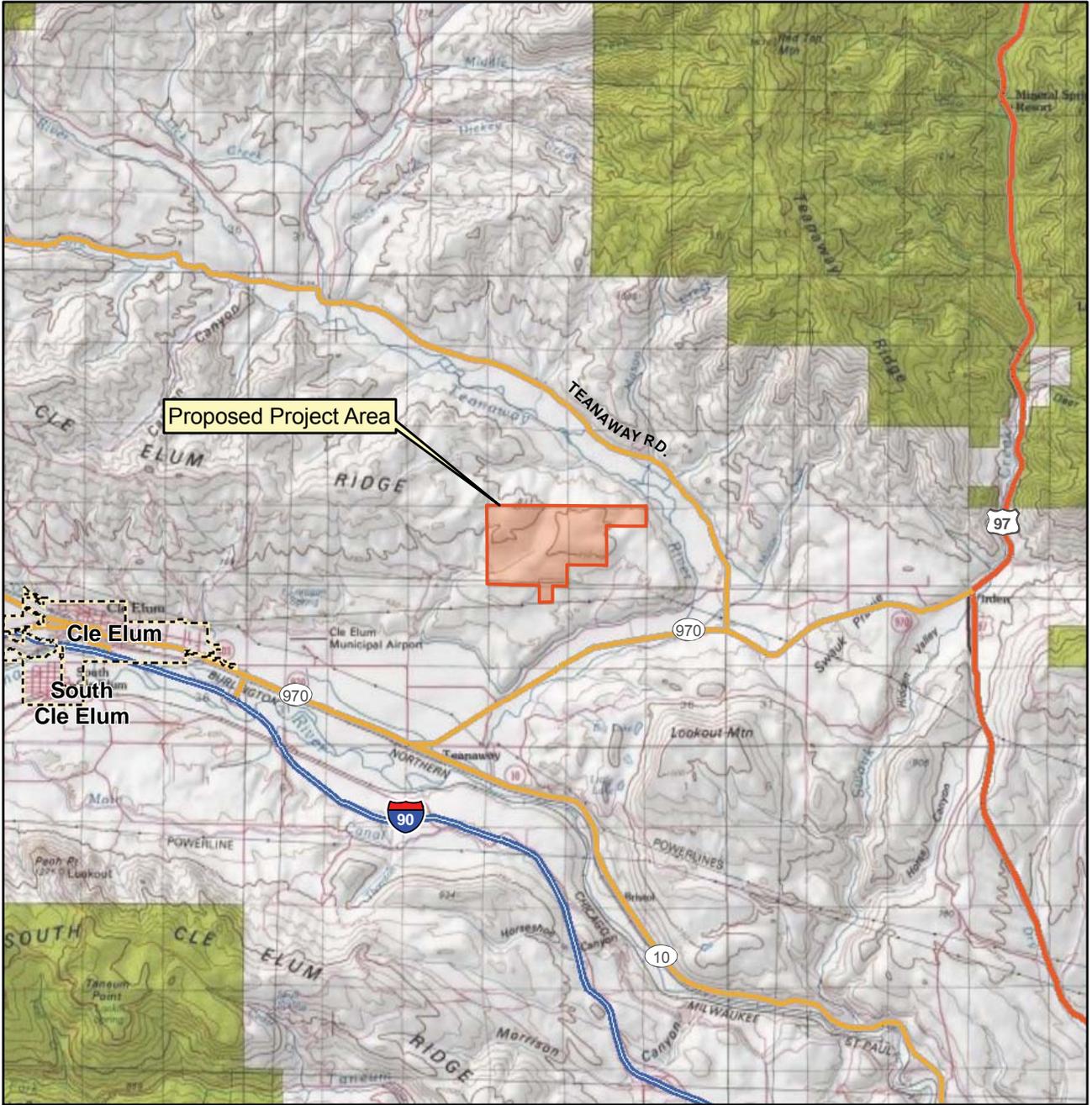
Associated General Contractors of Washington (AGC). 1998. *Guide to Handling Fugitive Dust From Construction Projects*.

Office of the Washington State Climatologist (OWSC). 2009. Wind Rose Plot for Yakima, Washington. <http://www.climate.washington.edu/climate.html>.

Washington Department of Ecology (WDE). September 2004. *Stormwater Management Manual for Eastern Washington*. <http://www.ecy.wa.gov/biblio/0410076.html>.

Washington State Department of Transportation (WSDOT). 2009. *Environmental Procedures Manual*. <http://www.wsdot.wa.gov/Publications/Manuals/M31-11.htm>.

APPENDIX A
Figures



VICINITY MAP

LEGEND

-  Proposed Project Area
-  City Boundary
-  Interstate
-  Highway
-  Major Road

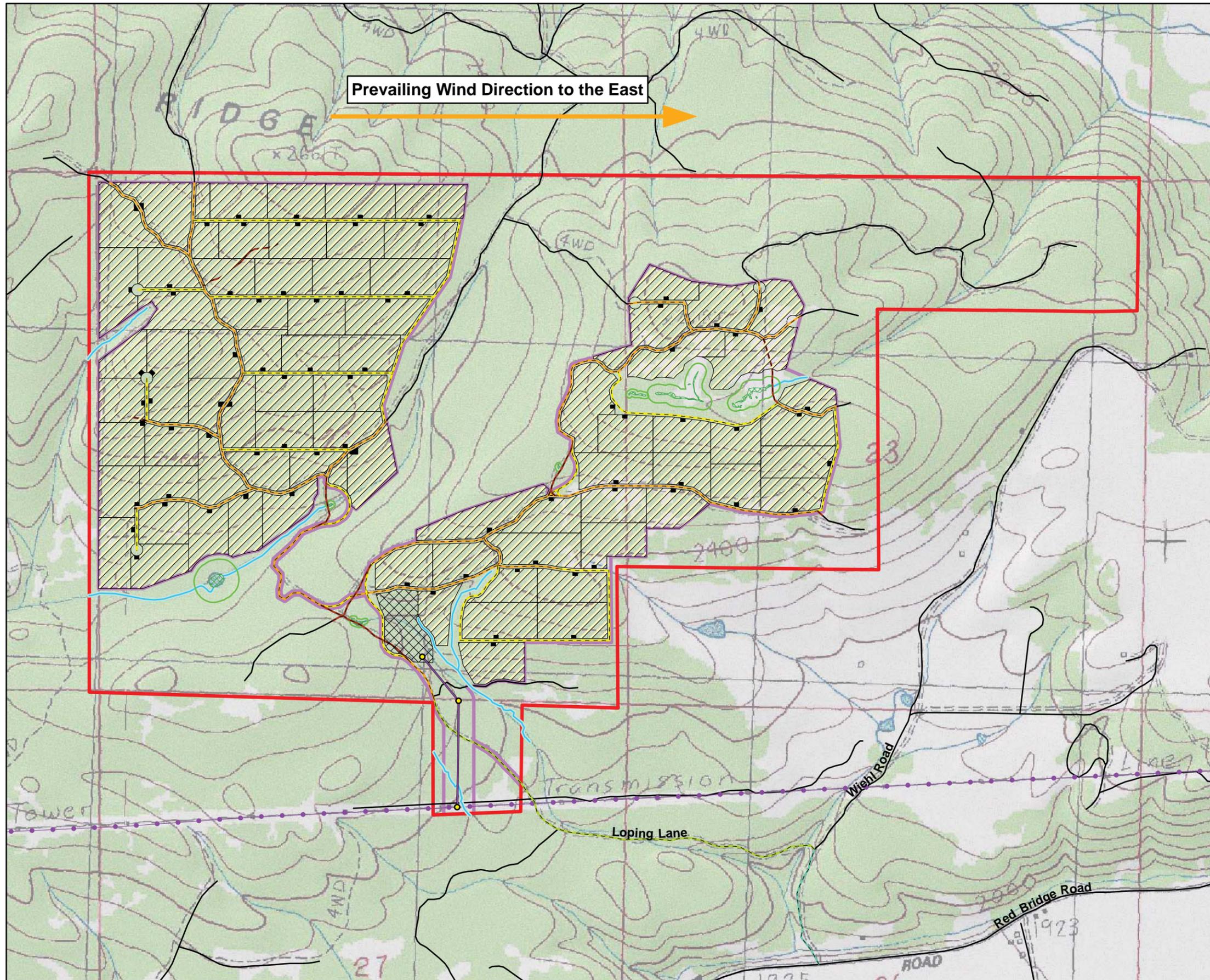
Note:
1. USGS 100K Quadrangle: Wenatchee.



FIGURE 1
Vicinity Map

Fugitive Dust Control Plan
Teanaway Solar Reserve
Kittitas County, Washington





- LEGEND**
- Proposed Project Features**
- Proposed Project Area (982 Acres)
 - Proposed Project Site (477 acres)
 - Proposed PV Array Block
 - Proposed Field Inverter and Field Transformer
 - Proposed Substation/O&M Facility
 - Proposed Transmission Line
 - Proposed Transmission Structure
 - ↘ Proposed Maintenance Road
 - ↘ Proposed Improved Maintenance Road
 - ↘ Existing Maintenance Road (Planned Decommissioning)
 - ↘ Proposed Improved County Access Road
 - ↘ Proposed Improved Private Access Road
- Existing Features**
- Existing BPA Transmission Line and ROW
 - ↘ Existing Road
 - ~ Stream
 - ~ Stream Buffer
 - ~ Wetland
 - ~ Wetland Buffer

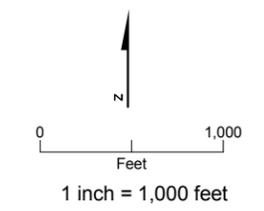


FIGURE 2
Proposed Site Layout
 Fugitive Dust Control Plan
 Teanaway Solar Reserve
 Kittitas County, Washington

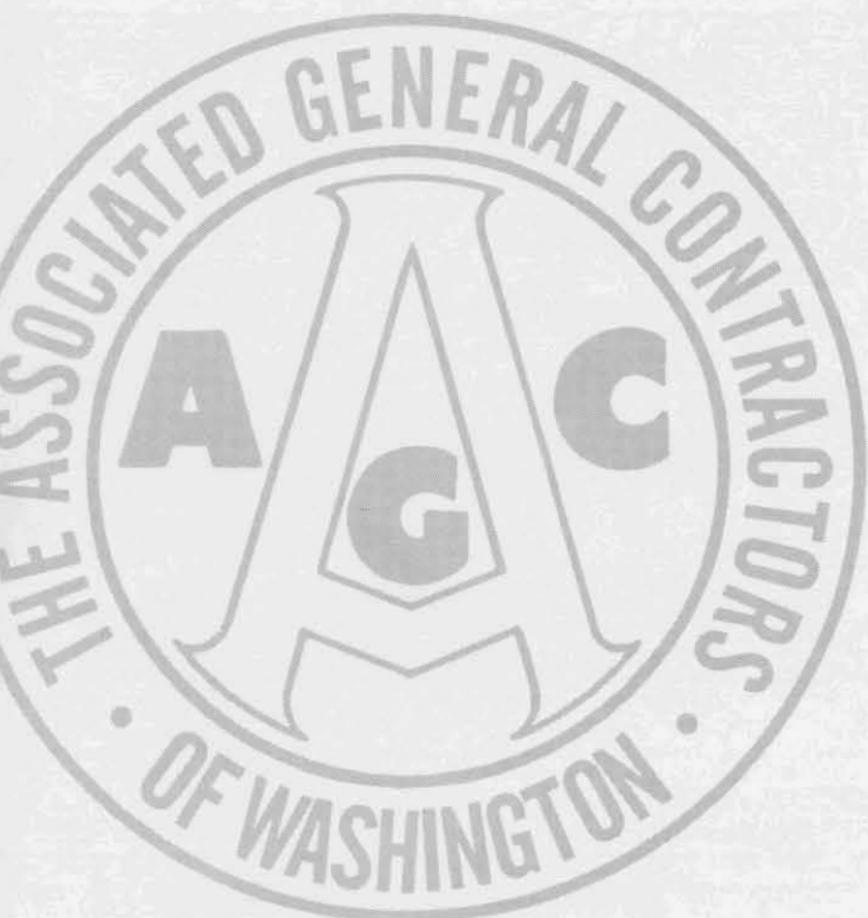
APPENDIX B

**AGC Guide to Handling Fugitive Dust
from Construction Projects**



AGC OF WASHINGTON
EDUCATION FOUNDATION AND
FUGITIVE DUST TASK FORCE

**GUIDE
TO HANDLING
FUGITIVE DUST
FROM CONSTRUCTION
PROJECTS**



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Some illustrations are courtesy of the California Environmental Protection Agency, Air Resources Board, Compliance Division.

GUIDE TO HANDLING *FUGITIVE DUST* FROM CONSTRUCTION PROJECTS

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INTRODUCTION

Fugitive Dust is particulate matter that is suspended in the air by wind or human activities and does not come out of a stack.

Air quality regulations require the use of control techniques to minimize *Fugitive Dust* emissions. The goal is to eliminate visible airborne *Fugitive Dust*. Therefore, state and local regulatory agencies expect that as many of these control techniques be employed as necessary to achieve this goal.

Reasons for *Fugitive Dust* Control

Fugitive Dust from construction projects is regulated by the Washington State air quality laws for several reasons:

1. *Fugitive Dust* can become a nuisance to neighbors by depositing on their property;
2. Inhaling *Fugitive Dust* particles can cause respiratory diseases;
3. *Fugitive Dust* can be a direct safety hazard.

Purpose of Brochure

This brochure is designed as a guide to provide practical examples of suggested best management practices necessary to comply with air quality regulations involved in the construction process.

While *Fugitive Dust* can be created from a variety of activities, such as agricultural activities, this brochure will focus on *Fugitive Dust* that is created by construction activities. Air pollution from debris burning, plant operations, rock crushing and abrasive blasting, sometimes associated with construction activities, are dealt with in other regulations and publications. For additional information on the subject, the numbers of local air quality agencies are listed in the back of this brochure.

WHY *FUGITIVE DUST* IS A PROBLEM

Nuisance

It is unlawful in the state of Washington to cause or allow air contaminant emissions in sufficient quantities and of such characteristics and duration that it unreasonably interferes with enjoyment of life and property.

Safety

Fugitive Dust from construction can reduce visibility on roadways and highways, resulting in traffic accidents.

Health

Fugitive Dust can also have significant health effects if it is inhaled in large amounts, or if dust contains crystalline silica, asbestos fibers, heavy metals or disease spores. Very small particles can be inhaled deep into lungs and are a particular health threat for the young, the old, and those with chronic respiratory problems.

Fugitive Dust can be created directly from the activities involved in construction, such as moving soils or demolishing structures. *Fugitive Dust* can also be generated by disturbing residual soils or materials that have been left behind by construction activities. For example, vehicles can generate *Fugitive Dust* from dirt on roadways that was tracked out as mud from construction sites.



PRE-CONSTRUCTION PLANNING

Fugitive Dust control planning is a partnership between the owner, general contractor, subcontractors and any other party whose activities during the project may lead to the generation of *Fugitive Dust*. This partnership extends to legal responsibilities as well in that all parties can be held liable for non-compliance and subsequent regulatory actions, including monetary penalties.

Incorporating *Fugitive Dust* control measures in the plans and specifications of the project can help ensure that the participants in the construction partnership avoid violations of *Fugitive Dust* regulations. Early planning can also help owners and project designers to "level the playing field" in the competitive bid process and avoid change orders.

A *Fugitive Dust* control plan might include:

- ◇ Identification of all *Fugitive Dust* sources.
- ◇ A description of the *Fugitive Dust* control method(s) to be used for each source.
- ◇ A schedule, rate of application, calculations or some other means of identifying how often, how much and when the control method is to be used.
- ◇ Provisions for monitoring and record-keeping.
- ◇ A backup plan in case the first control plan does not work or is inadequate.
- ◇ The name and phone number of the person responsible for making sure the plan is implemented and who can be contacted in the event of a *Fugitive Dust* complaint.
- ◇ Back-up or company phone number.
- ◇ Map or drawing of the site.

- ◇ Source and availability of materials such as water.

Weather, equipment and site conditions will require that field personnel make on the spot, common sense changes in order to address the intent of the regulations.

Incorporating a simple inspection checklist during the daily report process helps make the tasks of *Fugitive Dust* control more routine. A checklist system reduces paperwork, acts as a job reminder, and serves as a record of efforts to minimize *Fugitive Dust* problems. Categories that might be included in the checklist are:

- ◇ Date
- ◇ Time
- ◇ Preventative measures
- ◇ Frequency of control measures application
- ◇ Weather conditions
- ◇ Comments



REMEMBER: Fugitive Dust controls are only effective when they are monitored and managed through frequent inspections and maintenance of control measures.

SITE-SPECIFIC DESIGN CONSIDERATIONS

The specifics and level of complexity of each *Fugitive Dust* control plan will depend on a number of factors that are specific to each project. Consider the following:

Cost of Alternatives: Several factors must be taken into consideration when weighing various alternatives. Cost considerations include unit cost, total project cost, acquisition cost, maintenance cost, cost of non-compliance, capital cost, and the cost of time waiting for product or application. While one method may not be cost effective for large projects because the unit cost is high, it may be cost effective for small projects because the acquisition cost is low.

Environmental Constraints: Water application is one of the best short term methods for controlling *Fugitive Dust*. However, water run off containing mud and silt can cause damage to streams and other resources. A *Fugitive Dust* plan should be considered in conjunction with the overall Temporary Erosion and Sediment Control (TESC) plan. The Department of Ecology can be contacted for even more specific information.

Location: The proximity of the project to populated areas may dictate more controls, due to anticipated impacts, than a project in a remote location. Wildlife habitats and wetlands may also be affected by *Fugitive Dust*.

Project Size and Duration: The market place will not practically allow for the same rigors of control to be applied on all projects. For example, a land clearing project involving several acres or a major excavation project may call for truck wheel washing facilities, while this may not be practical for clearing a residential

lot. A project lasting several months may call for more durable measures where one lasting several days may rely solely on water.

Public Relations: Adopting a “good neighbor policy” by including a large sign with the company or job site phone number may help to make sure that local complaints are phoned directly to the site, rather than to the regulators.

Controversial projects, or projects that do not have a high level of community support, are often times under more scrutiny. Care should be given to choosing not only the technically correct, but aesthetically correct solutions.

Risk to Others (Sensitive Populations): *Fugitive Dust* can have particularly adverse health impacts on young children, the elderly, and persons with respiratory problems. Thus, additional control measures would be expected for a project near a hospital, nursing home, day care facility, school, etc.

Site Conditions: Topography and soil types can make a difference in the control of *Fugitive Dust*. Rocks and sand may be less dusty than hardpan, silts and clays. Hills, trees and shrubbery can serve as natural windbreaks; however, these are not control measures and do not meet the requirements of air pollution regulations. Soils that are disturbed on tops of hills or on wide open flat surfaces are more affected by wind.

Weather: Moisture, in the form of rain and humidity, are natural dust suppressants. However, extremely rainy conditions can carry soil, in the form of mud, to other areas where it can dry and become a *Fugitive Dust* hazard. Wind can intensify *Fugitive Dust* problems.

COMMON *FUGITIVE DUST* MANAGEMENT PRACTICES

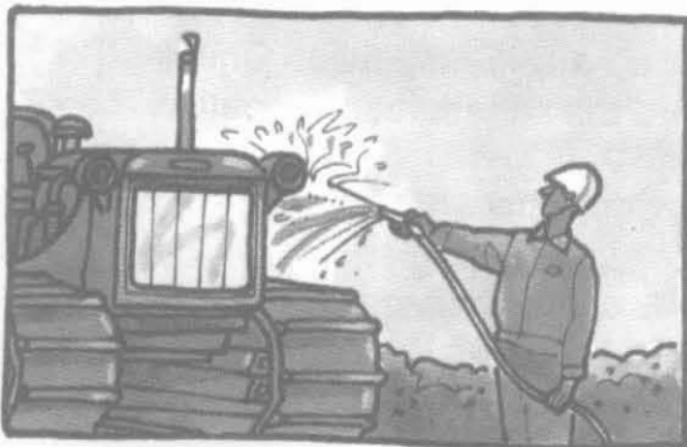
The following is a list of commonly employed *Fugitive Dust* management practices for various dust sources. The best management practices for a particular project should be selected based upon site-specific considerations.

GRADERS AND SCRAPERS:

- Use water truck or sprinklers to moisten soils before grading
- Minimize areas of clearing and grubbing to a manageable size
- Minimize timeframes between *Fugitive Dust*-creating activities and final solutions (ex., roadway excavation and paving)
- Avoid activity during high winds

FRONT-END LOADERS AND BACK-HOES:

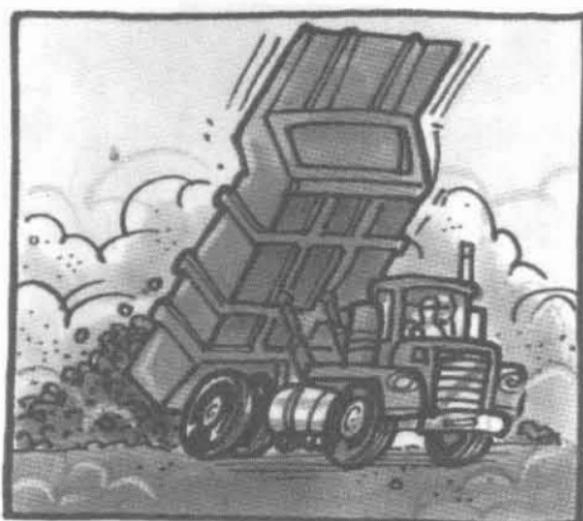
- Use water truck to keep soils moist
- Use water sprays (e.g. garden hose) when dumping soils into haul trucks
- Minimize drop height
- Avoid activity during high winds



HAUL TRUCKS:

- Wet loads with garden hose
- Ensure adequate freeboard
- Cover loads
- Reduce speed on unpaved haul roads to less than 15 mph
- Use water truck to keep haul roads moist
- Surface haul roads with gravel

- Pave haul roads
- Pave exit aprons
- Surface exit aprons with quarry spalls (aka "rip rap")
- Brush off mud from wheels, wheel wells, running boards and tail gates
- Wash wheels and inner fender wells immediately prior to exiting (note: this control may require installation of a sedimentation basin)
- Use street sweeper to remove trackout from paved roadways (note: sweepers should be periodically checked to insure that the water storage tank is full and spray nozzles are in good working order)
- Flush streets with water (note: this control may require the installation of a sedimentation basin)



DEMOLITIONS:

- Use water sprays (e.g., fire hoses) before, during and after use of wrecking ball or bulldozer
- Avoid activity during high winds

RENOVATIONS:

- Use chutes and covered dumpsters for lowering dusty materials (e.g., sheetrock) from multi-story buildings
- Avoid activity during high winds

STORAGE PILES:

- Use sprinklers to keep piles moist
- Use tarps to cover piles
- Use soil stabilizers

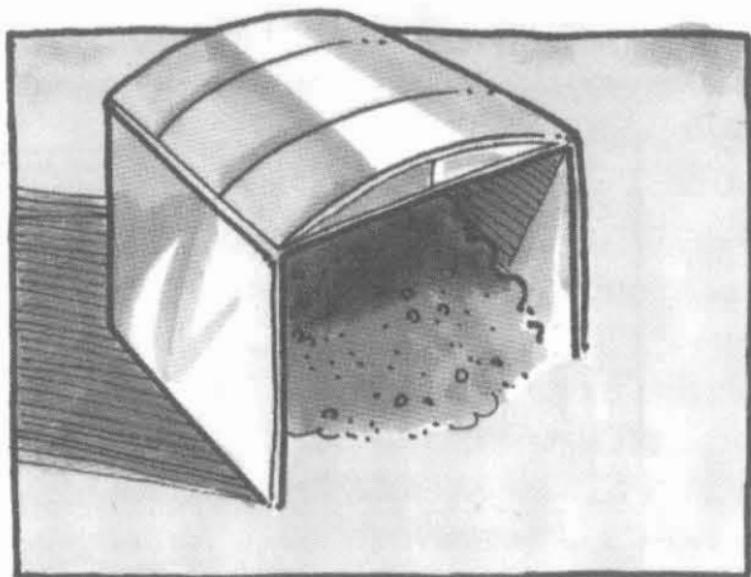
DESCRIPTIONS OF BEST MANAGEMENT PRACTICES

Fugitive Dust emissions can be prevented and reduced in four basic ways:

- ◇ Limiting the creation or presence of dust-sized particles.
- ◇ Reducing wind speed at ground level.
- ◇ Binding dust particles together.
- ◇ Capturing and removing *Fugitive Dust* from its sources.

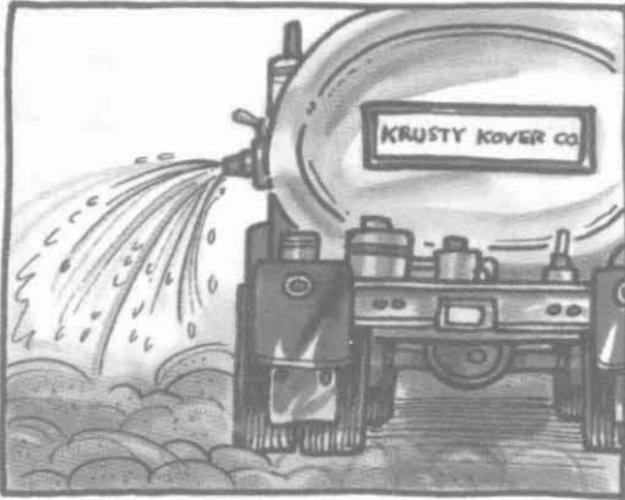
These *Fugitive Dust* control measures are not mutually exclusive. Most situations require the use of two or more of these methods in combination for any particular situation, and several methods will be employed to handle the variety of situations that make up a particular job.

COVERINGS - FABRIC/OTHER, FOR EROSION CONTROL: Fabrics and plastics for covering piles of soils and debris can be an effective means to reduce *Fugitive Dust*. However, these materials can be costly and are subject to degradation from the sun, weather, and human contact. Straw and hay can also be used to cover exposed soil areas, although they can be disturbed by wind and track through.



DUST SUPPRESSANTS - CHEMICAL:

There are many types and brands of Chemical Dust Suppressants which work by binding lighter particles. Chemical Suppressants may be applied as a surface treatment to “seal” the top of an area, or may be applied using an admix method that blends the product with the top few inches of the surface material.



Examples of these products include, but are not limited to, hydrolyzed starch derivatives, calcium chloride, magnesium chloride, lignin derivatives, tree resin emulsions, and synthetic polymer emulsions. Other products, and properties of products, can be found in the Department of Ecology's "Techniques for Dust Prevention and Suppression", as well as from many vendors.

USED OIL CAUTION: It is important to note that used oil may **NOT** be used as a dust suppressant. RCW 70.951 specifically prohibits the use of used oil as dust suppressant, and is referenced in the "Applicable Washington Regulations" section of this brochure.

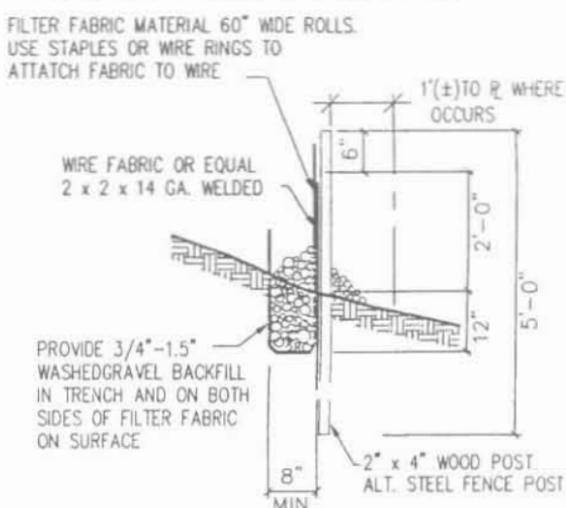
EROSION CONTROLS: Plants, bushes, trees, earthen banks and rock walls provide natural, and more permanent, windbreaks. Other erosion control measures, such as wood or porous fences can be installed for temporary measures. Because enclosures and wind screens can be costly the feasibility of

using this type of control must be determined on a case-by-case method.

FILTER FABRIC AROUND CATCH BASIN:

Filter fabric around a catch basin is used to collect sediment from muddy water run-off. Sediment, when left to dry, can cause *Fugitive Dust* emissions.

Sediment collected in filtering systems must be dealt with on a regular basis. Treating mud with flocculants, or “mucking out” catch basins, are two methods to deal with the residual debris.



FLOCCULATING AGENT: This is a method using a chemical agent to bind soil particles suspended in water so that when the material dries it does not become airborne. This method might be used after a sediment catch basin is no longer needed, but before water suspended soil can be dealt with in a more permanent way.

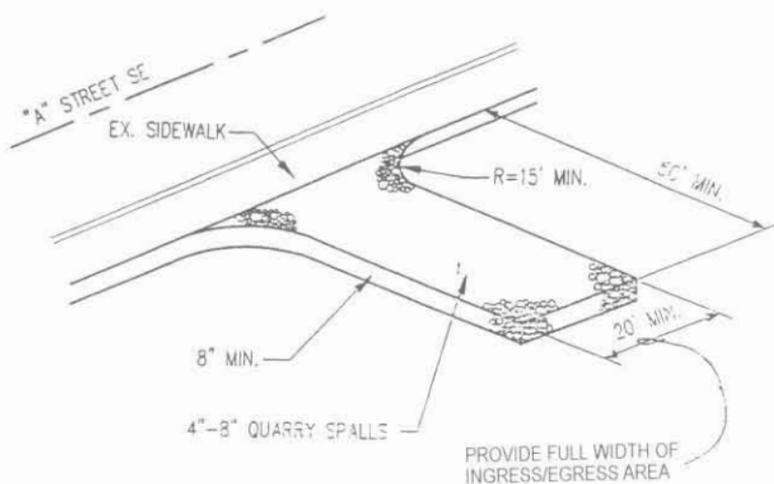
MINIMIZE DISRUPTED SURFACE

AREA: A conscious effort, especially during sitework and/or demolition, to disrupt only those areas that absolutely need to be cleared in order to accomplish a project can provide a variety of benefits. Vegetation left in place during sitework reduces the area subject to wind erosion. In addition, minimizing the disrupted surface area can also reduce the size of the project, potentially reducing the types and cost of *Fugitive Dust* control.

Disturbing natural soil crusts in some geographical areas, such as Central and Eastern Washington, may unnecessarily create *Fugitive Dust* situations. Limiting vehicle access points to, and routes within, a project help to reduce these disruptions.

PAVING: This is a more permanent solution to *Fugitive Dust* control, suitable for longer duration projects or situations. High cost is the major drawback to paving. Paving may be an appropriate solution for access roads to large development projects, where the road can eventually be incorporated in the overall plan for the area. Another appropriate use of paving might be “maintenance” projects such as parking lots and staging areas, where gravel cover is not adequate for *Fugitive Dust* control or erosion.

QUARRY SPALLS: These are buffer areas that minimize the amount of material tracked on to a trafficked road surface, sometimes called “rock entrances”. These buffer areas consist of very large aggregate, usually 4” to 8” crushed quarry rock, which jars particles free from wheels and undercarriage, as vehicles travel over the spall. This aggregate is sometimes laid over a fabric road carpet to increase effectiveness. A spall with typical dimensions is illustrated below.



SCHEDULE WORK: Rescheduling work around especially windy days can potentially be one of the least expensive and easiest *Fugitive Dust* control measures. This can also be a totally impractical option if work crews are idle and/or this is a project with significant time constraints. It is also unreasonable to expect to discontinue work in geographical areas that are prone to high and continuous winds. However, limited use of rescheduling in extreme weather conditions, might be appropriate.



The high profile aspects of certain projects and population exposed should be taken into consideration when scheduling especially *Fugitive Dust* producing work. Evenings and weekends are possible alternatives for scheduling work in business and school locations; while mid-day may be more appropriate for residential areas because people are more likely to be away from home.

SPEED REDUCTION: High vehicle speeds increase the amount of *Fugitive Dust* created from unpaved roads and lots. Reducing the speed of a vehicle from 45 to 35 miles per hour can reduce emissions by up to 22 percent according to a Washington State Department of Ecology study. However, no more than 5 to 15 miles per hour is recommended for most conditions. Speed bumps are a commonly used method to ensure speed reduction. In cases where speed reduction cannot effectively reduce *Fugitive Dust*, it may be necessary to divert traffic.



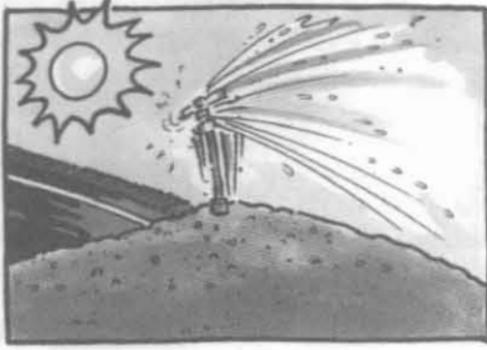
STREET SWEEPERS: Street sweepers are often used in conjunction with water. Some sweepers have a spray as well as brushes. However, sweepers can spread mud when there is a lot of wetness. Some sweepers, for parking lots and smaller jobs, actually have vacuum systems to trap *Fugitive Dust*. Dry sweeping is discouraged, especially in very dry climate conditions, because it causes dust particles to become airborne.

VEHICLE SPILLAGE: Covers for haul trucks help to prevent soils and other materials from being dropped on roads. However, covering loads is not required by state law if six inches of freeboard is maintained within the bed of the truck.

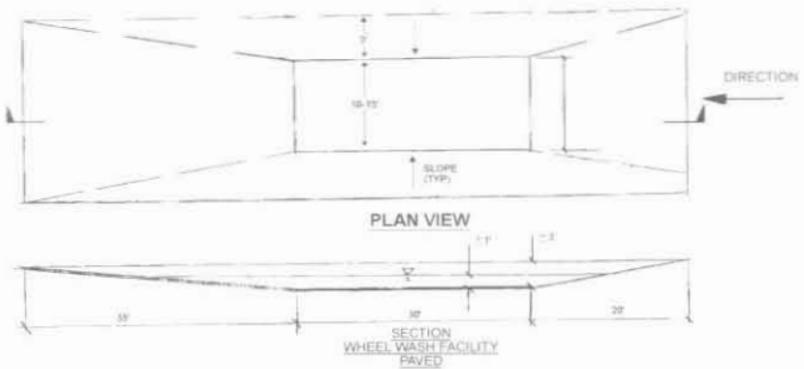
Vehicles driving over dirt and other debris tracked onto roads can cause significant *Fugitive Dust* emissions. Reducing the drop height for loading equipment, wet suppression, and wind guards are effective ways of minimizing the *Fugitive Dust* created during loading operations.

WATER SPRAY: Water spray, whether it is through a simple hose for small projects, or a water truck for large projects, is an effective way to keep *Fugitive Dust* under control. Misting systems and sprinklers are mechanisms that can be employed to deliver continuous wetness. However, there are several constraints in using water. Water can be very costly for larger projects in

comparison to other methods. Heavy watering can also create mud, run-off, and environmental problems.



WHEEL WASH: A wheel wash is a method to remove mud and dirt from wheels by driving through a shallow trench filled with water or onto an area where the wheel wells and undercarriage can be hosed down. Care should be taken to keep the trench deep enough that it is effective, but not so deep that it interferes with the mechanical operations of the vehicles. The trench may be lined with asphalt to ease maintenance in removing collected silt. A wheel wash can be used in conjunction with brooms or hoses to remove dirt from other areas of vehicles. Wheel washes must have a containment area to take care of the run-off.



VEHICLE SCRAPE: This is an alternative to a wheel wash when water disposal, or other environmental constraints, are present. Establishing a specific area where compact dirt or mud is removed from ledges of dump trucks, wheel wells, hitches, tires, and other confined areas, will reduce track out.

APPLICABLE WASHINGTON REGULATIONS

It is important to make sure that your *Fugitive Dust* control practices comply with federal, state and local laws. The following is a list of some of the regulations that apply; however contact your local Air Pollution Control Agency, County Health Department and/or Public Works Department to find out the specific requirements for the area in which your project is located.

Local Air Pollution Control Agency Regulations: Contact your local air pollution control agency for the specific regulations appropriate to the location of your project. These agencies and their phone numbers are listed on the last page of this brochure.

Chapter 70.94 RCW - Washington Clean Air Act and Chapter 173-400 WAC: These statutes require owners and operators of *Fugitive Dust* sources to prevent *Fugitive Dust* from becoming airborne and to maintain and operate sources to minimize emissions.

Chapter 70.951 RCW - Used Oil Recycling: This law prohibits the use of used oil as a dust suppressant. Used oil includes any oil that has been refined from crude oil, used, and as a result of such use, is contaminated by physical or chemical impurities. If you plan to use a chemical suppressant, verify that it does **not contain** any used oil as an ingredient. Also, be certain that if the product contains fuel oil ingredients that the fuel oil does not contain used oil.

Chapter 46.61.655 RCW - Dropping Load, Other Materials - Covering: This regulation prohibits the discharge of debris from vehicles and prescribes minimum loading standards in lieu of covering truck beds.

Chapter 90.48 RCW - Water Pollution

Control: Section .080 prohibits the discharge of any material into surface or ground waters that could cause pollution as defined in WAC 173-200-020(22). If your site is near surface or ground water, use dust control measures that have zero or minimal aquatic impact. If you decide to use a chemical dust suppressant, select a product with no aquatic toxicity.

Chapter 70.105 RCW - Hazardous Waste

Management: This statute prohibits the disposal to the ground of any dangerous (hazardous) waste. If you are planning to use a chemical dust suppressant, make sure it does **not** contain any dangerous waste ingredients.

Chapter 70.105D RCW - Hazardous Waste Cleanup - Model Toxics Control Act

(MTCA): This law requires the identification and cleanup of hazardous sites. The Department of Ecology can investigate reports of releases or the presence of hazardous substances. If a hazardous product is used as a dust suppressant and Ecology later receives a complaint of contamination, a site assessment may be conducted.

Chapter 90.03 RCW - Surface Water Code and Chapter 90.44 RCW Regulations of Public Ground Water (wells):

This regulation requires a water right permit for all surface water withdrawal and for any water from a well that will exceed 5,000 gallons per day. If you plan to use water, and have questions about it, call the Department of Ecology's Water Resources Program.

WASHINGTON STATE DEPT. OF ECOLOGY & LOCAL AIR POLLUTION CONTROL AGENCIES



A DEPARTMENT OF ECOLOGY - EAST REGION

North 4601 Monroe, Suite 202
Spokane, WA 99205-1295
(509) 456-2926

B OLYMPIC AIR POLLUTION CONTROL AUTHORITY

909 Sleater-Kinney Rd. SE, #1
Lacey, WA 98503
(360) 438-8768 or 1-800-422-5623

C SPOKANE CO. AIR POLLUTION CONTROL AUTHORITY

1101 West College Avenue, Suite 403
Spokane, WA 99201
(509) 477-4727

D NORTHWEST AIR POLLUTION AUTHORITY

1600 S. Second St.
Mount Vernon, WA 98273
(360) 428-1617 or 1-800-622-4627

E PUGET SOUND CLEAN AIR AGENCY

110 Union St., Suite 500
Seattle, WA 98101
(206) 343-8800 or 1-800-552-3565

F BENTON COUNTY CLEAN AIR AUTHORITY

650 George Washington Way
Richland, WA 99352
(509) 943-3396

G SOUTHWEST AIR POLLUTION CONTROL AUTHORITY

1308 N.E. 134th Street
Vancouver, WA 98685
(360) 574-3058 or 1-800-633-0709

H DEPARTMENT OF ECOLOGY - N.W. REGION

3190 - 160th Ave. SE
Bellevue, WA 98008-5452
(425) 649-7000

I YAKIMA COUNTY CLEAN AIR AUTHORITY

6 South 2nd St., Room 1016
Yakima, WA 98901
(509) 574-1410 or 1-800-540-6950

J DEPARTMENT OF ECOLOGY - CENTRAL REGION

15 W. Yakima Ave., Suite 200
Yakima, WA 98902
(509) 575-2490

PARTICIPATING ASSOCIATIONS



Asphalt Paving Association
of Washington, Inc.
1200 Westlake Ave. N., Suite 604
Seattle, WA 98109
(206) 284-8780



Associated Builder & Contractors
of Western Washington
1756-114th Ave. S.E., Suite 120
Bellevue, WA 98004-6931
(425) 646-8000



Associated Builder & Contractors
Inland Pacific Chapter
P.O. Box 3787
Spokane, WA 99220
(509) 534-0826



Associated General Contractors
Inland Northwest Chapter
P.O. Box 3266
Spokane, WA 99220
(509) 535-0391



Associated General Contractors
Of Washington
1200 Westlake Ave. N., Suite 301
Seattle, WA 98109-3528
(206) 284-0061



Building Industry Association of
Washington
P.O. Box 1909
Olympia, WA 98507
(800) 228-4229



Building Industry Association of
Whatcom County
3323 Northwest Ave.
Bellingham, WA 98225
(360) 671-4247



Central Washington Home
Builders Association
1018 S. 33rd Ave.
Yakima, WA 98902
(509) 454-4006



Master Builders
2155-112th Ave. N.E., Suite 100
Bellevue, WA 98004
(425) 451-7920



Tri-City Construction Council
P.O. Box 6025
20 E. Kennewick Ave.
Kennewick, WA 99336
(509) 582-7424

APPENDIX C

**Eastern Washington Stormwater
Management Manual,
BMP C140 and BMP C126**

***BMP C126:
Polyacrylamide
for Soil Erosion
Protection***

Purpose: Polyacrylamide (PAM) is used on construction sites to prevent soil erosion.

Applying PAM to bare soil in advance of a rain event significantly reduces erosion and controls sediment in two ways. First, PAM increases the soil's available pore volume, thus increasing infiltration through flocculation and reducing the quantity of stormwater runoff. Second, it increases flocculation of suspended particles and aids in their deposition, thus reducing stormwater runoff turbidity and improving water quality.

Conditions of Use

Conditions of Use: PAM shall not be directly applied to water or allowed to enter a water body. In areas that drain to a sediment pond, PAM can be applied to bare soil under the following conditions:

- During rough grading operations.
- Staging areas.
- Balanced cut and fill earthwork.
- Haul roads prior to placement of crushed rock surfacing.
- Compacted soil roadbase.
- Stockpiles.
- After final grade and before paving or final seeding and planting.
- Pit sites.

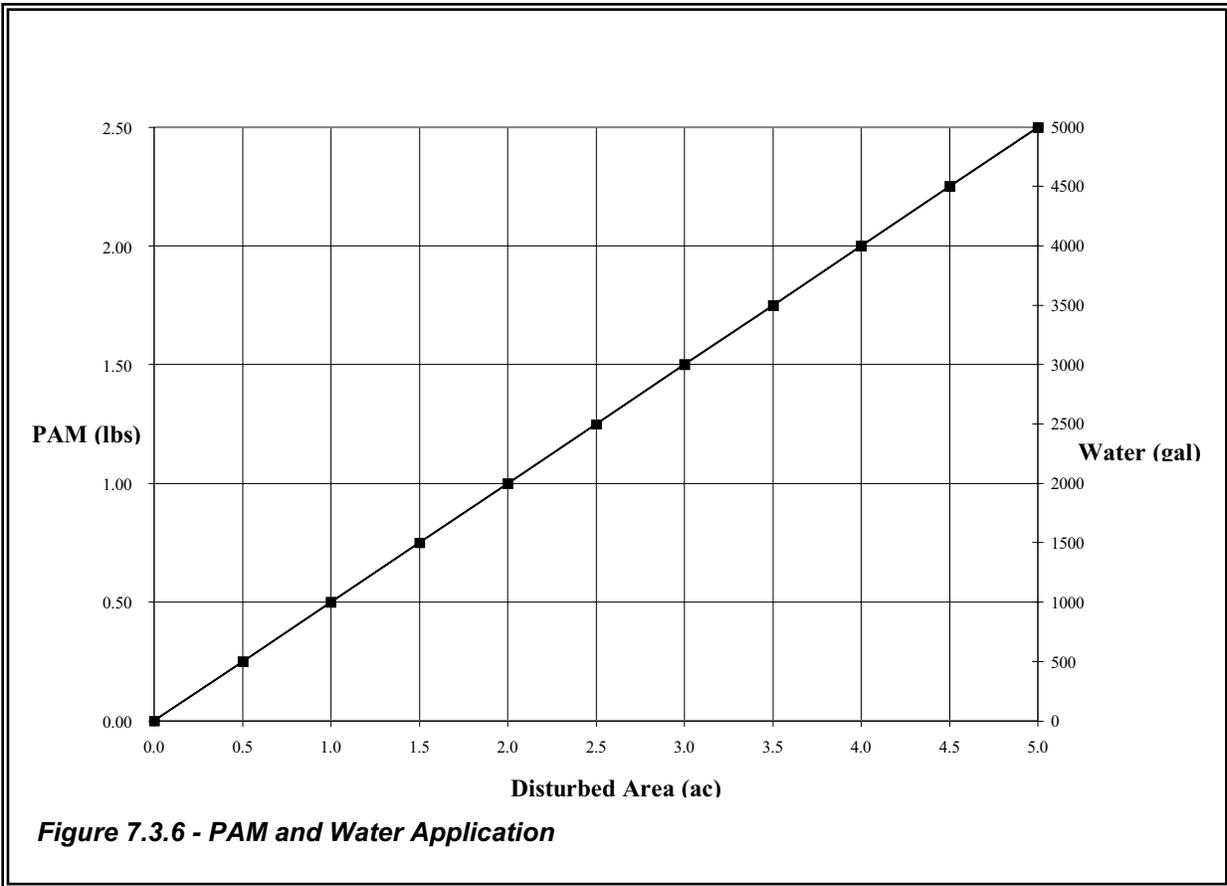
Sites having a winter shut down. In the case of winter shut down, or where soil will remain unworked for several months, PAM should be used together with mulch.

Design and Installation Specifications: PAM may be applied in dissolved form with water, or it may be applied in dry, granular or powdered form. The preferred application method is the dissolved form.

PAM is to be applied at a maximum rate of ½ pound PAM per 1000 gallons water per 1 acre of bare soil. Table 7.3.8 and Figure 7.3.6 can be used to determine the PAM and water application rate for a disturbed soil area. Higher concentrations of PAM do not provide any additional effectiveness.

**Table 7.3.8
PAM and Water Application Rates**

Disturbed Area (ac)	PAM (lbs)	Water (gal)
0.50	0.25	500
1.00	0.50	1,000
1.50	0.75	1,500
2.00	1.00	2,000
2.50	1.25	2,500
3.00	1.50	3,000
3.50	1.75	3,500
4.00	2.00	4,000
4.50	2.25	4,500
5.00	2.50	5,000



The Preferred Method:

- Pre-measure the area where PAM is to be applied and calculate the amount of product and water necessary to provide coverage at the specified application rate (1/2 pound PAM/1000 gallons/acre).
- PAM has infinite solubility in water, but dissolves very slowly. Dissolve pre-measured dry granular PAM with a known quantity of clean water in a bucket several hours or overnight. Mechanical mixing will help dissolve the PAM. Always add PAM to water - not water to PAM.
- Pre-fill the water truck about 1/8 full with water. The water does not have to be potable, but it must have relatively low turbidity – in the range of 20 NTU or less.
- Add PAM /Water mixture to the truck
- Completely fill the water truck to specified volume.
- Spray PAM/Water mixture onto dry soil until the soil surface is uniformly and completely wetted.

An Alternate Method:

PAM may also be applied as a powder at the rate of 5 lbs. per acre. This must be applied on a day that is dry. For areas less than 5-10 acres, a hand-held “organ grinder” fertilizer spreader set to the smallest setting will work. Tractor-mounted spreaders will work for larger areas.

The following shall be used for application of PAM:

- PAM shall be used in conjunction with other BMPs and not in place of other BMPs.
- Do not use PAM on a slope that flows directly into a stream or wetland. The stormwater runoff shall pass through a sediment control BMP prior to discharging to surface waters.
- Do not add PAM to water discharging from site.
- When the total drainage area is greater than or equal to 5 acres, PAM treated areas shall drain to a sediment pond.
- Areas less than 5 acres shall drain to sediment control BMPs, such as a minimum of 3 check dams per acre. The total number of check dams used shall be maximized to achieve the greatest amount of settlement of sediment prior to discharging from the site. Each check dam shall be spaced evenly in the drainage channel through which stormwater flows are discharged off-site.
- On all sites, the use of silt fence shall be maximized to limit the discharges of sediment from the site.

- All areas not being actively worked shall be covered and protected from rainfall. PAM shall not be the only cover BMP used.
- PAM can be applied to wet soil, but dry soil is preferred due to less sediment loss.
- PAM will work when applied to saturated soil but is not as effective as applications to dry or damp soil.
- Keep the granular PAM supply out of the sun. Granular PAM loses its effectiveness in three months after exposure to sunlight and air.
- Proper application and re-application plans are necessary to ensure total effectiveness of PAM usage.
- PAM, combined with water, is very slippery and can be a safety hazard. Care must be taken to prevent spills of PAM powder onto paved surfaces. During an application of PAM, prevent over-spray from reaching pavement as pavement will become slippery. If PAM powder gets on skin or clothing, wipe it off with a rough towel rather than washing with water-this only makes cleanup messier and take longer.
- Some PAMs are more toxic and carcinogenic than others. Only the most environmentally safe PAM products should be used.

The specific PAM copolymer formulation must be anionic. Cationic PAM shall not be used in any application because of known aquatic toxicity problems. Only the highest drinking water grade PAM, certified for compliance with ANSI/NSF Standard 60 for drinking water treatment, will be used for soil applications. Recent media attention and high interest in PAM has resulted in some entrepreneurial exploitation of the term “polymer.” All PAM are polymers, but not all polymers are PAM, and not all PAM products comply with ANSI/NSF Standard 60. PAM use shall be reviewed and approved by the jurisdiction. The Washington State Department of Transportation (WSDOT) has listed approved PAM products on their web page.

- PAM designated for these uses should be “water soluble” or “linear” or “non-crosslinked”. Cross-linked or water absorbent PAM, polymerized in highly acidic (pH<2) conditions, are used to maintain soil moisture content.
- The PAM anionic charge density may vary from 2-30 percent; a value of 18 percent is typical. Studies conducted by the United States Department of Agriculture (USDA)/ARS demonstrated that soil stabilization was optimized by using very high molecular weight (12-15 mg/mole), highly anionic (>20% hydrolysis) PAM.
- PAM tackifiers are available and being used in place of guar and alpha plantago. Typically, PAM tackifiers should be used at a rate of no more than 0.5-1 lb. per 1000 gallons of water in a hydromulch machine. Some tackifier product instructions say to use at a rate of 3 –5 lbs. per acre, which can be too much. In addition, pump problems can occur at higher rates due to increased viscosity.

Maintenance Standards: PAM may be reapplied on actively worked areas after a 48-hour period.

- Reapplication is not required unless PAM treated soil is disturbed or unless turbidity levels show the need for an additional application. If PAM treated soil is left undisturbed a reapplication may be necessary after two months. More PAM applications may be required for steep slopes, silty and clayey soils (USDA Classification Type “C” and “D” soils), long grades, and high precipitation areas. When PAM is applied first to bare soil and then covered with straw, a reapplication may not be necessary for several months.
- Loss of sediment and PAM may be a basis for penalties per RCW 90.48.080.

BMP C140: Dust Control

Purpose: Dust control prevents wind transport of dust from disturbed soil surfaces onto roadways, drainage ways, and surface waters. Wind erosion is a significant cause of soil movement from construction sites in Eastern Washington. Although wind erosion can contribute to water quality impacts, dust control is regulated in some areas of Eastern Washington primarily through local air quality authorities. Where such an entity exists, contact the local air quality authority for appropriate and required BMPs for dust control to implement at your project site.

Conditions for Use: In areas (including roadways) subject to surface and air movement of dust where on-site and off-site impacts to roadways, drainage ways, or surface waters are likely.

Design and Installation Specifications:

- Contact your local Air Pollution Control Authority for guidance and training on other dust control measures. Compliance with the local Air Pollution Control Authority constitutes compliance with this BMP.
- Water applied to construction sites for dust control must not leave the site as surface runoff.
- See also “Techniques for Dust Prevention and Suppression,” Ecology Publication Number 96-433, revised April 2002.
- Techniques that can be used for construction projects include:
- Vegetate or mulch areas that will not receive vehicle traffic. In areas where planting, mulching, or paving is impractical, apply gravel or landscaping rock.
- Limit dust generation by clearing only those areas where immediate activity will take place, leaving the remaining area(s) in the original condition, if stable. Maintain the original ground cover as long as practical.
- Construct natural or artificial windbreaks or windscreens. These may be designed as enclosures for small dust sources.
- Sprinkle the site with water until surface is wet. Repeat as needed. To prevent carryout of mud onto street, refer to Stabilized Construction Entrance (BMP C105).
- Irrigation water can be used for dust control. Irrigation systems should be installed as a first step on sites where dust control is a concern.
- Spray exposed soil areas with a dust palliative, following the manufacturer’s instructions and cautions regarding handling and application. Used oil is prohibited from use as a dust suppressant. Local governments may approve other dust palliatives such as calcium chloride or PAM.
- PAM (BMP C126) added to water at a rate of 0.5 lbs. per 1,000 gallons of water per acre and applied from a water truck is more effective than water

alone. This is due to the increased infiltration of water into the soil and reduced evaporation. In addition, small soil particles are bonded together and are not as easily transported by wind. Adding PAM may actually reduce the quantity of water needed for dust control, especially in eastern Washington. Since the wholesale cost of PAM is about \$ 4.00 per pound, this is an extremely cost-effective dust control method.

Techniques that can be used for unpaved roads and lots include:

- Lower speed limits. High vehicle speed increases the amount of dust stirred up from unpaved roads and lots.
- Upgrade the road surface strength by improving particle size, shape, and mineral types that make up the surface and base materials.
- Add surface gravel to reduce the source of dust emission. Limit the amount of fine particles (those smaller than .075 mm) to 10 to 20 percent.
- Use geotextile fabrics to increase the strength of new roads or roads undergoing reconstruction.
- Encourage the use of alternate, paved routes, if available.
- Restrict use by tracked vehicles and heavy trucks to prevent damage to road surface and base.
- Apply chemical dust suppressants using the admix method, blending the product with the top few inches of surface material. Suppressants may also be applied as surface treatments.
- Pave unpaved permanent roads and other trafficked areas.
- Use vacuum street sweepers.
- Remove mud and other dirt promptly so it does not dry and then turn into dust.
- Limit dust-causing work on windy days.

Maintenance Standards:

- Respray area as necessary to keep dust to a minimum. Water applied to construction sites for dust control must not leave the site as surface runoff.

APPENDIX D

WSDOT Chemical Dust Suppressant List

Chemical Dust Suppressant Contact Information

Exhibit 425-5

Type	Brand Name	Manufacturer	Contact Information
Freshwater			
Seawater			
Calcium Chloride	Calcium Chloride Flakes	General Chemical	800-668-0433
	Calcium Chloride Liquid	General Chemical	800-668-0433
	Dowflake	Dow Chemical	800-447-4369
	Liquidow	Dow Chemical	800-447-4369
Magnesium Chloride	Chlor-Tex	Soil-Tech	702-873-2023
	DustGard	IMC Salt	800-323-1641
	Dust-Off	Cargill Salt Division	800-553-7879
Sodium Chloride	IMC Salt	IMC Salt	800-323-1641
	Morton Salt	Morton International	312-807-2000
Lignin Derivatives	DC 22	Dallas Roadway Products, Inc.	800-317-1968
	Dustac	Georgia Pacific West, Inc.	360-733-4410
	Dustac-100	Georgia Pacific West, Inc.	360-733-4410
	RB Ultra Plus	Roadbind America, Inc.	888-488-4273
Tree Resin Emulsions	Dust Control E	Pacific Chemicals, Inc. / Lyman Dust Control	800-952-6457
	Dustrol EX		
	Road Oyl	Soil Stabilization Products Co. Inc.	800-523-9992
Electrochemical	Bio Cat 300-1	Soil Stabilization Products Co. Inc.	800-523-9992
	EMCSquared	Soil Stabilization Products Co. Inc.	800-523-9992
	SA-44 System	Dallas Roadway Products, Inc.	800-317-1968
	TerraBond Clay Stabilizer	Fluid Sciences, LLC	888-356-7847
Synthetic Polymer Emulsions	Aerospray 70A	Cytec Industries	800-835-9844
	ECO-110	Chem-crete	972-234-8565
	Soil Master WR	Environmental Soil Systems, Inc.	800-368-4115
	Soil Seal	Soil Stabilization Products Co. Inc.	800-523-9992
	Soil Sement	Midwestern Industrial Supply, Inc.	800-321-0699
	Top Shield	Base Seal International, Inc.	800-729-6985
Bitumens, Tars, and Resins	Asphotac	Actin	219-397-5020
	Coherex	Witco Corp.	800-494-8287
	PennzSuppress-D	Pennzoil-Quaker State Co.	713-546-4000
	Road Pro	Midwestern Industrial Supply, Inc.	800-321-0699
Geotextiles	Trevira Spunbound	Hoechst Celanese Corporation	

APPENDIX E

Self-Inspection Checklists

ATTACHMENT F

Hydrologic Analysis

Report

Teanaway Solar Reserve Hydrologic Analysis Kittitas County, Washington

Prepared for
Teanaway Solar Reserve, LLC

February 2010

Prepared by
CH2MHILL



**Printed on
Recycled and
Recyclable
Paper**

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- 2 100-year Floodplain Map
- 3 Proposed Site Layout with Drainage Basins

1.0 Introduction

At the request of Teanaway Solar Reserve, LLC (TSR) a hydrologic analysis for the proposed project site has been completed and is described in this memorandum. Background information was collected on the existing site conditions and used to create a pre-development model using the U.S. Army Corps of Engineers HEC-HMS 3.1.0 software. A model was also created to simulate the proposed site conditions. The models were then used to determine pre- and post-development peak rainfall runoff rates and volumes for 2-, 10-, and 100-year 6-hour storm events and a 10-year, 24-hour storm event. The runoff rates were then compared to determine the hydrologic impact of the development.

2.0 Background

The proposed 982-acre project site is located approximately 4 miles northeast of Cle Elum, Washington, in Township 20N, Range 16E, within Sections 22, 23, and 27 (see Figure 1 in Appendix A for the site location). This site is located on the eastern slopes of the Cascade Mountains on Cle Elum Ridge, which runs generally east to west at elevations ranging from approximately 2,200 to 2,600 feet. The Teanaway River is approximately 1 mile to the northeast of Cle Elum Ridge. The site is accessed from Highway 970 by way of county roads such as Red Bridge Road, private roads such as Loping Lane, and Wiehl Road, which is a dedicated public road that is maintained privately and not by the county. A description of the existing conditions is provided below.

2.1 Major Watersheds

Rainfall runoff from the proposed project site flows down the ridge through unnamed streams and eventually discharges to the Teanaway River. The Teanaway River is located in the Yakima River Basin and flows to the Yakima River. At its confluence with the Yakima River, the Teanaway River has a drainage area of 207 square miles. The peak 100-year flow as listed in the Flood Insurance Study (FIS) produced by the Federal Emergency Management Agency (FEMA) in 1981 is 7,350 cubic feet per second (cfs) at its confluence with the Yakima River.

Flood Insurance Rate Maps (FIRMs) from FEMA were used to determine the areas of special flood hazard near the proposed project site. The most recent available mapping comes from the 1981 FIS (map numbers 5300950254B, 5300950258B, 5300950262B, and 5300950266B). The data provided by the FIRMs only show the extent of the 100-year floodplain of the Teanaway River. The Teanaway River floodplain is located just downstream of the proposed site. See Figure 2 in Appendix A for a map of the 100-year floodplain in the vicinity of the project.

2.1.1 January 2009 Flooding Event

A major flood event occurred in January 2009 downstream of the proposed project site when heavy rain in the mountains and unseasonably warm temperatures turned the deep snow pack into flood waters. The flooding caused landslides and affected several landowners at the base of the ridge in the Teanaway River Valley. This event raised public and agency concerns pertaining to the potential hydrologic impacts associated with the

development of the proposed Teanaway Solar Reserve Project. A letter written by GeoEngineers, Inc. on October 5, 2009, suggested there is some evidence that the cause of this flood event may have been more related to anthropogenic causes rather than hydrologic issues on the proposed project site (see Appendix B).

Drainages from the project site have been characterized as ephemeral, vegetated swales. A field reconnaissance completed by a professional hydrologist from GeoEngineers after the flooding event showed the drainages that emanate from the project site were in stable condition. No excessive erosion, lateral shifting or incision was evident in the drainages around the project site. The vegetation in the drainages helps reduce the velocity and erosional forces of the water as it runs off hill slopes and flows into concentrated areas.

Interviews with local residents were also conducted as a part of the field reconnaissance. One resident, a Mr. Jesse Geiger, a homeowner in the area, told GeoEngineers personnel that another area resident had used excavating equipment to trench into and disturb the streambed of an unnamed small drainage in an effort to reroute flows into irrigation pipes and ultimately into an existing delivery system. According to Mr. Geiger, the channel was never armored or re-vegetated after the soil disturbance and channel realignment. As a result, high flows in January 2009 destabilized the unprotected channel and breached the weak soil dam that had been erected adjacent to Red Bridge Road. The condition of the channel upstream of the disturbed area was not subject to erosion or damage; rather, only the disturbed reach was destabilized, causing a debris torrent to spill into the road and the subsequent flooding and damage to the road. Field observations of the drainage correlate with the description of events recounted by area residents, as evidenced by comparing the condition of this drainage to the drainage adjacent to Wiehl Road.

2.2 Site-Specific Drainage Basins

There are two major drainage basins on the proposed project site. These drainage basins will be referred to as the South drainage basin and the North drainage basin for the purposes of this report. Figure 3 in Appendix A is a map showing the location of the drainage basins on the proposed project site. Multiple drainage paths leave the site. Flow rates are comparative, but don't provide detail of flow distribution by sub-basin. Drainage basins were delineated for this analysis to assess the impact the project is expected to have on major receiving waters. A more detailed analysis of the small, natural drainage basins on the site will be completed during the design phase of the project.

The South drainage basin has an area of 723 acres and covers a majority of the proposed site. Rainfall runoff from this drainage basin generally flows south to the base of the ridge, where it then flows east along the north side of Red Bridge Road eventually discharging to the Teanaway River.

The North drainage basin has an area of 259 acres and is located in the northeast corner of the proposed project site with a few small areas along the northern border of the project site. Rainfall runoff from the North drainage basin flows to the north from the site and eventually discharges into the Teanaway River.

3.0 Model Methodology

The selected methodology chosen for this analysis is based on the Natural Resources Conservation Service (NRCS) Technical Release-55 (TR-55), which presents procedures to calculate stormwater runoff volumes and peak rates of discharge. To determine runoff from storm rainfall, this methodology uses a runoff curve number (CN) method. Determination of the CN depends on the watershed's soil and cover conditions, which the model represents as hydrologic soil group, cover type, and hydrologic condition.

The following subsections describe the existing and proposed conditions for the site that were used to create a model of the drainage basins.

3.1 Existing Conditions

3.1.1 Impervious Cover

Currently, no impervious area exists on the project site. The area is undeveloped ponderosa pine forest with dirt roadways.

3.1.2 Rain-on-Snow Events

A rain-on-snow event is an occurrence when rain falls onto frozen or saturated ground with a pre-existing snow pack. The rain can cause the snow to melt, and with the frozen or saturated ground acting like an impervious surface, large volumes of runoff are generated. Rain-on-snow events pose a significant flood hazard, such as occurred in 2009.

The magnitude of runoff from a rain-on-snow event is not expected to significantly increase as a result of the construction of the project. Due to limited infiltration capacity during a rain-on-snow event, the site would be expected to generate a similar volume of runoff at build-out as would be generated with the current site conditions.

3.1.3 Soil Infiltration and Drainage Characteristics

Soil types for the project site were determined using the NRCS web soil survey application. There are four types of soil located at the proposed project site: Nard ashy loam, 5 to 25 percent slopes; Nard ashy loam, 25 to 45 percent slopes; Teanaway loam, 3 to 10 percent slopes; and Teanaway loam, 25 to 50 percent slopes. All four soil types are in hydrologic soil group C. Soils in hydrologic soil group C have slow infiltration rates when thoroughly wetted and consist chiefly of soils with a layer that impedes downward movement of water, or soils with moderately fine to fine texture. These soils have a slow rate of water transmission, thus producing a moderate amount of rainfall runoff.

3.1.4 Slopes

Slopes in the South drainage basin were estimated to range between 3 and 26 percent. Slopes in the North drainage basin were estimated to range between 3 and 31 percent. Topographic maps were used to calculate the time of concentration for each basin. Time of concentration calculations are provided in Appendix C.

3.1.5 Vegetated Cover

Per Kittitas County zoning, the site is currently zoned Forest and Range (F&R). Since the early 1900s, this site has been repeatedly selectively logged. Harvests have occurred in the 1920s, 1950s, 1980s, and 2000s. Pre-commercial thinning occurred in the decades between logging. Prior to 1900, the site had a fire frequency of 9 to 12 years, indicating that a healthy understory and small trees did not exist, creating a park-like stand of larger trees that were fire resistant to low-intensity, periodic fires. The site was most recently selectively logged in 2001, and existing site vegetation consists of low grasses, shrubs, and trees. Shrubs and riparian communities are predominantly snowberry and rose bushes. Herbaceous plant communities are predominantly lupine, yarrow, arrowleaf balsamroot, and various grass species. Wetland plant communities are dominated by rushes sedges, wild onion, and various other grass species.

Table 1 is a summary of CNs based on hydrologic soil group and vegetative cover type from *Technical Release 55: Urban Hydrology for Small Watersheds* (NRCS, 1986). The woods-grass combination was used to determine the existing curve number for the site. The existing site's CN of 72 was computed for an area with 50 percent woods and 50 percent grass (pasture) cover in good condition.

TABLE 1
 Runoff Curve Numbers (TR-55)

Cover Description		Curve Numbers for Hydrologic Soil Group			
Cover Type	Hydrologic Condition	A	B	C	D
Pasture, grassland, or range-continuous forage for grazing ^a	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Woods- grass combination (orchard or tree farm) ^b	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods ^c	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30 ^d	55	70	77

^a Poor: <50% ground cover
 Fair: 50 to 75% ground cover
 Good: >75% ground cover

^b CNs shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

^c Poor: Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
 Fair: Woods are grazed but not burned, and some forest litter covers the soil.
 Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

^d Actual curve number is less than 30; use CN=30 for runoff computations.

3.2 Proposed Conditions

The purpose of the proposed project is to generate up to 75 direct current megawatts (MWdc) of photovoltaic (PV) solar energy for distribution to utilities and communities seeking to optimize their renewable and sustainable energy sources. The proposed project area consists of 982 acres. Based on site surveys, the project will utilize approximately 477 acres within the proposed project area. Solar arrays will be placed on approximately 399 acres. The remaining acres are currently undeveloped open space, which will be preserved as part of the wildlife mitigation plan for the project. The proposed project will consist of the following key components:

- Solar modules
- Power inverter enclosures
- Power transformers
- Underground electrical conductors
- Electrical substation and switchyard
- Operations and maintenance (O&M) building supervisory control and data acquisition (SCADA) system
- Overhead interconnection transmission line
- Access and maintenance roads

3.2.1 Impervious Cover

An increase in impervious area on the proposed project site is expected to be generated by the following: solar modules, power inverter enclosures, and the O&M facility. Other project components that include maintenance and access roads, a 6-acre graveled substation, etc. are accounted for in the change in CN. A conceptual site plan and corresponding areas were provided to CH2M HILL by Studio GREENE. These areas were used to determine the impervious area for the site. Impervious surfaces and their corresponding areas are shown in Table 2.

TABLE 2
 Project Impervious Surfaces and Areas

Impervious Surface	Area (SF)	Area (ac)
Array Fields		
Solar Modules	12,665	0.291
Field Inverters	6,400	0.147
Field Transformers	3,840	0.088
BPA Substation		
Concrete Pads	23,000	0.528
BPA Control House	1,800	0.041
Tower and Transmission Pole	100	0.002
BPA Switchgear Building	1,080	0.025
Operations and Maintenance Building	1,000	0.023
Transmission Structure	1,000	0.023

Notes:
 SF = square feet
 ac = acres

An assumption for calculating the impervious area created by solar panels was used for this analysis. The impervious area created by a solar panel was considered to be the area of the foundation of the panels, not the panels themselves. While solar panels do generate concentrated runoff on the panel surfaces, the panels are considered a disconnected impervious surface because the infiltration capability of the soil is only affected by the foundation. Flow spreaders can be used to distribute the concentrated flow from the panels evenly over the ground surface.

Because impervious area from the site is disconnected, the resulting impacts calculated in this analysis are conservative. A more detailed analysis of the small, natural drainage basins on the site that will be completed during the design phase of the project may reveal lesser impacts. The detailed analysis completed during design will be used to select the appropriate stormwater Best Management Practice (BMP) that is best-suited to protect each drainageway and minimize the impacts of the project to the maximum extent practicable.

3.2.2 Vegetated Cover

The construction of the proposed solar reserve would result in a reduction of the ponderosa pine forest canopy. Project elements that will affect the vegetated cover are shown in Table 3. The CN for the solar array field is based on a CN for grassland in fair condition. Areas were based on a conceptual site plan and corresponding areas that were provided to CH2M HILL by Studio GREENE.

TABLE 3
Project Elements Creating a Change in Vegetated Cover

Project Element	Area (SF)	Area (ac)	Curve Number Used
Roads (Graveled)			
Existing Road Improvements	450,200	10.3	89
New Roads	301,200	6.91	89
BPA Substation			
Graveled Area	90,000	2.07	89
Roads	35,000	0.803	89
Array Fields			
Solar Array Field	17,380,440	399	79

4.0 Climate

The NRCS classifies storms in the project vicinity as being Type 1A. Total precipitation amounts in the vicinity of the project were taken from National Oceanic and Atmospheric Administration (NOAA) Atlas 2 and increased by 16 percent per guidance provided by the Eastern Washington Stormwater Management Manual. The storm depths used in the analysis are described in Table 4.

TABLE 4
Total Precipitation Storm Events

Storm Event	Precipitation (inches)
2-year, 6-hour	1.04
10-year, 6-hour	1.51
10-year, 24-hour	2.90
100-year, 6-hour	2.03

Data gathered from the NRCS Temperature and Precipitation Summary (TAPS) station WA1504 show the climate in Cle Elum consists of mild summers and cold winters. Temperatures range from an average January minimum of 21.2 degrees Fahrenheit (°F) to an average August maximum of 80.0°F. The average annual precipitation is 23.09 inches, with the majority occurring from November through March. Table 5 presents average monthly precipitation and snowfall data for Cle Elum.

TABLE 5
 Average Annual Precipitation, Cle Elum, Washington (1971 - 2000)

Month	Average Precipitation (in)	Average Total Snowfall (in)
January	3.80	24.6
February	2.51	14.7
March	1.67	6.2
April	1.16	0.8
May	0.93	0.2
June	0.96	0.0
July	0.46	0.0
August	0.58	0.0
September	0.93	0.0
October	1.76	0.5
November	3.90	12.6
December	4.43	27.0
Annual Average	23.09	86.5

5.0 Drainage Basin Modeling

The background information described above was used to create basin models using the U.S. Army Corps of Engineers Hydrologic Modeling System HEC-HMS 3.1.0. This software was used to determine the pre- and post- development runoff rates and volumes from the project site for the 2-, 10-, and 100-year, 6-hour storm events to determine the impacts the development will have on hydrology of the two drainage basins on the site and the surrounding area. A 10-year, 24-hour storm was also used to illustrate the effect of a longer duration storm event.

The 2-, 10-, and 100-year, 6-hour storm events were used with the NRCS storm distribution Type 1A to calculate the runoff from the drainage basins for the existing and proposed conditions in the North and South drainage basins. A 10-year, 24-hour storm was also used to illustrate the effect of a longer duration storm event. A summary of the areas and curve numbers used in the model are shown in Table 6. The peak rainfall runoff rates and volumes for the existing and proposed conditions are shown in Tables 7 and 8, respectively.

TABLE 6
Areas and Curve Numbers used in the HEC-HMS Model

Conditions	Drainage Basin	Impervious Area (ac)	Impervious Area Curve Number	Pervious Area (ac)	Pervious Area Curve Number ^a
Existing Conditions					
	North	0	98	259	72
	South	0	98	723	72
Proposed Conditions					
	North	0.06	98	258.94	73
	South	1.11	98	721.89	76

^a Values of proposed conditions are weighted per values shown in Table 3.

TABLE 7
Existing Site Rainfall Runoff and Volume Calculations from HEC-HMS Model

Drainage Basin	Storm	Peak Discharge (cfs)	Total Runoff Volume (cf)
North Drainage Basin	2-year, 6-hour Storm	0.60	18,803
	10-year, 6-hour Storm	2.50	103,419
	10-year, 24-hour Storm	21.80	695,726
	100-year, 6-hour Storm	5.40	282,051
South Drainage Basin	2-year, 6-hour Storm	1.70	52,490
	10-year, 6-hour Storm	6.90	288,694
	10-year, 24-hour Storm	56.00	1,915,878
	100-year, 6-hour Storm	15.00	787,347

TABLE 8
Proposed Site Rainfall Runoff and Volume Calculations from HEC-HMS Model

Drainage Basin	Storm	Peak Discharge (cfs)	Total Runoff Volume (cf)
North Drainage Basin	2-year, 6-hour Storm	0.80	18,803
	10-year, 6-hour Storm	2.70	122,222
	10-year, 24-hour Storm	24.80	742,734
	100-year, 6-hour Storm	5.70	310,256
South Drainage Basin	2-year, 6-hour Storm	3.30	131,225
	10-year, 6-hour Storm	9.80	498,653
	10-year, 24-hour Storm	89.60	2,440,776
	100-year, 6-hour Storm	24.90	1,102,286

The existing site rainfall runoff and volume calculations were used as a baseline for determining the increase in rainfall runoff and volume expected as a result of the construction of the proposed project.

Rainfall runoff and volume are expected to increase in both the North and South drainage basins. Due to the small amount of construction in the North drainage basin, peak rainfall runoff rates and volumes are expected to increase on a much smaller scale when compared to the increases in the South drainage basin. See Table 9 for a summary of the increase by drainage basin.

TABLE 9
 Summary of Peak Discharge and Volume Increases by Basin

Drainage Basin	Storm	Increase in Peak Discharge (cfs)	Increase in Total Runoff Volume (cf)
North Drainage Basin	2-year, 6-hour Storm	0.20	0
	10-year, 6-hour Storm	0.20	18,803
	10-year, 24-hour Storm	3.00	47,009
	100-year, 6-hour Storm	0.30	28,205
South Drainage Basin	2-year, 6-hour Storm	1.60	78,735
	10-year, 6-hour Storm	2.90	209,959
	10-year, 24-hour Storm	33.60	524,898
	100-year, 6-hour Storm	9.90	314,939

The largest increase in peak discharge for the 6-hour storm events occurred during the 100-year storm in the South drainage basin (9.90 cfs). At the point of discharge to the Teanaway River, the total contributing drainage basin area is 195 square miles. Using a direct proportion of drainage basin area to flow (FEMA data reports recorded the total size of the drainage basin to be 207 square miles and have a 100-year discharge of 7,350 cfs), the flow in the Teanaway River at the discharge point is expected to be approximately 6,924 cfs during a 100-year storm event. An increase of 9.90 cfs results in a 0.14 percent increase in flow during the 100-year storm event. From a flooding standpoint, this increase is determined to be negligible when compared to the contribution of the entire watershed at the point of discharge from the project site.

For the 10-year, 24-hour duration storm, the largest increase in peak discharge occurred in the South drainage basin (33.60 cfs). Again, using a direct proportion of drainage basin area to flow (FEMA data reports recorded the total size of the drainage basin to be 207 square miles and have a 10-year discharge of 5,300 cfs), the flow in the Teanaway River at the discharge point is expected to be approximately 4,993 cfs during a 10-year storm event. An increase of 33.60 cfs results in a 0.67 percent increase in flow during the 10-year storm event. From a flooding standpoint, this increase is determined to be negligible when compared to the contribution of the entire watershed at the point of discharge from the project site.

Increases in rainfall runoff rates and volumes experienced by the onsite natural drainages will be managed using infiltration to the maximum extent practicable and stormwater BMPs will also be implemented if necessary.

5.1 Stormwater BMPs

Stormwater BMPs will be chosen based on site-specific conditions during design and on their ability to function with and protect the natural watershed. Specific BMPs will be outlined in the National Pollutant Discharge Elimination System (NPDES) permit and the Stormwater Pollution Prevention Plan (SWPPP) that will be submitted to the Washington State Department of Ecology prior to construction of the project.

There are three basic types of stormwater BMPs: source control, water quality treatment, and flow control. Source control BMPs are measures that are directed toward pollutant-generating activities that will help prevent pollution or other adverse effects of stormwater. Water quality treatment BMPs remove pollutants from stormwater by filtration, biological uptake, adsorption, and gravity settling. The need for water quality BMPs is based on the types of pollutants generated by a project and the vulnerability of the receiving waters to the pollutants of concern. Flow control BMPs control the rate, frequency, and/or flow duration of stormwater runoff through infiltration, evaporation, or detention facilities with infiltration being the preferred method wherever possible. The concept of detention is to collect runoff from a developed area and release it at a slower rate than it would typically run off the site.

Stormwater management involves careful application of source controls, site design principles, and construction techniques in order to protect a watershed. Some potential stormwater BMPs for the site include, but are not limited to, infiltration ponds; infiltration trenches; infiltration swales; large, extended-detention wet ponds; and extended-detention wetlands. Facilities will be designed in accordance with the standards outlined in the Eastern Washington Stormwater Management Manual in order to protect water quality in the receiving waters and reduce the impacts of development on the watershed. Guidance on stormwater BMPs and Low Impact Development (LID) were provided by the Washington Department of Ecology; however, they were not included in the list of facilities above. Stormwater BMPs provided in the Eastern Washington Stormwater Management Manual were more applicable to the rural setting of the project and also account for location and climate in the project area.

6.0 Construction- and Operation- Related Stormwater Impacts

This section addresses specific concerns related to the stormwater impacts from construction and operation of the Teanaway Solar Reserve facility.

6.1 Teanaway River Total Maximum Daily Loads

Section 303(d) of the federal Clean Water Act requires states to periodically prepare a list of all surface waters in the state whose beneficial uses are impaired by pollutants. Waters placed on the 303(d) list require the preparation of Total Maximum Daily Loads (TMDLs). TMDLs are used to set and implement standards to clean up the polluted waters. TMDLs

identify the maximum amount of a pollutant allowed to be released into a waterbody so as not to impair uses of the water, and allocate that amount among various sources.

The Teanaway River has a TMDL for temperature. From July through September stream temperatures in the Teanaway River basin often exceed Washington State water quality standards. Temperature increases in streams can occur for a variety of reasons. Some examples include the loss of vegetation along streams that used to shade the water, impervious area that causes rainfall to increase in temperature before it runs off into a stream, and sediment transport that results in reduced channel width-to-depth ratios.

The Teanaway River is also included in the Upper Yakima Suspended Sediment, Turbidity, and Organochlorine Pesticide TMDL. Suspended sediments and turbidity are caused by erosion of earthen roads and stream banks, and by the discharge of agricultural return flows to the river that are full of sediment. Organochlorine pesticides are also transported by suspended sediment.

In accordance with the standards outlined in the Teanaway Temperature TMDL and Upper Yakima Suspended Sediment, Turbidity, and Organochlorine Pesticide TMDL and the stormwater requirements for Eastern Washington, BMPs will be implemented to prevent soil erosion and any downstream turbidity during construction and operation of the Teanaway Solar Reserve facilities. These BMPs will be outlined in the National Pollutant Discharge Elimination System (NPDES) permit and the Stormwater Pollution Prevention Plan (SWPPP) that will be submitted to the Washington State Department of Ecology prior to construction of the project. The project is highly unlikely to increase temperature in the Teanaway River due to the disconnected nature of impervious area, flow paths on the site, and distance from the project site to its discharge into the Teanaway River.

6.2 Vegetation Management

Routine vegetation management will be required to ensure vegetation growth does not interfere with the operation of any equipment on the Teanaway Solar Reserve project site. Woody vegetation removal and ongoing management will be necessary to prevent interference with solar arrays. Measures will be implemented to protect herbaceous plant cover on site, including under solar arrays. These measures include ongoing vegetation removal that will be limited to woody vegetation that could potentially interfere with safe and effective project operations and preventing non-native plant invasion into the project area.

For a list of BMPs that will be implemented during construction and operation of the Teanaway Solar Reserve, please refer to Attachment G, *Vegetation Management Plan*. The use of herbicides in accordance with the BMPs and requirements of the local, state, and federal jurisdictions is not expected to affect stormwater quality in the project area.

6.3 Improvements to Loping Lane and Wiehl Road

The Teanaway Solar Reserve site will be accessed via Kittitas County and private roads that interconnect with Highway 970. Loping Lane, a private road, and Wiehl Road, a privately maintained public road, will be used to access the site during construction and operation of the project. Currently, Loping Lane and Wiehl Road generally consist of gravel and dirt; the

portions of Loping Lane and Wiehl Road that will be used during construction and operation will need to be improved pursuant to County requirements.

With several drainages in close proximity to the roads, stormwater drainage infrastructure will be necessary if Loping Lane and Wiehl Road are improved. All drainage improvements will be designed and constructed in accordance with the Eastern Washington Stormwater Management Manual and the requirements of local, state, and federal jurisdictions. BMPs will also be implemented to prevent soil erosion and any downstream turbidity during construction and operation.

7.0 Summary

Background information was collected on the existing and proposed site conditions for the Teanaway Solar Reserve Project and used to create models of the existing and proposed conditions for the two drainage basins on the project site. The NRCS *Technical Release 55 (TR-55)* methodology was the selected method for the analysis to determine the increase in rainfall runoff and volume from the project site. To determine runoff from storm rainfall, this methodology uses a runoff CN method. Determination of the CN depends on the watershed's soil and cover conditions, which the model represents as hydrologic soil group, cover type, and hydrologic condition.

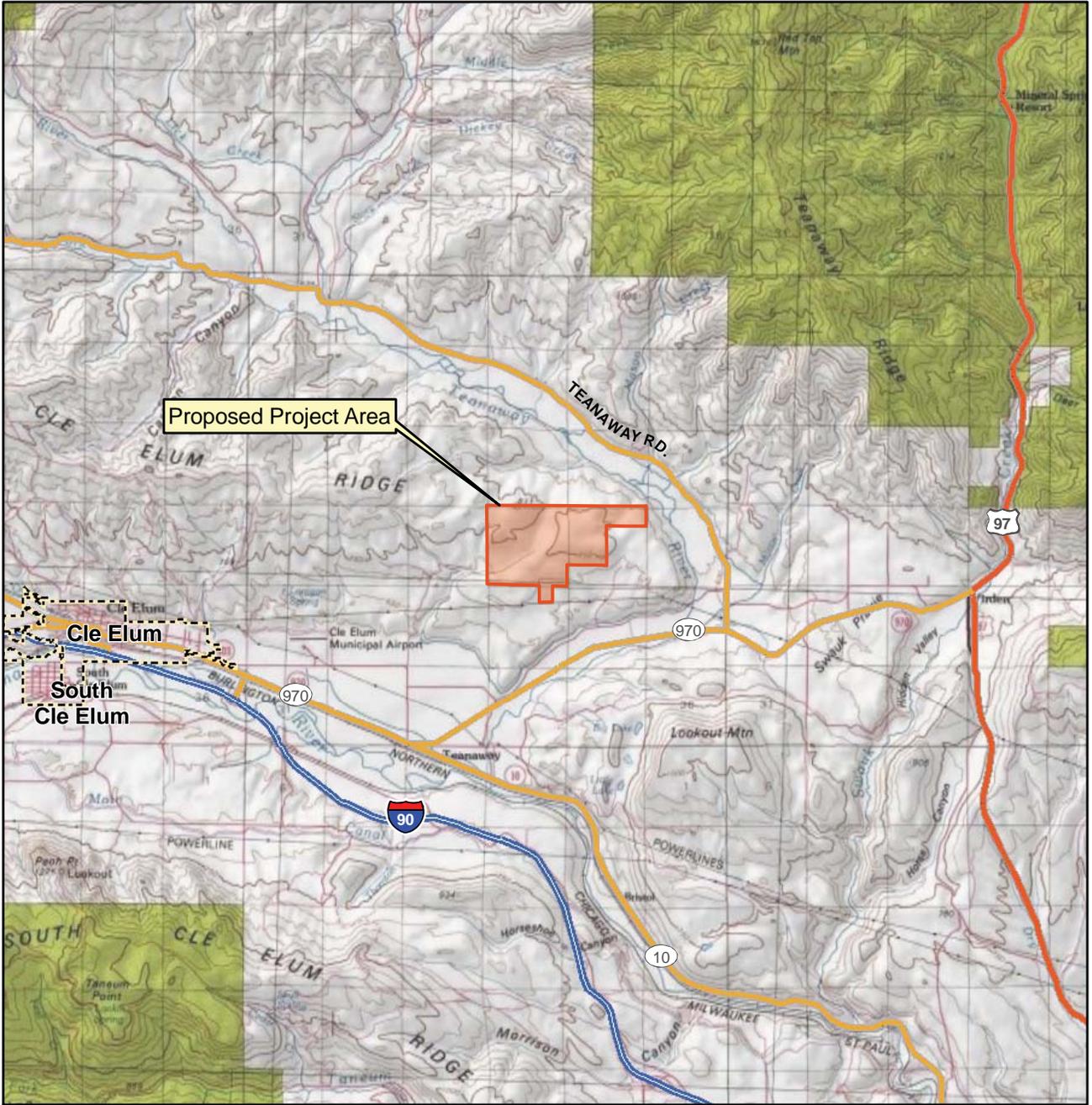
Once all of the inputs were determined for the existing and proposed conditions in each drainage basin, models were built using the U.S. Army Corps of Engineers HEC-HMS 3.1.0 software. The models were then used to determine pre- and post-development peak rainfall runoff rates and volumes for 2-, 10-, and 100-year 6-hour and 10-year, 24-hour storm events. Peak runoff rates and volumes are expected to increase minimally as a result of the development of the site. The increases are negligible when compared to the contribution of the entire watershed at the point of discharge to the Teanaway River. Mitigation of the hydrologic impacts from the increased runoff rates and volumes for local drainages will be mitigated through infiltration to the maximum extent practicable and stormwater BMPs will be implemented if necessary. These measures will be designed and constructed in compliance with the Eastern Washington Stormwater Management Manual.

Rain-on-snow events pose a significant flood hazard, however the magnitude of runoff from a rain-on-snow event is not expected to significantly increase as a result of the construction of the project. Specific concerns related to the stormwater impacts from construction and operation of the Teanaway Solar Reserve facility were addressed in regards to the Teanaway Temperature and Upper Yakima Suspended Sediment, Turbidity, and Organochlorine Pesticide TMDLs and the improvements to Loping Lane and Wiehl Road. Vegetation management through the use of Department of Ecology-approved herbicides is not expected to affect stormwater quality. All stormwater drainage improvements associated with the Teanaway Solar Reserve project will be designed and constructed in accordance with the Eastern Washington Stormwater Management Manual and the requirements of local, state, and federal jurisdictions to reduce the impacts of the project to the maximum extent practicable.

8.0 References

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APPENDIX A
Figures



LEGEND

-  Proposed Project Area
-  City Boundary
-  Interstate
-  Highway
-  Major Road

Note:
1. USGS 100K Quadrangle: Wenatchee.

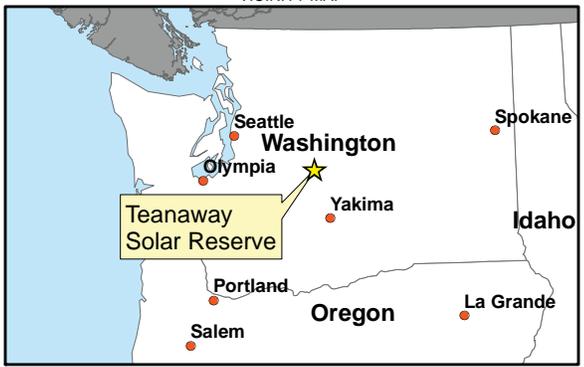
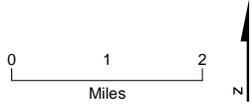
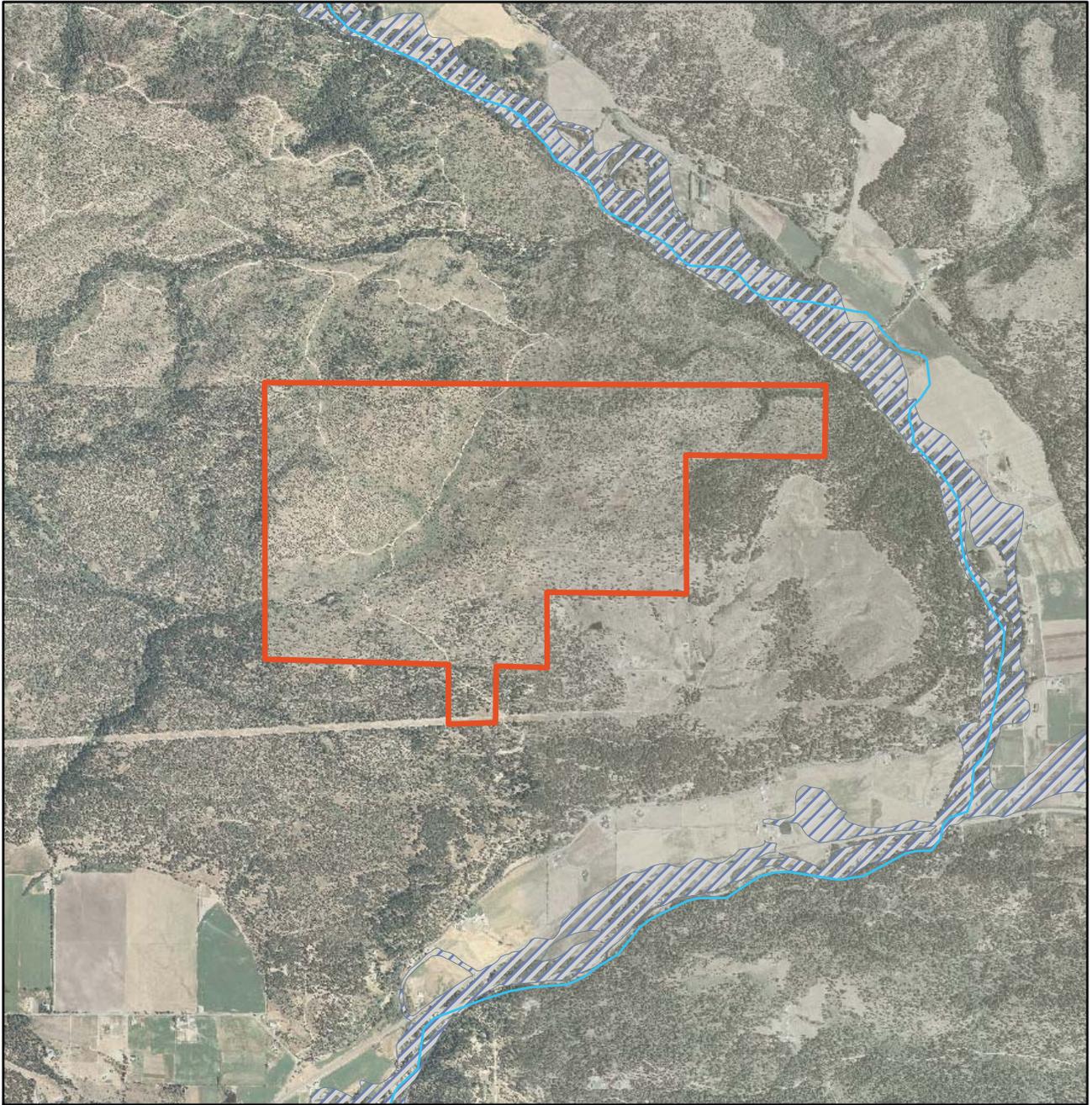


FIGURE 1
Vicinity Map
Hydrologic Analysis
Teanaway Solar Reserve
Kittitas County, Washington



VICINITY MAP

LEGEND

-  Shoreline Management Act Stream (450 feet from proposed project area)
-  FEMA 100-year Flood Zone
-  Proposed Project Area

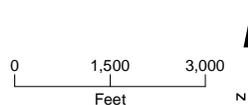
Notes:

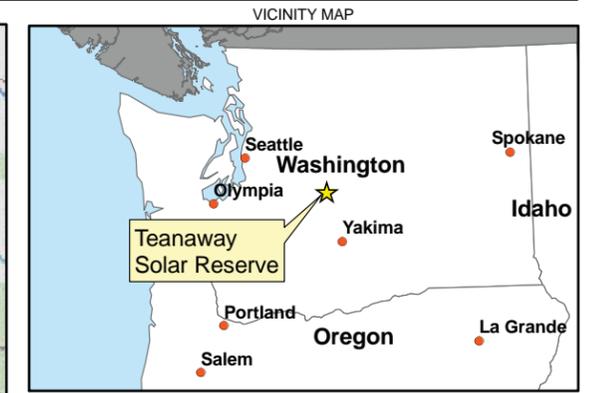
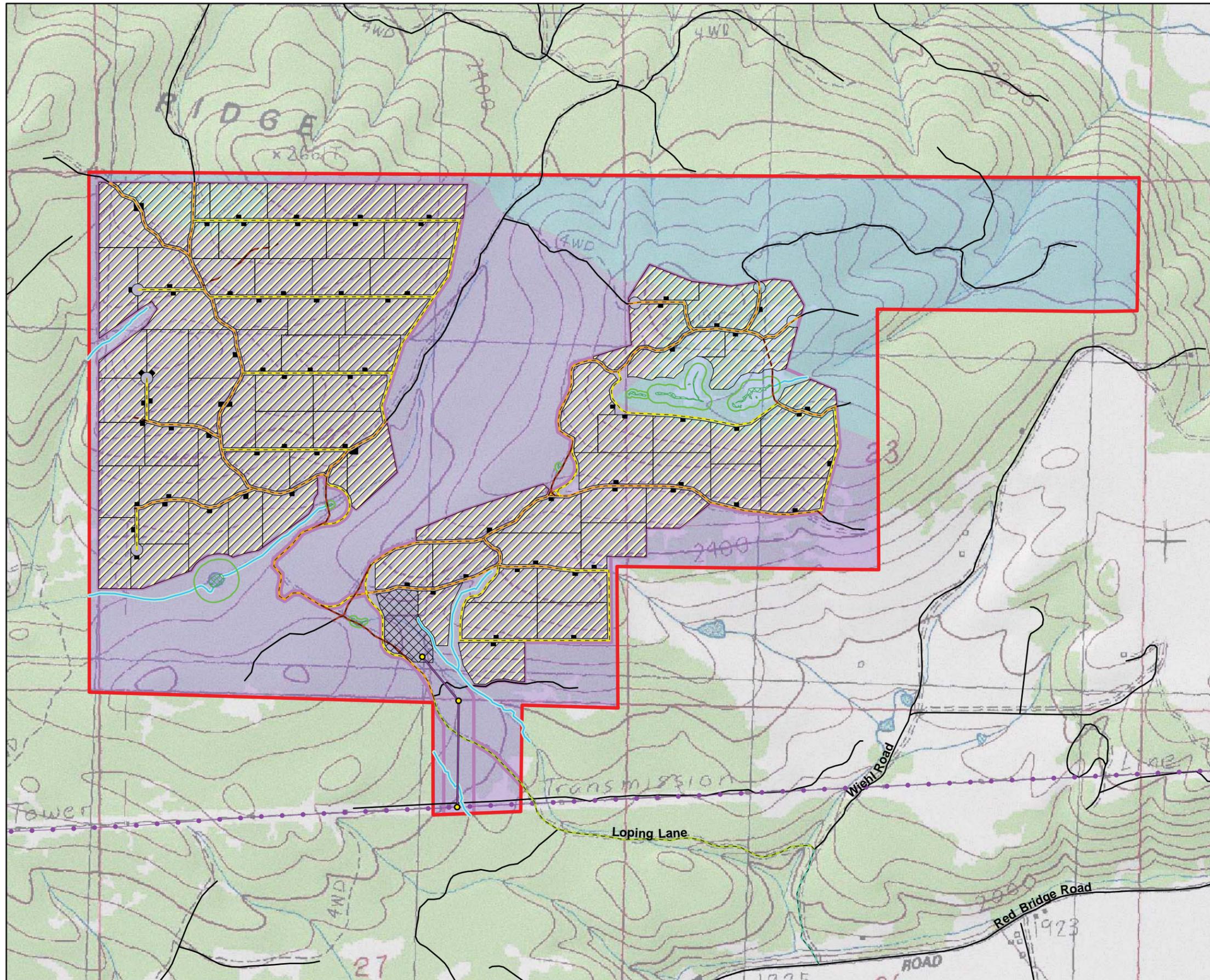
1. Flood Data: Federal Emergency Management Agency Flood Insurance Rate Map.
2. Stream Data: Washington Department of Ecology.
3. Aerial Imagery: 2006 1m NAIP.



FIGURE 2
100-year Floodplain Map

Hydrologic Analysis
Teanaway Solar Reserve
Kittitas County, Washington





- LEGEND**
- Proposed Project Features**
- Proposed Project Area (982 Acres)
 - Proposed Project Site (477 acres)
 - Proposed PV Array Block
 - Proposed Field Inverter and Field Transformer
 - Proposed Substation/O&M Facility
 - Proposed Transmission Line
 - Proposed Transmission Structure
 - Proposed Maintenance Road
 - Proposed Improved Maintenance Road
 - Existing Maintenance Road (Planned Decommissioning)
 - Proposed Improved County Access Road
 - Proposed Improved Private Access Road
- Existing Features**
- Existing BPA Transmission Line and ROW
 - Existing Road
 - Stream
 - Stream Buffer
 - Wetland
 - Wetland Buffer
 - South Drainage Basin
 - North Drainage Basin

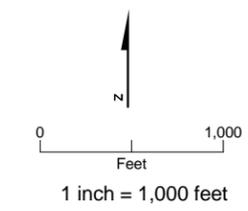


FIGURE 3
Proposed Site Layout with Drainage Basins
 Hydrologic Analysis
 Teanaway Solar Reserve
 Kittitas County, Washington

APPENDIX B

GeoEngineers Letter (October 2009)



Plaza 600 Building
600 Stewart Street, Suite 1700
Seattle, Washington 98101
206.728.2674

February 19, 2010

Teaway Solar Reserve, LLC
218 East First Street, Suite B
Cle Elum, Washington 98922

Attention: Mr. Howard Trott

Subject: Hydrologic Evaluation
(CU-09-00005)
Hydrologic Services
Teaway Solar Reserve
Kittitas County
File No. 17700-001-01

INTRODUCTION

Teaway Solar Reserve, LLC (TSR) proposes to construct and operate the project on approximately 982 acres of private land within the Forest and Range (F&R) zoning district in an unincorporated area of Kittitas County, Washington. TSR submitted a Conditional Use Permit (CUP) and State Environmental Policy Act (SEPA) Checklist for the proposed project to Kittitas County on August 18, 2009. The application was deemed complete by the County on September 3, 2009. The public comment period on the CUP/SEPA ended on October 5, 2009. Comments were received from various state agencies and interested local parties.

This letter has been prepared on behalf of Teaway Solar Reserve, LLC (TSR) in response to the September 16, 2009 comment letter prepared by Mark Teske of the Washington Department of Fish and Wildlife (WDFW) regarding the Teaway Solar Reserve located in Kittitas County, Washington. The letter raised questions regarding the solar reserve's impact, if any, on flooding and erosional hazards in the vicinity of tributary streams to the Teaway River. To address issues raised in the WDFW letter, a professional hydrologist from GeoEngineers visited the site of the proposed solar reserve, the surrounding watershed, and the drainages that emanate from the project area. The information presented in this letter is based on a review of Solar Reserve design information, a review of area topographic maps, a field reconnaissance and interviews with local residents familiar with the history of flooding issues along Red Bridge Road. This response is organized according to the topics outlined in the September 16th WDFW letter.



PROJECT DESCRIPTION

Teaaway Solar Reserve, LLC (TSR) proposes to construct and operate the project on approximately 982 acres of private land within the Forest and Range (F&R) zoning district in an unincorporated area of Kittitas County, Washington. The project will generate up to 75 direct current megawatts (MWdc) of photovoltaic (PV) solar energy utilizing approximately 477 acres of land within the proposed project area. The project location was chosen for its south-facing slopes of moderate steepness, which are required for the effectiveness of the solar facilities. Studio Greene Architects has completed the initial site layout work on the project and Quanta Services, Inc. will manage site development and construction. GeoEngineers was provided layout and foundation information by CH2M HILL Inc.

Several module mounting types will be considered to best address the slope of land and soil stability at the project site. For example, large land areas with a slope toward the south are excellent for single-axis tracking systems. Land areas that are sloped to the east, southeast, west, or southwest will not as easily accommodate single-axis tracking systems, and are better suited to a fixed-tilt mounting structure.

The foundations securing the solar modules will be designed to withstand high winds and snow loads. The site may have multiple foundation types to match the ground conditions and type of mounting structures used. The mounting-system support structures could consist of embedded posts, poles, or structural steel angle. The embedment could be completed via a vibratory drill or similar installation method to depths of approximately 8 feet. Pending final design, the solar module foundations will require site work and potential boring.

The posts will not be anchored unless a patch of bedrock is encountered during installation. After the posts are installed, they are held in place by friction from the surrounding soil, without the use of concrete. Driven piles develop their strength by utilizing a definable skin friction between the pile and the soil. As the pile is forced into the ground, the displaced material compresses and that, in turn, creates the friction at the pile/soil interface. Piles are typically driven to a depth that prevents seasonal and temporary changes from affecting their strength. A geotechnical engineer will determine the parameters to be used in the structural design. No concrete will be used when installing the foundations for the modules.

METHOLODOLGY

A professional hydrologist from GeoEngineers visited the site of the proposed solar reserve, the surrounding watershed, and the drainages that emanate from the project area. The information presented in this technical memorandum is based on a review of Conceptual Site Layout as presented in the CUP/SEPA application materials, topographic maps, a field reconnaissance, and interviews with local residents familiar with the history of flooding issues along Red Bridge Road.

RESULTS

A summary of the potential impacts related to the development of the solar reserve is presented below. The public comment letter from the Washington Department of Fish and Wildlife (WDFW) outlined the following concerns: impervious surfaces, January 2009 flooding, and the 303(d) listing of the Teaaway River.



Impervious Surfaces

Concern was raised by the public comments that impervious surfaces from the proposed project will intercept rain and snow.

Permanent impacts resulting from installation of the solar reserve may result from the removal of ponderosa pine trees, road construction, and placement of the panels. In terms of permanent land conversion and modification of the hydrology of the watershed, the impacts are significantly less than a typical development which typically consists of paved roadways, impervious structures and supporting facilities. The roads at TSR will be maintained as dirt or gravel, and no large-scale clearing or grading beyond tree removal is required for the reserve. After construction, native grasses will be restored to the disturbed areas.

Although the solar reserve panels are impervious, due to their angled orientation above the ground surface, they will not function as an impervious surface such as a roadway or flat surface at ground level. Therefore, rainwater or snow intercepted by the panels will run off the elevated surface and flow to the native soil and grasses, which will continue to serve the same drainage function that approximates the current condition. The primary effect of runoff from the solar panels will be to concentrate the natural rainfall that would naturally have fallen over a 17.5-square-foot area (individual panel dimensions are 3.5 feet by 5 feet) into a linear corridor with a length that may vary from 3.5 feet to 8.5 feet, depending on the orientation and angle of the panel at the time of a storm event. The likely impact that may result from construction of the individual solar panels would be a minor concentration of runoff at the base of each panel that could result in rilling or small-scale gully formation in extreme rainfall cases.

JANUARY 2009 FLOODING

The January 2009 flooding that occurred adjacent to the proposed project area, specifically along Red Bridge and Wiehl Roads was the result of a significant rain-on-snow event and was possibly the flood of record for the small drainages that emanate from the project area. These drainages can be characterized as ephemeral, vegetated swales. A field visit to the project area shows that the drainages that drain the project area are in stable condition. No excessive erosion, lateral shifting or incision was evident in the drainages around the project site. The vegetation in the drainages acts to reduce velocity and erosional forces of water as it runs off hillslopes into concentrated areas.

The proposed project area is situated within two basins, one of which (east tract) drains to the Red Bridge Road via Wehl Road. The condition of the channel that drains Wiehl Road shows that the channel was not significantly altered as a result of the extreme flood events in January 2009. Drainage from the west tract is routed through a stock pond, which effectively removes any peak flow from major flood events, and runs southwest into a drainage that is captured for irrigation along Masterson Road. Observations of the channel upstream and downstream of the stock pond show that the extreme flooding in January 2009 did not significantly impact the channel stability.

One of the major sources of flooding and the main source of debris onto Red Bridge Road during the January 2009 event was a small drainage that does not emanate from the project area and will not be affected by the proposed solar reserve. The unnamed drainage is not located within the proposed project area and is hydrologically and topographically disconnected from the project area. The drainage receives



flow from the hillside above and directs the runoff down a short, steep section that runs into an irrigation ditch parallel to Red Bridge Road.

According to Jesse Geiger, the homeowner across the street from the unnamed drainage, the flooding and debris flow from this drainage were a result of recent disturbance to the stream channel caused by another local valley resident. Mr. Geiger told us that another area resident had used excavating equipment to trench into and disturb the streambed of the unnamed small drainage in an effort to reroute flows into irrigation pipes and ultimately into an existing delivery system. According to Mr. Geiger, the channel was never armored or revegetated after the soil disturbance and channel realignment. As a result, high flows in January 2009 destabilized the unprotected channel and breached the weak soil dam that had been erected adjacent to Red Bridge Road. The condition of the channel upstream of the disturbed area was not subject to erosion or damage; rather, only the disturbed reach was destabilized, causing a debris torrent to spill into the road and the subsequent flooding and damage to the road. Field observations of the drainage correlate with the description of events recounted by area residents, as evidenced by comparing the condition of this drainage to the drainage adjacent to Wiehl Road.

TEANAWAY RIVER

The WDFW letter identifies that the Teanaway River is an impaired waterbody due to temperature and flow limitations as defined by the Washington State Department of Ecology (Ecology) Total Maximum Daily Load (TMDL) detailed implementation plan (DIP). According to the DIP, the sources of temperature and flow impairment in the Teanaway River are:

- Lack of streamside shade
- Increased channel width:depth ratio
- Instability of streambanks
- Lower instream flows during the summer

The proposed solar reserve will have negligible influence on any of the processes listed above. WDFW suggests that the proposed development will result in a flashier hydrograph in the drainage channels that emanate from the planned solar reserve project area and that this conversion will further impair conditions in the Teanaway River. We address issues raised by WDFW below:

Timing of Runoff

Historically, and in an undisturbed state, the ephemeral drainages emanating from the project area flow are naturally “flashy,” typically resulting from short, intense rainfall or rain-on-snow events. These events are likely to occur in autumn and early winter, when flows in the Teanaway River are naturally elevated and temperatures low.

It is also important to note that, the drainages flowing from the project area either are intercepted by irrigation ditches or cross over Red Bridge Road and spread out over the fields between Red Bridge Road and Highway 970. As such, there is no direct surface water connection to the Teanaway River from these drainages.



Sediment Transport

WDFW suggests that the proposed solar reserve project is expected to increase sediment load and impact salmonid egg incubation in the Teanaway River. Sediment transport from the project area to the Teanaway River is not expected to increase as a result of the detention facilities that will be put in place to offset any predicted increases in post-development sediment load. Additionally, irrigation diversions and the lack of a surface water connection limit any sediment movement to the Teanaway River except during periods of extreme flows and sediment concentrations, when the entire valley is flooding and overtopping Highway 970. Furthermore, field observations indicate that the channels routing water from the project area are in stable condition, while the major source of flooding and debris is from a drainage unaffected by the proposed project.

Hyporheic Zone

Hyporheic exchange between the Teanaway River and its floodplain can be an important source of cool water during periods of low flow. However, the historically ephemeral and flashy flow from the project area stream channels likely supplied little of the total water volume in the hyporheic zone. Most of the water that emanates from the project area and adjacent basins is captured for irrigation and therefore is regulated by the irrigation schedule and ultimately enters the Teanaway River as return flows. Flows that exceed the capacity of the irrigation system or that are routed past irrigation diversions have no open channel to pass water quickly to the Teanaway River; rather, the flows spread across the fields and infiltrate into the floodplain, slowly working their way towards the river as hyporheic flows. The processes that currently supply the hyporheic zone from the project area streams will not be altered, nor will the floodplain processes of the Teanaway River be modified as a result of the proposed project.

CONCLUSIONS

During final design of the project, and as part of the building permit application, more detailed hydrologic analyses will be completed to design stormwater management features. The applicant proposes to have no effect on the existing hydrology leaving the project site. Any calculated increase in runoff will be managed through the implementation of Best Management Practices. Runoff from the project area routes through two drainages, one of which currently has a stock pond that can be easily modified to collect and release runoff in a manner such that the post-development runoff matches the existing hydrology. When additional analyses are completed, the applicant will utilize a continuous hydrologic model such as MGS Flood or the Western Washington Hydrology Model to accurately model the effects of the development on basin hydrology.

There is no field evidence that the landslides/debris torrents referenced in the public comment letter received from the WDFW emanated from the proposed project area. Flooding of the drainages is a natural process that occurs during extreme events such as the rain-on-snow event that occurred in January 2009. The volume and timing of surface water runoff from the project area will not increase beyond the existing condition as a result of careful planning and application of stormwater management measures where necessary. The proposed solar reserve development will not result in hundreds of acres of impervious area, as suggested by the WDFW letter. The primary cause of landslides/debris torrents seen in the January 2009 event that impacted Red Bridge Road resulted from land disturbance in drainage that is neither within, nor affected by, the proposed project.



LIMITATIONS

GeoEngineers has prepared this letter report for the exclusive use of the Teanaway Solar Reserve, LLC and their authorized agents for Hydrologic Services for the Teanaway Solar Reserve located in Kittitas County, Washington.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with the generally accepted hydrologic science practices in this area at the time this report was prepared. The conclusions and opinions presented in this report are based on our professional knowledge, judgment and experience. No warranty or other conditions, express or implied, should be understood.

Sincerely,
GeoEngineers, Inc.


Jonathan M. Ambrose
Senior Hydrologist


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Principal

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APPENDIX C

Time of Concentration Calculations

Time of Concentration Worksheet				
PROJECT:		Teanaway Solar Reserve Project		
BASIN		Teanaway Drainage Basin		
LOCATION:		Kittatas County, Washington		
Parameters		Units		Comments
Total length of Flow	4895	ft		
Sheet Flow Segment				
Length	100	ft		
Slope of hydraulic Grid Line - S_o	0.11	ft/ft		
n_s - Sheet flow Manning' Effective roughness coeff.	0.4			[HEC-HMS Technical Reference Manual]
Travel time (sheet Flow Segment) $T_1 = 0.42 (n_s L)^{0.8} / ((1.58 * S_o)^{0.4})$	12.3	min		[City of Portland Stormwater Management Manual 2004 page C-2]
Shallow Concentrated Flow Segment				
Length	300	ft		
S_o	0.050	ft/ft		[City of Portland Stormwater Management Manual 2004 page C-2]
Velocity $V = 16.1345(S_o)^{0.5}$	3.61	ft/s		[City of Portland Stormwater Management Manual 2004 page C-2]
$T_2 = L / (60 * V)$	1.4	min		[City of Portland Stormwater Management Manual 2004 page C-2]
Pipe Flow Segment				
Length	4495	ft		Assume sheet flows empty into inlets connected to pipes.
$T_3 = L / (60 * V)$	25.0	min		Assume pipe flow velocity of 3fps
T_c	38.7	min		

Time of Concentration Worksheet				
PROJECT:		Teanaway Solar Reserve Project		
BASIN		South Drainage Basin		
LOCATION:		Kittatas County, Washington		
Parameters		Units		Comments
Total length of Flow	7738	ft		
Sheet Flow Segment				
Length	100	ft		
Slope of hydraulic Grid Line - S_o	0.11	ft/ft		
n_s - Sheet flow Manning' Effective roughness coeff.	0.25			[City of Portland Stormwater Management Manual 2004 page 2-74]
Travel time (sheet Flow Segment) $T_1 = 0.42 (n_s L)^{0.8} / ((1.58 * S_o)^{0.4})$	8.4	min		[City of Portland Stormwater Management Manual 2004 page C-2]
Shallow Concentrated Flow Segment				
Length	300	ft		
S_o	0.070	ft/ft		[City of Portland Stormwater Management Manual 2004 page C-2]
Velocity $V = 16.1345(S_o)^{0.5}$	4.27	ft/s		[City of Portland Stormwater Management Manual 2004 page C-2]
$T_2 = L / (60 * V)$	1.2	min		[City of Portland Stormwater Management Manual 2004 page C-2]
Pipe Flow Segment				
Length	7338	ft		Assume sheet flows empty into inlets connected to pipes.
$T_3 = L / (60 * V)$	40.8	min		Assume pipe flow velocity of 3fps
T_c	50.4	min		

ATTACHMENT G

Vegetation Management Plan

Report

Vegetation Management Plan: Teanaway Solar Reserve Kittitas County, Washington

Prepared for
Teanaway Solar Reserve, LLC

February 2010

Prepared by
CH2MHILL



**Printed on
Recycled and
Recyclable
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1 Vicinity Map
2 Proposed Site Layout
3 Habitat Types within the Proposed Project Site

1.0 Introduction

Teaway Solar Reserve, LLC (TSR) proposes to construct an array of solar collection panels on 477 acres of privately held land near Cle Elum, Washington. (See Appendix A, Figure 1.) The proposed solar panel project site would be constructed on land leased from American Forest Holdings, LLC, which is managed and operated by American Forest Land Company, LLC of Ellensburg, Washington. The total leased parcel covers 982 acres (proposed project area). This Vegetation Management Plan (Plan) was developed in order to avoid or alleviate impacts to vegetation resources that are expected to result from the project and to provide TSR with guidance during and after construction for the management of vegetation resources within the proposed project area.

The proposed project site currently contains important habitat for wildlife, particularly elk, and supports a high diversity of native plant species. For this reason, this management plan uses many conservation and mitigation measures defined for the wind power industry by the Washington Department of Fish and Wildlife (WDFW) (2009).

This Plan also provides mitigation goals for offsetting the expected reduction in carbon-sequestering conifers with project implementation. Tree seedlings will be planted in nearby conservation easement lands and/or riparian corridors along degraded areas of the Teaway River to mitigate for the permanent loss of tree cover under panels and facilities.

1.1 Site Location

The proposed project site is located approximately 4 miles northeast of Cle Elum, Washington, in Township 20N, Range 16E, within Sections 22, 23, and 27 (see Appendix A, Figure 2). The site is located on the eastern slopes of the Cascade Mountains on Cle Elum Ridge, which runs generally from east to west at elevations ranging from approximately 2,200 to 2,600 feet. The Teaway River is approximately 1 mile to the northeast of Cle Elum Ridge. The site is accessed from Highway 970 by way of County roads such as Red Bridge Road (see SEPA Checklist Attachment J, Figure 3), private roads such as Loping Lane, and public roads that are privately maintained such as Wiehl Road.

The proposed project area consists of 982 acres. Based on site surveys, the project will utilize approximately 477 acres within the proposed project area. The remaining acres are currently undeveloped open space.

The Teaway River is approximately 1 mile to the northeast of Cle Elum Ridge. The Teaway River is the largest naturally flowing tributary in the Upper Yakima Basin. It supports populations of spring chinook salmon, steelhead, and bull trout. Several reaches of the Teaway River and its tributaries do not meet Washington State's numeric water quality standards for stream temperature and several segments of the Teaway River have been placed on Washington State's 303(d) list of impaired water bodies.

In general, the proposed project area is open ponderosa pine (*Pinus ponderosa*) forest with a mixed bunchgrass-forb understory. A few areas support wetlands and aspen groves. Habitat across the proposed project areas is rated as Category II by the WDFW. (Class I and Class II habitats are considered the highest priorities for current statewide conservation action in Washington. Class I habitats have a greater number of associated Species of

Greatest Conservation Need [SGCN] than the Class II habitats and Class II habitats have a greater number of associated SGCN than the Class III habitats. Class IV habitats are generally low-value habitats, and this is the only class that generally requires no mitigation for impacts.) The proposed project area supports elk herds, at least seasonally, and is considered habitat for elk and deer.

1.2 Purpose and Intent

The purpose of the proposed project is to generate up to 75 direct current megawatt (MWdc) of photovoltaic (PV) solar energy for distribution to utilities and communities seeking to optimize their renewable and sustainable energy sources. The project was conceived in response to the growing need for sustainable energy sources and the State of Washington's Renewable Electricity Standard, Revised Code of Washington (RCW) Title 19, mandate that by the year 2020, the state's largest electric utilities meet 15 percent of their retail electric load with renewable electricity (for example, wind and solar energy). The standard first takes effect in 2012 with a requirement of 3 percent through 2015, then 9 percent from 2016 through 2019 and 15 percent thereafter.

Oregon and California have adopted similar standards. Depending on the commercial terms available for the power sales, the utilities that may buy the power from the project could change over time.

TSR proposes to develop the site with key components described below to maximize its solar energy potential, based on its commitment to providing renewable energy and becoming the leading (in terms of energy production and environmentally sensitive development and management of its solar production site) sustainable energy production location in North America. The following factors will be analyzed to determine optimal location within the site defined below:

- Significant solar radiation (insolation)
- Site accessibility
- Avoidance of environmentally sensitive areas
- Limited visibility from offsite locations

All utility-scale solar energy facilities require relatively large areas for solar radiation collection when used to generate electricity at a commercial scale, and the large arrays of solar collectors may interfere with natural sunlight, rainfall, and drainage, which could have a variety of effects on plants and animals. Proper siting decisions and conservation mitigation measures described in this Plan were developed to help avoid land disturbance and land use impacts and to mitigate for unavoidable impacts to vegetation.

1.2.1 Key Project Components

The proposed project will consist of the following key components:

- Solar modules
- Field inverters
- Field transformers
- Electrical conductors

- Electrical substation and switchyard
- Operations and maintenance (O&M) building supervisory control and data acquisition (SCADA) system
- Overhead interconnection transmission line
- Access and maintenance roads

Key components are described in more detail in the project description section of the Expanded SEPA Checklist.

1.3 Goals and Objectives

To meet the purpose and intent of this Plan, goals, and objectives were developed to guide vegetation management activities related to project construction and solar production O&M. These goals and objectives for vegetation management are described below:

1.3.1 Vegetation Maintenance

- Maintain, preserve, and restore the diversity of herbaceous native plant species within the proposed project site.
 - **Objective:** Woody vegetation removal and ongoing management will be necessary to prevent interference with solar collectors. Measures will be implemented to protect herbaceous plant cover on site, including under collectors, to the fullest extent possible in order to retain high carbon sequestration potential for the site, to avoid extreme changes in hydrological infiltration-runoff ratio, to protect wildlife forage, and to maintain vegetation diversity to the greatest extent possible.
 - **Objective:** Restoration of impacted areas, of weed control areas, and for future decommissioning of the site will be based on native species currently on site.
- Develop and maintain native plant communities that are resistant to non-native plant invasion.
 - **Objective:** Develop and implement construction BMPs that will prevent weed invasion into project area and limit construction impacts to the smallest footprint possible.

1.3.2 Revegetation

- Maintain carbon sequestration potential after woody vegetation removal.
 - **Objective:** Develop or enhance woody vegetation on nearby parcels to offset the negative impacts to woody vegetation from the construction of solar panels and other facilities.
- Preserve and maintain the land's aesthetic values to the fullest extent possible while developing electrical production.
 - **Objective:** Provide screening around the perimeter of the project area and make trees available for neighboring landowners to plant on their land to provide additional screening as they see fit. These plantings will further enhance potential carbon sequestering.

1.3.3 Agency Coordination

Through the formation of a Technical Advisory Committee (TAC), present the WDFW and the Washington Department of Natural Resources (WDNR) with a plan to provide conservation measures that will compensate for the loss of native vegetation that will be permanently affected by project construction and O&M without negatively impacting forest health, fire risk, and elk habitat by overstocking trees in areas that are already high-value forests. This would mean replacing and/or upgrading deteriorated native vegetation nearby.

- **Objective:** Present the WDFW with a plan to ensure that vegetation removal and associated revegetation mitigation activities are consistent with, or complementary to, objectives for weed prevention, fish and wildlife habitat, erosion control, ground cover, riparian reserves, and fire/fuels management. Promote the idea of a TAC with Kittitas County, WDNR, WDFW and other stakeholders to help guide the deliberation process for tree planting locations and stocking rates that would best serve elk habitat values, forest health values, and fire prevention measures. Investigate opportunities to use tree plantings along segments of the Teanaway River that are currently listed by the U.S. Environmental Protection Agency (EPA) as impaired water bodies (303(d)) because of high temperatures to improve shading and channel morphology over time.

1.3.4 Weed Control

Comply with recommendations of the Washington State and Kittitas County Weed Control Boards for Region 6 Class A, B, and C weeds, which require land owners within weed-control districts to protect and preserve the land and resources from the degrading impact of noxious weeds.

- **Objective:** Reduce cover of noxious weeds. Restore cover by native plant species in areas of temporary disturbance. Maintain a clean, healthy environment with diverse native plant assemblages that resemble current conditions.

1.4 Summary of Plan Implementation Actions

The intent of the Plan is to provide Teanaway Solar Reserve, WDFW, WDNR, and Kittitas County with the information needed to evaluate vegetation management activities associated with proposed project construction and operations and maintenance activities. The Plan will ultimately provide Teanaway Solar Reserve with information needed to implement vegetation management activities for the project over the long term.

This Plan is neither a fiscal nor a funds obligation document. Any endeavor involving reimbursement or contributions of funds between Teanaway Solar Reserve and other stakeholders relative to the Plan will be handled in accordance with applicable laws, regulations, and procedures including those for government procurement and printing. This Plan does not provide such authority.

The Plan consists of three separate but inter-related elements of implementation; each deals with a specific aspect of vegetation management:

1. **Vegetation Maintenance** - describes measures for the routine removal and disposal of vegetation that interferes with safe and effective project construction and long-term operations, while protecting herbaceous vegetation on the site.
2. **Noxious Weed Prevention and Control** - prescribes methods for the prevention and control of noxious weeds in the project boundary.
3. **Revegetation** - outlines the measures to replace woody vegetation that will be removed from the project site by planting woody vegetation on other appropriate locations. It also discusses the procedure for revegetating abandoned road segments. Revegetation includes replanting all areas disturbed during construction. It also describes activities for decommissioning the project site.

2.0 Planning and Coordination

Implementation of the Plan is the primary responsibility of TSR. However, since much of the project is located in the leased land and habitat concerns for elk are important, other stakeholders have important roles in its implementation through the consultation process. The proposed solar panel project site is on land leased from American Forest Holdings, LLC, which is managed and operated by American Forest Land Company, LLC (AFL) of Ellensburg, Washington. Conservation easements for sections for impacted uplands nearby and for impaired segments of the Teanaway River will be investigated in coordination with Kittitas County, WDFW and WDNR. Assessment of the suitability of all potential mitigation replanting sites for elk would include consultation with WDFW.

2.1 Permits and Authorizations

Table 1 outlines the permits and authorizations required to construct the proposed project. Several of these permits involve vegetation avoidance or management.

TABLE 1
Required Permits and Authorizations

Act/Law	Permit/Authorization	Permit Trigger	Agency/Contact
Federal Permits			
Section 404 Clean Water Act Compliance	Section 404—Nationwide Permit	May be required if road improvements impact wetlands along Loping Lane	U.S. Army Corps of Engineers
State Permits			
Historic Preservation Act Compliance	Section 106 Review	Applicants receiving a section 404 permit from the U.S. Army Corps must undergo a Section 106 review	Washington Authority Delegated to State Department of Archaeology and Historic Preservation (DAHP)
State Environmental Policy Act	Chapter 197-11 Washington Administrative Code	Conditional use permit per Kittitas County	Authority Delegated to Kittitas County
Clean Water Act—Section 401 Compliance	Water Quality Certification	Applicants receiving a section 404 permit from the U.S. Army Corps are required to obtain a section 401 water quality certification	Washington Department of Ecology
National Pollutant Discharge Elimination System (NPDES)	General Construction Permit	Required for land disturbances greater than 1 acre	Washington Department of Ecology
Forest Practices Act (76.09 RCW)	Forest Practices Permit	Harvesting trees from onsite	Washington Department of Natural Resources (WDNR)
County Permits			
Land Use Review	Conditional Use Permit	Development occurring within Kittitas County	Kittitas County
Land Use Review	Development Agreement	Development occurring within Kittitas County	Kittitas County
Land Use Review	Cultural Resources	Development occurring within Kittitas County	Kittitas County
Land Use Review	Stormwater	Development occurring within Kittitas County	Kittitas County
Land Use Review	Critical Areas Ordinance	Development occurring within Kittitas County	Kittitas County
Land Use Review	Construction Permit	Development occurring within Kittitas County	Kittitas County

2.2 Summary of Construction Activities and Components

Site preparation will consist of clearing the existing vegetation only in those areas where construction, grading, and road improvements will occur. Site preparation will be limited to maintenance roads, the O&M facility, the substation, and the solar facility. Once the site is prepared, the installation of foundations, trackers, modules, inverter pads and enclosures, and substation foundation can begin.

2.3 Site Clearing and Grading

The project area will require clearing to address the potential for damage to the project from blown down trees, decreased power efficiency of the solar modules because of shading, the risk of fire from fuel buildup within the project area, and the need to create a 100-foot firebreak along the project's perimeters as described below. To clear the site for installing the project facilities, trees will be harvested within the project area on an as-needed basis for facilitating the each construction phase of the project (Table 2-1). Trees will generally be harvested to a stump level of 6 to 12 inches above ground level. TSR will obtain a permit from the WDNR and contract with a professional forester to harvest these trees in accordance with the Forest Practices Act (FPA). Because the bottoms of the solar modules will be approximately 3 feet above grade, any vegetation taller than 3 feet or expected to exceed 3 feet in height will be removed. Shrubs, grass, and groundcover will, to the maximum extent practicable, remain between rows and under the solar modules.

Trees within the 100-foot firebreak will be limbed up to 12 feet, as negotiated with Kittitas County Fire District 7. This minimizes the need to remove the entire tree, thus potentially decreasing the visual impact to nearby landowners. Also, existing trees with a dbh of 3 inches or greater will be replanted at a 3:1 ratio. Although there is no legal requirement for this action, TSR is committed to undertaking efforts that will further the potential long-term sustainability of the land. These two measures will provide greater carbon sequestration, wildlife habitat, and soil stabilization opportunities than are currently available on the site.

Construction equipment such as tractors, backhoes, loaders, dozers, and graders will be needed to clear brush and vegetation from the site as needed, and to grade roads and foundation locations. If the slope of the land is excessive, terracing, or retaining walls may be required.

3.0 Existing Conditions

Five vegetation categories or habitat types were mapped for the project area based on classification descriptions using Chappel *et al.* (2001) and field studies performed by CH2M HILL in the summer of 2009. These five habitat types are illustrated in Appendix A, Figure 3:

- Ponderosa Pine Forest and Woodlands
- Open Water – Lakes, Rivers, and Streams
- Herbaceous Wetlands
- Riparian
- Upland Aspen Forest

These vegetation categories are described in more detail below. Two of the vegetation categories described below are Washington Priority Habitats: Upland Aspen Forest and Herbaceous Wetlands. Because these habitats comprise only a small portion of the site, direct impacts to these habitats from construction and operation of the project will be avoided.

Native plant diversity is high across the project area, 66 of the 81 (81 percent) plant species found during rare plant inventories were native species.

3.1 Ponderosa Pine Forest and Woodlands

Ponderosa Pine Forest and Woodlands vegetation is the dominant vegetation category found on the proposed project site. The project site has been actively managed as commercial timberlands for the past 100 years. The proposed project area was last logged in 2001-2002, leaving relatively few trees per acre and open stands of predominantly ponderosa pine (*Pinus ponderosa*). Crown cover of larger ponderosa pine, commercial grade, (greater than 8 inches diameter at breast height [dbh]) currently is approximately 10 to 15 percent across the proposed project site. Ponderosa pine stands growing on site are dominated by an overstory of 50-year-old ponderosa pine trees with a subcomponent of Douglas-fir (*Pseudotsuga menziesii*) trees. Saplings of both species are present in the understory.

The understory is dominated by a mixture of native bunchgrass species, including Idaho fescue (*Festuca idahoensis*), bluebunch wheatgrass (*Pseudoroegneria spicata*), squirreltail (*Elymus elymoides*), and western wheatgrass (*Pascopyrum smithii*). Common native forbs in the understory are arrowleaf balsamroot (*Balsamorhiza sagittata*), yarrow (*Achillea millefolium*), silky lupine (*Lupinus* spp.), sticky purple geranium (*Geranium viscosissimum*), and Oregon checkermallow (*Sidalcea oregana* var. *procera*).

The variety of Oregon checkermallow found on site is the more common of two varieties of this species. A second variety of this checkermallow (*Sidalcea oregana* var. *calva*) was federally listed under the Endangered Species Act as Endangered on December 22, 1999 (64 FR 71680). Rare plant surveys completed for the proposed project site in 2009 determined that the Oregon checkermallow variety found on site is not the endangered variety (CH2M HILL 2010).

Non-native species, such as bulbous bluegrass (*Poa bulbosa*), ventenata (*Ventenata dubia*), and rush skeletonweed (*Chondrilla juncea*) are abundant in many areas. Rush skeletonweed is a Class B noxious weed in Washington.

3.2 Open Water—Lakes, Rivers, and Streams

Several ephemeral streams and one artificially ponded area occur within the proposed project area. Streambeds were vegetated to varying extents and all dry at the time of the field visits (June and July 2009). Typical herbaceous grass and forb species within most dry channels include Brewer's navarretia (*Navarretia brewerii*), poverty oatgrass (*Danthonia spicata*), and small tarweed (*Madia exigua*). Other channels were dominated by dense shrub and herb species including Woods' rose (*Rosa woodsii*), snowberry (*Symphoricarpos albus*), cinquefoil (*Potentilla* spp.), and Oregon checkermallow (*Sidalcea oregana* var. *procera*).

3.3 Herbaceous Wetlands

Herbaceous wetland habitats within the survey area consist of depressional wetlands dominated by herbaceous vegetation. Exposed soils were cracked, which is evident of altering drying and wetting periods. Water arrives as either snowmelt or rain. These wetlands support hydrophytic herbaceous vegetation and meet the criteria for hydric soils and wetland hydrology. Common plant species within these wetlands were creeping spikerush (*Eleocharis palustris*), Parry's rush (*Juncus parryi*), marsh cudweed (*Gnaphalium palustre*), and several sedge (*Carex* spp.) species. The non-native, annual grass ventenata (*Ventenata dubia*) had invaded most of the depressional wetlands and dominated them as they dried. Herbaceous wetlands are located within the proposed project area boundary but will not be impacted by project activities (see Appendix A, Figure 2).

3.4 Riparian

Riparian habitat is found adjacent to some of the ephemeral stream channels in the survey area. Riparian habitat is located in the transitional area between the stream channel and ponderosa pine forest. It typically consists of a dense shrub layer composed of a mixture of oceanspray (*Holodiscus discolor*), mountain spiraea (*Spiraea betulifolia*), Woods' rose (*Rosa woodsii*), and ponderosa pine. Oregon checkermallow (*Sidalcea oregana* var. *procera*) was often found in the understory of these areas.

3.5 Upland Aspen Forest

A small grove of aspen (*Populus tremuloides*) forest occurs along one drainage and around an artificially impounded pond in the southwestern portion of the survey area. Associated species include ponderosa pine, snowberry, and wild rose. This aspen grove is within the proposed project area boundary, but will not be impacted by project activities as it is located outside of the proposed project site boundary (see Appendix A, Figure 2).

4.0 Vegetation Maintenance

This section provides a set of procedures and associated BMPs to guide the routine removal and disposal of vegetation during construction and during O&M. Ongoing O&M vegetation removal will be limited to woody vegetation that could potentially interfere with safe and effective project operations. Vegetation maintenance goals for the Plan are:

- Maintain, preserve, and restore the diversity of herbaceous native plant species within the proposed project site.
- Develop and maintain native plant communities that are resistant to non-native plant invasion.

The objectives of these goals are described in described in Section 1.4. Two general categories of vegetation impact (described in Section 2.2 Construction Activities and Components and Section 2.3 O&M Activities) will occur. Construction activities are likely to be of short duration, but they will be permanent in areas where roads or structures will be constructed. Some construction activities will have more short-term impacts, such as areas used for staging or slash collection. O&M activities will continue to occur over the life of the project and are long-term impacts.

4.1 Maintain Herbaceous Plant Diversity.

Goal 1 of this plan is to maintain, preserve, and restore the diversity of herbaceous native plant species within the proposed project site during construction and O&M activities. Construction BMPs are provided in Section 7.1 to avoid impacts to plants that will not be directly and permanently removed by construction activities. These include erosion control and temporary fencing protection. In addition, site preparation will consist of clearing the existing vegetation only in those areas where construction, grading, and road improvements will occur. Temporary staging and material storage areas will be located within areas that will be required for later construction to minimize site disturbance. Site preparation will be limited to maintenance roads, the O&M facility, the substation, and the solar facility. Once the site is prepared, the installation of foundations, trackers, modules, inverter pads and enclosures, and substation foundation will use built roads. Avoiding incidental impacts to vegetation that will not be permanently impacted helps promote plant communities that are more resistant to non-native plant invasion.

As described in Section 2.3 above, woody vegetation management will be necessary to prevent interference with solar collectors. The bottoms of the solar modules will be approximately 3 feet above the ground; any vegetation taller than 3 feet or expected to exceed 3 feet in height will be removed. Approximately 10 to 15 percent of the crown cover currently on the proposed project site is commercial-size timber (larger than 8-inch dbh). Shrubs, grass, and groundcover will, to the maximum extent practicable, remain between rows and under the solar modules.

Trees within the 100-foot firebreak will be limbed up to 12 feet, as negotiated with Kittitas County Fire District 7.

Goal 2 will be discussed primarily under Section 5.0 Weed Control. However, maintaining healthy, diverse herbaceous plant communities for carbon sequestering has the added bonus of making the project site more resistant to non-native plant invasion.

The objective of this goal is to develop and implement construction BMPs that will prevent weed invasion into the project area and ensure construction impacts are limited to the smallest footprint possible.

5.0 Weed Control

Routine weed control will be required to ensure vegetation growth does not interfere with the operation of any equipment. The frequency of visits will be determined by the growth rate and density of the vegetation left on the site once construction is complete. TSR will comply with the Development Agreement, included as Attachment E of the Conditional Use Permit. TSR is also contractually bound to reclaim the site to address any damage caused by the demolition and removal of any alterations or improvements to the site, including the project.

While attempting to reach weed control goals and objectives, TSR will take a long-term, integrated approach. It will strive to reduce herbicide use over the long term while making measurable progress toward vegetation management goals over the short term. Reliance solely upon broadleaf herbicides without additional tools would be expensive, increase

health concerns, and ultimately lead to losses in native broadleaf diversity. An aggressive, creative, and fully integrated management approach to weed control will be promoted.

Table 2 lists the known non-native species currently found within the project area boundaries and the status of each as a noxious weed. This is not an exhaustive weed list and other species may be introduced onto the site during construction. Appendix B lists all current noxious weeds for Washington. Eradication of Class B weeds with reseeding of native species will be implemented to contain infestations. Control of all other non-native species from spreading and eradicating if possible is recommended in order to ease site restoration after the project facilities are removed in the future.

TABLE 2
Non-native Species Currently Known to Occur within the Proposed Project Area

Common Name	Scientific Name	Status in Washington ^a	Recommended Action
Common corncockle	<i>Agrostemma githago</i>		Control
European water plantain	<i>Alisma plantago-aquatica</i>		Control
Centauray	<i>Centaurium erythraea</i>		Control
Rush skeletonweed	<i>Chondrilla juncea</i>	Class B	Eradicate and reseed
Ox-eye daisy	<i>Chrysanthemum leucanthemum</i>	Class B	Eradicate and reseed
Bull thistle	<i>Cirsium vulgare</i>	Class C	Control
Field bindweed/ morning glory	<i>Convolvus arvensis</i>	Class C	Control
Rough hawksbeard	<i>Crepis setosa</i>		Control
Scotch broom	<i>Cytisus scoparius</i>	Class B	Eradicate and reseed
Common timothy	<i>Phleum pratense</i>		Control
Bulbous bluegrass	<i>Poa bulbosa</i>		Control
Self-heal	<i>Prunella vulgaris</i>		Control
Tall buttercup	<i>Ranunculus acris</i>		Control
Sheep sorrel	<i>Rumex acetosella</i>		Control
Yellow salsify	<i>Tragopogon dubius</i>		Control
Ventenata	<i>Ventenata dubia</i>		Control

Notes:

^a Class A Weeds: Non-native species whose distribution in Washington is still limited. Preventing new infestations and eradicating existing infestations are the highest priority. Eradication of all Class A plants is required by law.

Class B Weeds: Non-native species presently limited to portions of the state. Species are designated for control in regions where they are not yet widespread. Preventing new infestations in these areas is a high priority.

Class C Weeds: Noxious weeds which are already widespread in Washington or are of special interest to the state's agricultural industry. The Class C status allows counties to enforce control if locally desired.

6.0 Revegetation

Existing trees with a diameter at breast height (dbh) of 3 inches or greater will be replanted at a 3:1 ratio. Although there is no legal requirement for this mitigation, TSR is committed to undertaking efforts that will further the long-term sustainability of the land. These two measures may provide greater carbon sequestration, wildlife habitat, and soil stabilization opportunities than are currently available onsite. On the other hand, if trees are stocked too heavily, elk forage habitat values decrease, fire dangers increase, and forest health issues increase. In order to address locations where these trees can be planted, TSR will coordinate with the TAC (Kittitas County, WDNR, and WDFW).

The Forest Practices Act (FPA) requires 150 or more well-distributed, vigorous, undamaged seedlings per acre of commercial tree species (the site is dominated by Ponderosa Pine) 3 years post harvest. As a general rule, a stand is replanted within 1 or 2 years after harvest. Beyond this, the FPA does not have a specific stocking standard related to forest health or fire issues. Further standards will be developed by the TAC.

6.1 Agency Coordination

TSR is forming a TAC to address mitigation for tree replacement (TAC commitment letters are provided in Appendix C). TSR will plan and coordinate meetings between these stakeholders to discuss and formulate a planting plan and to determine acceptable final goals for a monitoring plan. At a minimum, the planting plan would include the following elements:

- Determine suitable parcels for planting, both upland areas and areas along the Teanaway River, including riparian and upland buffers will be considered.
- Define areas for ponderosa pine planting so that plantings would not result in overstocking areas just to meet total numbers. Suitable stocking rates for ponderosa pine forest in this area are 150 trees per acre.

The TAC includes at a minimum TSR, Kittitas County, WDNR, and WDFW.

6.2 Monitoring

Once plantings are in place, the success of plantings will be monitored annually for 3 years by TSR by installing monitoring plots. Plots will be monitored for seedling survival for the duration of 3 years. If the viable seedlings meet or exceed 150 stems 3 years post planting, the site is considered fully stocked and WDNR will close the FPA permit. An annual monitoring report will be sent to Kittitas County, WDNR, and WDFW, at a minimum

6.3 Revegetation Guidance

6.3.1 Temporary Disturbance Seeding

Areas temporarily disturbed by construction activities, including the areas under solar arrays, will be revegetated with native species. Annual revegetation monitoring will be undertaken to ensure that all seeded revegetation sites meet a minimum cover standard of 70 percent cover composed of predominantly native species within 3 years. A general seeding mixture consisting of 12 pounds per acre of pure live seed (PLS) from a certified

weed-free source will be planted on disturbed sites at a ratio of 4 pounds of bluebunch wheatgrass (*Pseudoroegneria spicata*), 2 pounds of Idaho fescue (*Festuca idahoensis*), 2 pounds of prairie junegrass (*Koeleria macrantha*), 2 pounds needle-and-thread grass (*Hesperostipa comata*), 1 pound of arrowleaf balsamroot (*Balsamorhiza sagittata*), and 1 pound of silky lupine (*Lupinus sericeus*).

6.3.2 Road Decommissioning during Construction

Several small roads segments located near wetlands will be abandoned during construction of the project to avoid impacts to the wetland resource.

6.3.3 Decommissioning

Per the Development Agreement (Attachment E of the Conditional Use Permit) TSR will return the site in good condition and, at the landowner's request, to remove any or all of the project's components. For more details on project decommissioning, see Attachment E of the Conditional Use Permit. TSR will also reclaim the site to address any damage caused by the demolition and removal of any alterations or improvements to the site, including the project. Decommissioning could include removing all facilities and roads. It is likely to include reseeding and replanting areas disturbed by construction activities at the project site with a diverse mix of native plants. If some of the species currently on site, particularly the forb species, are not readily available commercially, this agreement could require seed collection to fulfill the intent of the decommissioning language.

7.0 Best Management Practices (BMPs) and Mitigation Measures

7.1 Construction BMPs and Mitigation Measures

BMPs will be implemented during construction to avoid and reduce temporary and permanent impacts to the extent practicable. In the event that a state or federally listed threatened or endangered plant or wildlife species is observed during project development, work will be halted immediately and a qualified biologist notified.

BMPs will be implemented wherever surface disturbances occur. These measures include, but are not limited to, the following:

- Trees will generally be harvested to a stump level of 6 to 12 inches above ground level. TSR will obtain a permit from the WDNR and contract with a professional forester to harvest these trees in accordance with the Forest Practices Act.
- It is TSR's intent not to burn woody debris, slash, or logging refuse. Any woody debris chipped on site will be put to a beneficial use (e.g. chipped material will be sent to a compost facility, used for paper or ground cover). If burning is necessary, TSR will secure the necessary permits from the regulatory agencies and no more than approximately 130 consumable tons of material will be burned.
- Slash production from logging will use a chipper, such as the Hydro-ax, to de-limb and process slash and small trees. This will be done in confined staging areas on or next to proposed or current roadways. The resulting chips could be used as composting chips,

ground cover, or erosion control material, or taken to a mulch center for recycling. Kittitas County has a new compost center north in Ellensburg, which is approximately 25 miles from the project site. No slash or brush piles permanently left on the project site to inadvertently impact herbaceous vegetation cover.

- All trees, shrubbery, and other vegetation not designated for removal will be protected from damage caused by the project construction.
- Areas of temporarily disturbed by construction activities will be seeded with the specified seed mix.
- Install filter bags, sediment fences, sediment filter fabric traps, and graveled construction accesses as necessary for erosion control, where possible.
- Cover stockpiles with impervious materials when unattended or during rainfall.
- Locate construction staging areas for storage, maintenance, and fueling of construction equipment minimum of 150 feet from creeks or wetlands. Show staging areas on the construction plans.
- Petroleum products and other harmful material will be prevented from entering wetland or waterways at all times.
- Upon completion of construction, seed or plant all areas of temporary disturbance due to construction activities with native plants.
- Erect construction fencing along buffered boundaries of all wetland and riparian areas and aspen groves within the proposed project site prior to construction to avoid inadvertent impacts to these habitats.
- Monitor areas used for staging after construction to determine if impacts to these areas are temporary. If weeds invade or native plants on these sites appear to be dead or unhealthy the year following construction, weeds will be controlled and these areas will be overseeded with the same seeding mixture described for other disturbed areas.
- Where seeding is necessary, seeding mixture consisting of 12 pounds of PLS from a certified weed-free source will be planted on this prepared surface at a ratio of 4 pounds of bluebunch wheatgrass (*Pseudoroegneria spicata*), 2 pounds of Idaho fescue (*Festuca idahoensis*), 2 pounds of prairie junegrass (*Koeleria macrantha*), 2 pounds needle-and-thread grass (*Hesperostipa comata*), 1 pound of arrowleaf balsamroot (*Balsamorhiza sagittata*), and 1 pound of silky lupine (*Lupinus sericeus*).

7.2 Operations and Maintenance BMPs and Mitigation Measures

7.2.1 Noxious Weed Control

The following BMPs for noxious weed control will be presented to the Kittitas County Noxious Weed Control Board (NWCB).

- Weed monitoring and any necessary control efforts will be completed annually.
- Ground application of herbicides will be with a dripless wand applicator carried over the site either on foot in a backpack sprayer or in a tank on a rubber-tired all-terrain

vehicle (ATV). Herbicide(s) used will be limited to types that do not move through the soil and whose affect is immediate but short-lived. Herbicide(s) used will be approved for use near or in wetlands to avoid unintentional affects to aquatic species.

- Herbicide mixes will be colored with dye to aid in post-application monitoring.
- The first pass of each application will be made parallel to the buffer zones in such a way that chemicals cannot drift into the buffers.
- Wetland buffers will be maintained and are described in detail in Attachment B, *Wetland Delineation Report*.

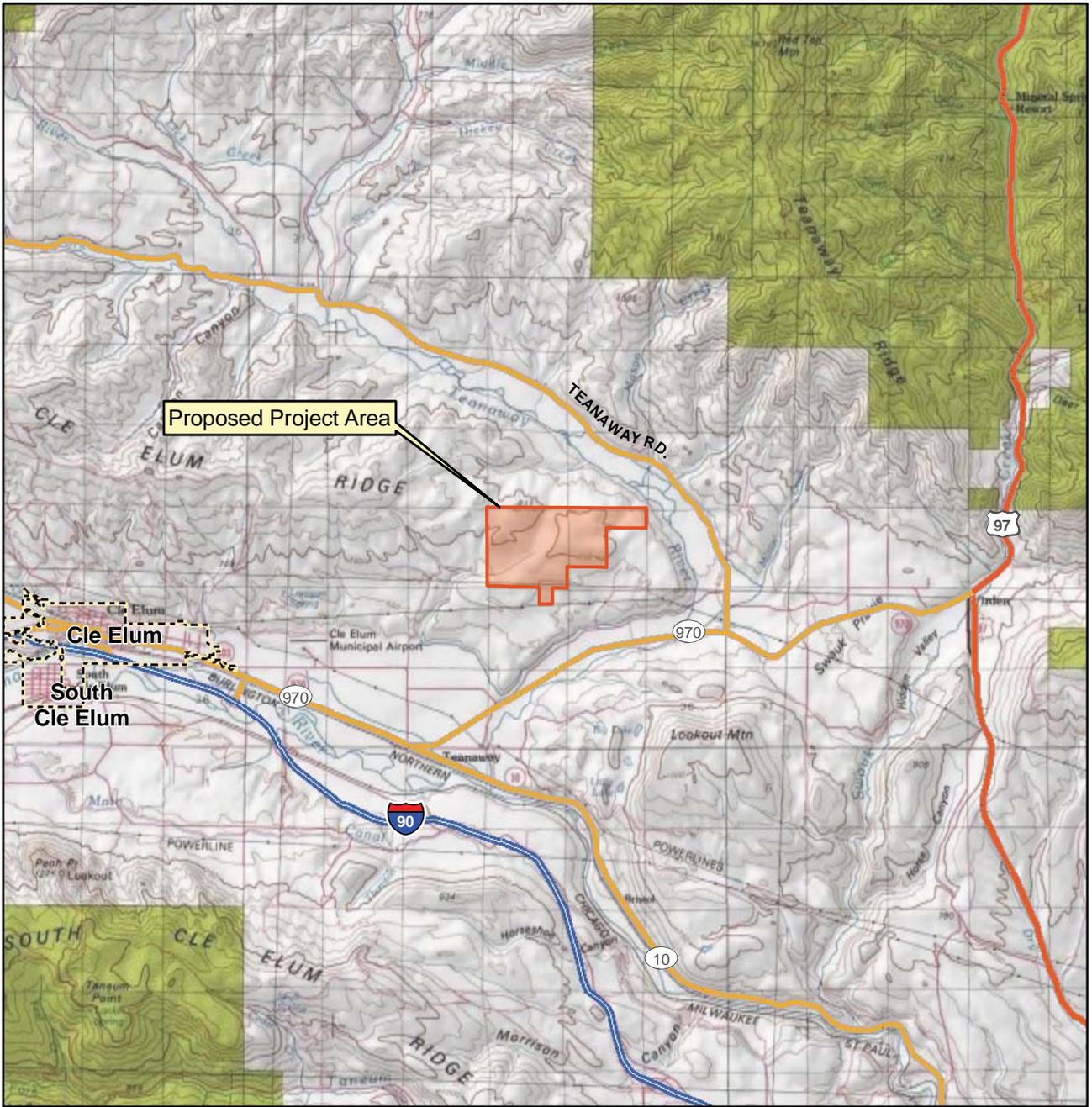
8.0 References

CH2M HILL. 2010. *Sensitive Species Surveys for the Teanaway Solar Reserve Kittitas County, Washington*. February.

Chappell, C.B., R.C. Crawford, C. Barrett, J. Kagan, D.H. Johnson, M. O'Mealy, G.A. Green, H.L. Ferguson, W.D. Edge, E.L. Greda, and T.A. O'Neill. 2001. "Wildlife Habitats: Descriptions, Status, Trends, and System Dynamics." *Wildlife-Habitat Relationships in Oregon and Washington*. D.H. Johnson and T.A. O'Neil, managing directors. Oregon State University Press, Corvallis. Pages 22-114.

Washington Department of Fish and Wildlife (WDFW). 2009. *Washington Department of Fish and Wildlife Wind Power Guidelines*.

APPENDIX A
Figures



VICINITY MAP

LEGEND

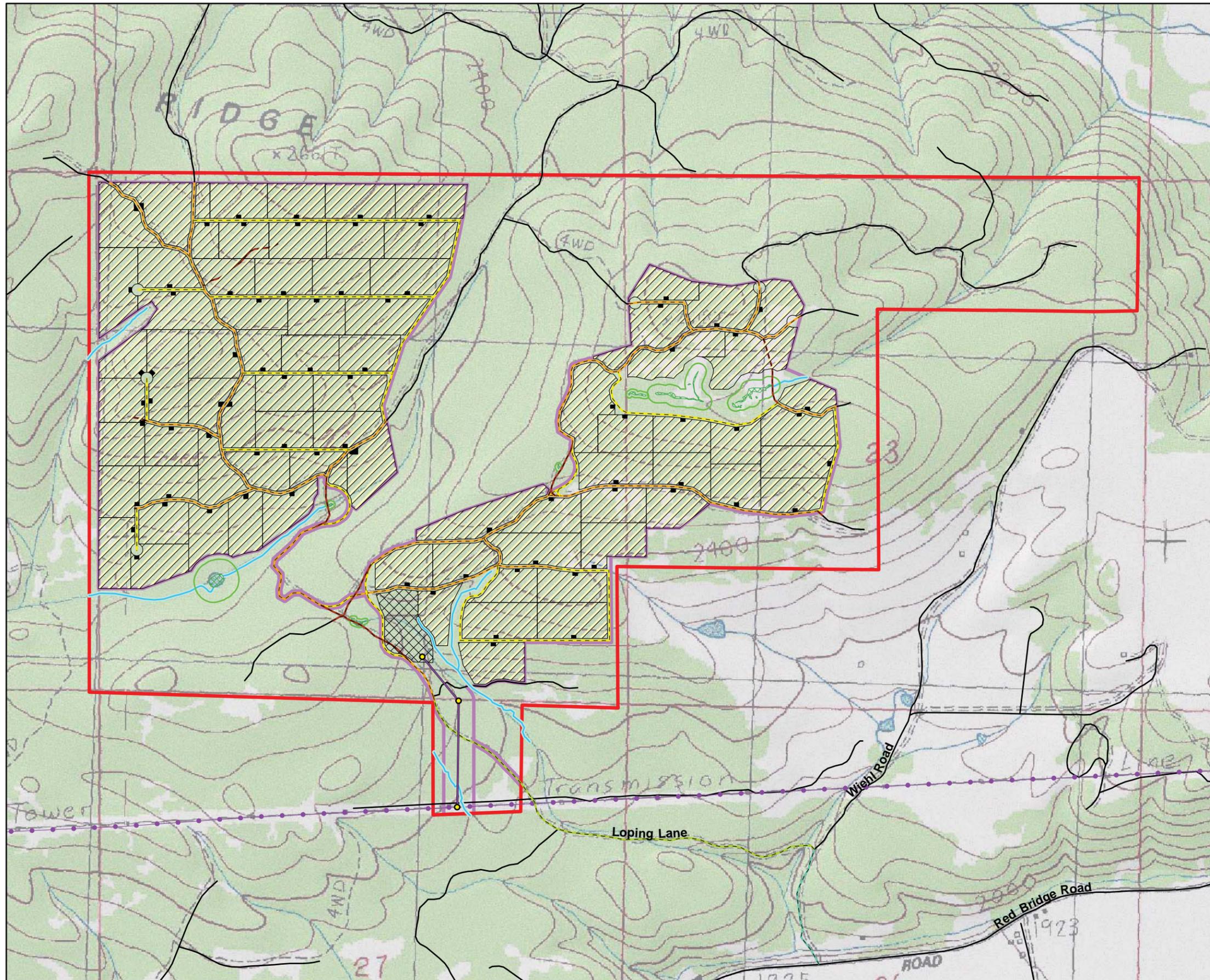
-  Proposed Project Area
-  City Boundary
-  Interstate
-  Highway
-  Major Road

Note:
1. USGS 100K Quadrangle: Wenatchee.



FIGURE 1
Vicinity Map

Vegetation Management Plan
Teanaway Solar Reserve
Kittitas County, Washington



- LEGEND**
- Proposed Project Features**
- ☐ Proposed Project Area (982 Acres)
 - ☐ Proposed Project Site (477 acres)
 - ▨ Proposed PV Array Block
 - Proposed Field Inverter and Field Transformer
 - ⊠ Proposed Substation/O&M Facility
 - Proposed Transmission Line
 - Proposed Transmission Structure
 - ↗ Proposed Maintenance Road
 - ↘ Proposed Improved Maintenance Road
 - ↗ Existing Maintenance Road (Planned Decommissioning)
 - ↘ Proposed Improved County Access Road
 - ↘ Proposed Improved Private Access Road
- Existing Features**
- Existing BPA Transmission Line and ROW
 - ↗ Existing Road
 - ~ Stream
 - ~ Stream Buffer
 - ⊠ Wetland
 - ~ Wetland Buffer

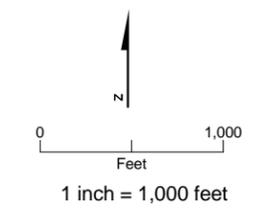
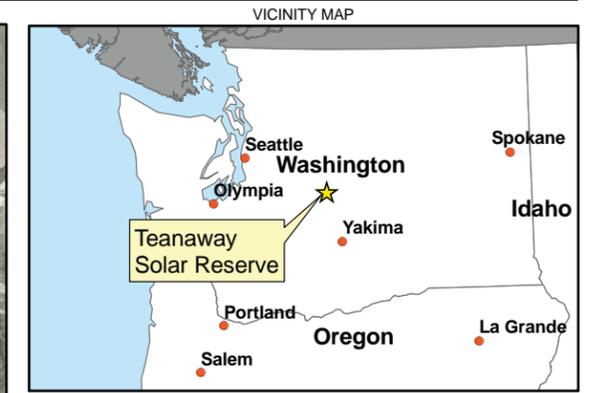
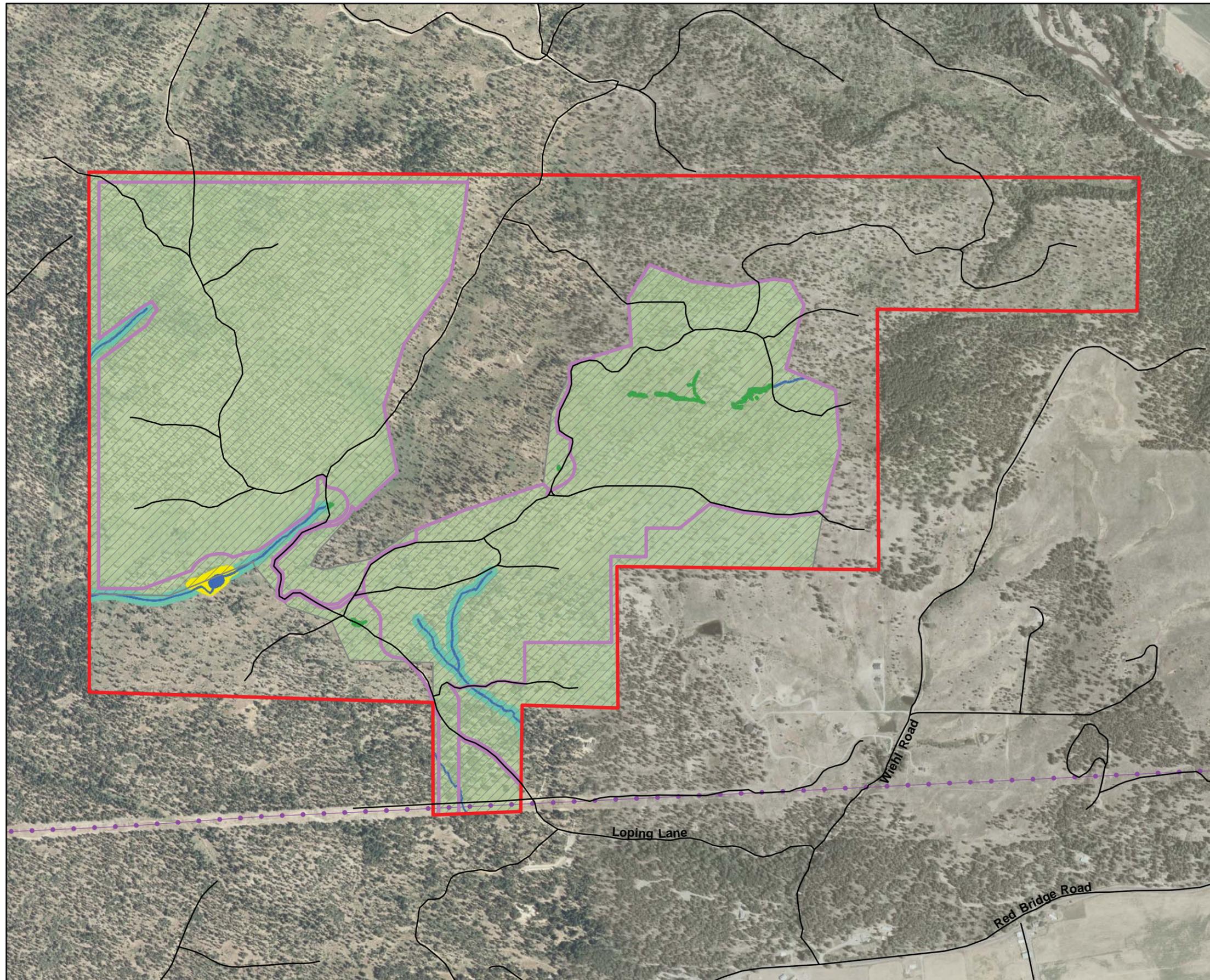


FIGURE 2
Proposed Site Layout
 Vegetation Management Plan
 Teanaway Solar Reserve
 Kittitas County, Washington



- LEGEND**
- Proposed Project Area (982 Acres)
 - Proposed Project Site (477 acres)
 - Biological Survey Area
- Habitat**
- Herbaceous Wetlands
 - Open Water
 - Ponderosa Pine Forest and Woodlands
 - Riparian
 - Upland Aspen
 - Existing Transmission Line (with an approximate 150-foot corridor)
 - Existing Road

Note:
1. Aerial Imagery: 2006 1m NAIP.

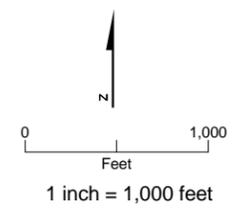


FIGURE 3
Habitat Types Within the Proposed Project Site
 Vegetation Management Plan
 Teanaway Solar Reserve
 Kittitas County, Washington

APPENDIX B

Washington Noxious Weeds (2009)

Noxious Weeds are non-native plants introduced to Washington State that can be highly destructive, competitive, and difficult to control. These plants invade our croplands, rangeland, forests, parks, rivers, lakes, wetlands, and estuaries causing both ecological and economical damage that affects us all. Noxious weeds can:

- Lower crop yields
- Reduce forage quality
- Destroy plant and animal habitat
- Displace native plants
- Reduce recreational opportunities (e.g., fishing, hunting, swimming and hiking)
- Clog waterways
- Decrease land values
- Increase erosion and wildfire risk
- And some are toxic to humans and livestock

To help protect the State's resources and economy, the Washington State Noxious Weed Control Board adopts a State Noxious Weed List each year (WAC 16-750). This list classifies weeds into three major classes – A, B, and C – based on the stage of invasion of each species and the seriousness of the threat they pose to Washington State. This classification system is designed to:

- Prevent small infestations from expanding by eradicating them when they are first detected
- Restrict already established weed populations to regions of the state where they occur and prevent their movement to un-infested areas
- Allow flexibility of weed control at the local level for weeds that are already widespread.

To learn more about noxious weeds and noxious weed control in Washington State, please contact:

WA State Noxious Weed Control Board

P.O. Box 42560
Olympia, WA 98504-2560
(360)-725-5764

Email: noxiousweeds@agr.wa.gov

Website: <http://www.nwcb.wa.gov>

Or

WA State Department of Agriculture

21 North First Avenue #103
Yakima, WA 98902
(509) 225-2604

Or

**Your local County
Noxious Weed Control Board**

**Please help protect Washington's
economy and environment
from noxious weeds!**

2009 Washington State Noxious Weed List



Shiny geranium, *Geranium lucidum*,
a new Class A noxious weed

Figure from *Deutschlands Flora in
Abbildungen* at <http://www.biolib> by
Johann Georg Sturm in 1796.
Image taken from Wikimedia Commons

Class A Weeds: Non-native species whose distribution in Washington is still limited. Preventing new infestations and eradicating existing infestations are the highest priority. **Eradication of all Class A plants is required by law.**

Class B Weeds: Non-native species presently limited to portions of the State. Species are **designated** for control in regions where they are not yet widespread. Preventing new infestations in these areas is a high priority. In regions where a Class B species is already abundant, control is decided at the local level, with containment as the primary goal. Please contact your County Noxious Weed Control Coordinator to learn which species are designated in your area.

Class C Weeds: Noxious weeds which are already widespread in WA or are of special interest to the state's agricultural industry. The Class C status allows counties to enforce control if locally desired. Other counties may choose to provide education or technical consultation.

**Class A Weeds
Eradication is required**

buffalobur	<i>Solanum rostratum</i>
common crupina	<i>Crupina vulgaris</i>
cordgrass, common	<i>Spartina anglica</i>
cordgrass, dense flower	<i>Spartina densiflora</i>
cordgrass, salt meadow	<i>Spartina patens</i>
■ cordgrass, smooth	<i>Spartina alterniflora</i>
dyers woad	<i>Isatis tinctoria</i>
eggleaf spurge	<i>Euphorbia oblongata</i>
● false brome	<i>Brachypodium sylvaticum</i>
floating primrose-willow	<i>Ludwigia peploides</i>
● flowering rush	<i>Butomus umbellatus</i>
garlic mustard	<i>Alliaria petiolata</i>
giant hogweed	<i>Heraclium mantegazzianum</i>
goatsrue	<i>Galega officinalis</i>
hawkweed, European	<i>Hieracium sabaudum</i>
hawkweed, yellow devil	<i>Hieracium floribundum</i>
hydrilla	<i>Hydrilla verticillata</i>
johnsongrass	<i>Sorghum halepense</i>
knapweed, bighead	<i>Centaurea macrocephala</i>
knapweed, Vochin	<i>Centaurea nigrescens</i>
kudzu	<i>Pueraria montana</i> var. <i>lobata</i>

meadow clary	<i>Salvia pratensis</i>
purple starthistle	<i>Centaurea calcitrapa</i>
reed sweetgrass	<i>Glyceria maxima</i>
ricefield bulrush	<i>Schoenoplectus mucronatus</i>
sage, clary	<i>Salvia sclarea</i>
sage, Mediterranean	<i>Salvia aethiopis</i>
● shiny geranium	<i>Geranium lucidum</i>
silverleaf nightshade	<i>Solanum elaeagnifolium</i>
Spanish broom	<i>Spartium junceum</i>
spurge flax	<i>Thymelaea passerina</i>
Syrian bean-caper	<i>Zygophyllum fabago</i>
Texas blueweed	<i>Helianthus ciliaris</i>
thistle, Italian	<i>Carduus pycnocephalus</i>
thistle, milk	<i>Silybum marianum</i>
thistle, slenderflower	<i>Carduus tenuiflorus</i>
variable-leaf milfoil	<i>Myriophyllum heterophyllum</i>
velvetleaf	<i>Abutilon theophrasti</i>
wild four o'clock	<i>Mirabilis nyctaginea</i>

Class B Weeds

Austrian fieldcress	<i>Rorippa austriaca</i>
blackgrass	<i>Alopecurus myosuroides</i>
blueweed	<i>Echium vulgare</i>
Brazilian elodea	<i>Egeria densa</i>
bugloss, annual	<i>Anchusa arvensis</i>
bugloss, common	<i>Anchusa officinalis</i>
butterfly bush	<i>Buddleja davidii</i>
camelthorn	<i>Alhagi maurorum</i>
common catsear	<i>Hypochaeris radicata</i>
common fennel	<i>Foeniculum vulgare</i>
common reed	<i>Phragmites australis</i>
(nonnative genotypes)	
Dalmatian toadflax	<i>Linaria dalmatica</i> ssp. <i>dalmatica</i>
Eurasian watermilfoil	<i>Myriophyllum spicatum</i>
fanwort	<i>Cabomba caroliniana</i>
gorse	<i>Ulex europaeus</i>
grass-leaved arrowhead	<i>Sagittaria graminea</i>
hawkweed oxtongue	<i>Picris hieracioides</i>
hawkweed, mouseear	<i>Hieracium pilosella</i>
hawkweed, orange	<i>Hieracium aurantiacum</i>
hawkweed, polar	<i>Hieracium atratum</i>
hawkweed, queen-devil	<i>Hieracium glomeratum</i>
hawkweed, smooth	<i>Hieracium laevigatum</i>
hawkweed, yellow	<i>Hieracium caespitosum</i>

herb-Robert	<i>Geranium robertianum</i>
hoary alyssum	<i>Berteroa incana</i>
houndstongue	<i>Cynoglossum officinale</i>
indigobush	<i>Amorpha fruticosa</i>
knapweed, black	<i>Centaurea nigra</i>
knapweed, brown	<i>Centaurea jacea</i>
knapweed, diffuse	<i>Centaurea diffusa</i>
knapweed, meadow	<i>Centaurea jacea x nigra</i>
knapweed, Russian	<i>Acroptilon repens</i>
knapweed, spotted	<i>Centaurea stoebe</i>
knotweed, Bohemian	<i>Polygonum bohemicum</i>
knotweed, giant	<i>Polygonum sachalinense</i>
knotweed, Himalayan	<i>Polygonum polystachyum</i>
knotweed, Japanese	<i>Polygonum cuspidatum</i>
kochia	<i>Kochia scoparia</i>
lawnweed	<i>Soliva sessilis</i>
lepyrodiclis	<i>Lepydiclis holosteoides</i>
longspine sandbur	<i>Cenchrus longispinus</i>
loosestrife, garden	<i>Lysimachia vulgaris</i>
loosestrife, purple	<i>Lythrum salicaria</i>
loosestrife, wand	<i>Lythrum virgatum</i>
oxeye daisy	<i>Leucanthemum vulgare</i>
parrotfeather	<i>Myriophyllum aquaticum</i>
perennial pepperweed	<i>Lepidium latifolium</i>
perennial sowthistle	<i>Sonchus arvensis</i> ssp. <i>arvensis</i>
policeman's helmet	<i>Impatiens glandulifera</i>
poison-hemlock	<i>Conium maculatum</i>
puncturevine	<i>Tribulus terrestris</i>
rush skeletonweed	<i>Chondrilla juncea</i>
saltcedar	<i>Tamarix ramosissima</i>
Scotch broom	<i>Cytisus scoparius</i>
spurge laurel	<i>Daphne laureola</i>
spurge, leafy	<i>Euphorbia esula</i>
spurge, myrtle	<i>Euphorbia myrsinites</i>
sulfur cinquefoil	<i>Potentilla recta</i>
swainsonpea	<i>Sphaerophysa salsula</i>
tansy ragwort	<i>Senecio jacobaea</i>
thistle, musk	<i>Carduus nutans</i>
thistle, plumeless	<i>Carduus acanthoides</i>
thistle, Scotch	<i>Onopordum acanthium</i>
water primrose	<i>Ludwigia hexapetala</i>
white bryony	<i>Bryonia alba</i>
wild carrot	<i>Daucus carota</i>
wild chervil	<i>Anthriscus sylvestris</i>

yellow floating heart	<i>Nymphoides peltata</i>
yellow nutsedge	<i>Cyperus esculentus</i>
yellow starthistle	<i>Centaurea solstitialis</i>

Class C Weeds

absinth wormwood	<i>Artemisia absinthium</i>
babysbreath	<i>Gypsophila paniculata</i>
black henbane	<i>Hyoscyamus niger</i>
cereal rye	<i>Secale cereale</i>
common groundsel	<i>Senecio vulgaris</i>
common St. Johnswort	<i>Hypericum perforatum</i>
common tansy	<i>Tanacetum vulgare</i>
curly-leaf pondweed	<i>Potamogeton crispus</i>
English ivy - four cultivars only	<i>Hedera helix</i> 'Baltica', 'Pittsburgh', and 'Star'; <i>H. hibernica</i> 'Hibernica'
● evergreen blackberry	<i>Rubus laciniatus</i>
field bindweed	<i>Convolvulus arvensis</i>
fragrant water lily	<i>Nymphaea odorata</i>
hairy whitetop	<i>Cardaria pubescens</i>
hairy willow-herb	<i>Epilobium hirsutum</i>
hawkweed, common	<i>Hieracium lachenalii</i>
hawkweeds, nonnative and invasive species not listed elsewhere	<i>Hieracium</i> spp.
● Himalayan blackberry	<i>Rubus armeniacus</i>
hoary cress	<i>Cardaria draba</i>
jointed goatgrass	<i>Aegilops cylindrica</i>
old man's beard	<i>Clematis vitalba</i>
reed canarygrass	<i>Phalaris arundinacea</i>
scentless mayweed	<i>Matricaria perforata</i>
smoothseed alfalfa	<i>Cuscuta approximata</i>
dodder	
spikeweed	<i>Hemizonia pungens</i>
spiny cocklebur	<i>Xanthium spinosum</i>
thistle, bull	<i>Cirsium vulgare</i>
thistle, Canada	<i>Cirsium arvense</i>
white cockle	<i>Silene latifolia</i> ssp. <i>alba</i>
yellow archangel	<i>Lamium galeobdolon</i>
yellow flag iris	<i>Iris pseudacorus</i>
yellow toadflax	<i>Linaria vulgaris</i>

- New additions to the 2009 Noxious Weed List
- Change in Noxious Weed Class

APPENDIX C
TAC Commitment Letters

Seidell, Nichole/PDX

From: MAUNEY, MARTY (DNR) [MARTIN.MAUNEY@dnr.wa.gov]
Sent: Wednesday, February 10, 2010 6:48 PM
To: Seidell, Nichole/PDX
Cc: MAUNEY, MARTY (DNR)
Subject: RE: Teanaway Solar Reserve- Vegetation Mitigation TAC

Nichole:

Thanks for the chance to talk with you and Travis Nelson this afternoon. I am looking forward to working with you on the TAC. I will be the DNR's representative on the TAC. Please let Kittitas County know this, as well as my contact information, in case they should need to get a hold of me.

Sincerely:

Marty Mauney

Forest Practices Forester
Southeast Region
Washington State Department of Natural Resources (DNR)
(509) 925-0909 (office)
(509) 856-7054 (cell)
marty.mauney@dnr.wa.gov

From: Nichole.Seidell@ch2m.com [mailto:Nichole.Seidell@ch2m.com]
Sent: Wednesday, February 10, 2010 4:21 PM
To: Nelson, Travis W (DFW); MAUNEY, MARTY (DNR)
Subject: Teanaway Solar Reserve- Vegetation Mitigation TAC

Thank you both for taking the time to discuss the TAC for the Teanaway Solar Reserve.

I appreciate your willingness to serve as a member of the TAC. As I mentioned on the phone call today, we are submitting supplemental information to Kittitas County on February 22, 2010.

If you wouldn't mind responding to this email and confirming my understanding that you (or someone from your agency) is willing to serve on the TAC, that would be a huge help to us.

Again, thanks for your time and I look forward to working with you on this project!

Nichole Seidell
CH2M HILL, Inc.
503.872.4803 (office)
503.329.2543 (cell)
503.736.2000 (fax)
nseidell@ch2m.com

From: [Nelson, Travis W \(DFW\)](#)
To: [Seidell, Nichole/PDX](#)
Subject: RE: Teanaway Solar Reserve- Vegetation Mitigation TAC
Date: Wednesday, February 10, 2010 6:55:19 PM

Nicole,

WDFW will participate in a Technical Advisory Committee (TAC) for the Teanaway Solar Reserve. WDFW involvement will be dependent upon staff availability and term of commitment.

Travis Nelson
Washington Department of Fish and Wildlife
Renewable Energy Section Manager
600 Capitol Way North
Olympia, WA 98501-1091
phone: 360-902-2390
facsimile: 360-902-2946
Travis.Nelson@dfw.wa.gov

From: Nichole.Seidell@ch2m.com [<mailto:Nichole.Seidell@ch2m.com>]
Sent: Wednesday, February 10, 2010 4:21 PM
To: Nelson, Travis W (DFW); MAUNEY, MARTY (DNR)
Subject: Teanaway Solar Reserve- Vegetation Mitigation TAC

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If you wouldn't mind responding to this email and confirming my understanding that you (or someone from your agency) is willing to serve on the TAC, that would be a huge help to us.

Again, thanks for your time and I look forward to working with you on this project!

Nichole Seidell
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503.329.2543 (cell)
503.736.2000 (fax)
nseidell@ch2m.com

ATTACHMENT H
Wildlife Mitigation Plan

Report

Teanaway Solar Reserve Wildlife Mitigation Plan Kittitas County, Washington

Prepared for
Teanaway Solar Reserve, LLC

February 2010

Prepared by
CH2MHILL



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- A Figures
- B Washington State Department of Fish and Wildlife Correspondence
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- D Washington State Elk Herd Plan, Colockum Elk Herd
- E Photos
- F Settlement Agreement with Washington State Department of Fish and Wildlife
- G Correspondence from REC Solar, Inc.

Figures (*Provided in Appendix A*)

- 1 Vicinity Map
- 2 Colockum Herd Map
- 3 Wildlife Mitigation Plan Proposed Onsite Mitigation Areas

1.0 Introduction

Teanaway Solar Reserve, LLC (TSR) submitted a Conditional Use Permit (CUP) and Expanded State Environmental Policy Act (SEPA) Checklist for the proposed project to Kittitas County on August 18, 2009. The application was deemed complete by the County on September 3, 2009. The public comment period on the CUP/SEPA ended on October 5, 2009. Comments were received from various state agencies and interested local parties. Comments were raised pertaining to the potential for the proposed project to impact elk habitat and migration. TSR prepared this technical memorandum in response to the public comments.

The purpose of this technical report is to assess the potential impacts to elk, elk habitat, and migration corridors associated within the proposed project area and to present options for mitigation measures to offset the potential impacts.

2.0 Project Background

TSR proposes to construct and operate the project on approximately 982 acres of private land within the Forest and Range (F&R) zoning district in an unincorporated area of Kittitas County, Washington (see Appendix A, Figure 1). The project will generate up to 75 direct current megawatts (MWdc) of photovoltaic (PV) solar energy utilizing approximately 477 acres of land within the proposed project area.

The purpose of the proposed project is to generate up to 75 MWdc of PV solar energy for distribution to utilities and communities seeking to optimize their renewable and sustainable energy sources. The project was conceived in response to the growing importance of and need for sustainable energy sources and the State of Washington's Renewable Electricity Standard, Revised Code of Washington (RCW) Title 19, mandate that by the year 2020, the state's largest electric utilities meet 15 percent of their retail electric load with renewable electricity (for example, wind and solar energy). The standard first takes effect in 2012 with a requirement of 3 percent through 2015, then 9 percent from 2016 through 2019 and 15 percent thereafter.

Oregon and California have adopted similar standards. Depending on the commercial terms available for the power sales, the utilities that may buy power from the project could change over time.

TSR proposes to develop the site to maximize its solar energy potential, based on its commitment to providing renewable energy and becoming the leading (in terms of energy production and environmentally sensitive development and management of its solar production site) sustainable energy production location in North America. The following factors have been analyzed to determine optimal location within the site:

- Significant solar radiation (insolation)
- Site accessibility
- Avoidance and minimization of impacts to environmentally sensitive areas
- Limited visibility from offsite locations

The proposed project will consist of the following key components (see Figure 4 in Attachment J, *Figures*):

- Solar modules
- Field inverters
- Field transformers
- Electrical conductors
- Electrical substation and switchyard
- Operations and maintenance (O&M) building supervisory control and data acquisition (SCADA) system
- Overhead interconnection transmission line
- Access and maintenance roads

Site preparation will consist of clearing the existing vegetation only in those areas where construction, grading and road improvements will occur. Site preparation will be limited to maintenance roads, the O&M facility, the substation, and the solar facility. Once the site is prepared, the installation of foundations, trackers, modules, inverter pads and enclosures, and substation foundation can begin (CH2M HILL, 2009a).

3.0 Existing Site Conditions

The proposed project area is located on Cle Elum Ridge (elevations ranging from approximately 2,200 to 2,600 feet). Due to its higher elevation, snow accumulation is greater here than in neighboring lowland habitats located to the northeast. Snowfall for Cle Elum, Washington (elevation 1,930 feet) averages 86.5 inches per year (USDA NRCS, 2002). Based on landowner comments, snow depth varies from year to year along the Cle Elum ridge.

The site is currently zoned F&R (see Figure 6 in Attachment J, *Figures*). Since the early 1900s this site has been repeatedly selectively logged. Harvests have occurred in the 1920s, 1950s, 1980s, and 2000s. Pre-commercial thinning occurred in the decades between logging. Prior to 1900 the site had a fire frequency of 9 to 12 years, indicating that a healthy understory and small trees did not exist, creating a park-like stand of larger trees that were fire resistant to low intensity periodic fires. The site was most recently selectively logged in 2001 and existing site vegetation consists of low grasses, shrubs, and plants with scattered 50- to 60-foot, 6- to 18-inch-diameter ponderosa pine (*Pinus ponderosa*) trees. Shrub and riparian plant communities are predominantly snowberry (*Symphoricarpos albus*) and Rose (*Rosa spp.*) bushes. Herbaceous plant communities are predominantly Lupine (*Lupinus seiceus*), yarrow (*Achillea millefolium*), arrowleaf balsamroot (*Balsamorhiza sagittata*), and various grass species. Wetland plant communities are dominated by rushes (*Juncus spp.*), sedges (*Carex spp.*), wild onion (*Allium douglasii*), and various grass species (see Appendix E for site photographs).

All streams and wetlands observed during site reconnaissance in early June 2009 were dry within the upper 20 inches, with the exception of a pond (W12) located in the southwest corner of the proposed study area (CH2M HILL, 2009b). No snow was observed along the top of Cle Elum ridge during June surveys.

CH2M HILL biologists conducted reconnaissance-level surveys for rare plant and wildlife species throughout the area. The purpose of the surveys was to identify potential

populations of special status species and to determine whether proposed project activities will affect these populations. The reconnaissance level surveys identified 81 plant species, 12 wildlife species, and 5 habitat types on the site. During field surveys in June 2009, six cow elk were observed in forested areas near the northwest boundary of the proposed project area. No state or federally listed endangered or threatened species were observed in the survey area during field surveys. Three habitat types in the survey area, Upland Aspen, Riparian, and Herbaceous Wetlands, are considered Washington Priority Habitats (Aspen Stands, Riparian, and Freshwater Wetlands). Because these habitats comprise only a small portion of the survey area, direct impacts to these habitats from construction and operation of the project will be avoided. Indirect impacts on wildlife habitat function would likely occur in situations where a freshwater wetlands and streams are avoided but surrounded by solar panels. The approximately 0.2 acre upland aspen stand is located in the southwest corner of the project site and is more than 200 feet from the edge of any proposed solar facilities.

4.0 Available Elk Literature and Data

TSR coordinated with local researchers and state agencies in an attempt to compile data and studies regarding the effects of solar facilities on large game, in particular elk. Information regarding elk use of the proposed project area is limited and, in some cases, contradictory.

4.1 Colockum Elk Herd

The proposed project area is within the area occupied by the Colockum elk herd (see Figure 2 in Appendix A). The Colockum elk herd range covers over 1,600 square miles between the Columbia River to the east and the Cascade crest to the west and U.S. Highway 2 to the north and Interstate 90 (I-90) to the south (WDFW, 2006) (Figure 2). The proposed project area is located within the western portion of the Colockum elk herd range where approximately 15 percent of the herd use 614,450 acres occurs (Figure 2). The proposed project area represents 0.0016 percent of the 614,450 acres.

According to the Colockum Elk Herd Plan, developed by WDFW and included here as Appendix D, the majority of elk summer in the Naneum, Swauk, and Teanaway drainages. The eastern edge of the proposed project area is located within the Teanaway drainage. The Naneum and Swauk drainages are located approximately 5 and 12 miles to the east of the proposed project area, respectively. Some of the Cle Elum elk may migrate north in the summer, but surveys and casual observations suggest the majority do not make long movements (WDFW, 2006). Other landowner observations state that the large herds of elk move to higher elevations along the Cle Elum Ridge in June and return in October (see Appendix C).

Although no elk migration studies have been conducted within the proposed project area, most Colockum elk display distinct seasonal migration patterns (WDFW, 2006). They generally move northwest to higher elevations during the summer (Bracken and Musser, 1993). With the progression of winter, snow accumulation causes elk to move southeast and use more arid, lower-elevation ranges, including lowlands adjacent to the Teanaway River (WDFW, 2002 and WDFW, 2005). The Teanaway River is located approximately 1 mile east of the proposed project area. Bracken and Musser (1993) estimated 90 percent of the

Colockum elk winter in an area bounded by Colockum Creek, the Columbia River, Rocky Coulee, and the 1,281-meter (4,200-foot) elevation contour west to Naneum Creek. Small subherds also winter near Cle Elum, between Peshastin and Colockum Creeks, and along the Wenatchee River (WDFW, 2006). These winter ranges are located approximately 12 miles east of the proposed project area.

WDFW rated summer foraging habitat in elk management areas adjacent to the Cle Elum ridge as being in fair to good condition (WDFW, 2002). Studies indicate that foraging habitat for elk will continue to decline in Washington as private and public forests are being managed for old growth establishment (WDFW, 2002). Clear cutting practices create openings where food plants preferred by elk grow in abundance. In contrast, the closed canopy typical of old growth forests limits the abundance and diversity of browse plants. The proposed project site is currently zoned F&R; it was most recently selectively logged in 2001 and existing site vegetation consists of low grasses, shrubs, and plants with scattered 50- to 60-foot, 6- to 18-inch-diameter ponderosa pine (*Pinus ponderosa*) trees.

A population objective of 4,275 to 4,725 animals was identified for the Colockum elk herd in the Game Management Plan (WDFW, 2006). Since 2001, the number of animals estimated on the surveyed winter range has declined. The February 2006 estimate on the surveyed winter range was 3,145 to 3,465 elk. The survey data suggests a declining trend since 1995, but wide variances for estimates prior to 2000 make analysis difficult.

4.2 Elk Use in the Vicinity of the Proposed Project Area

4.2.1 Washington Priority Habitats and Species and WDFW

According to Washington Priority Habitats and Species (PHS) data, no critical areas or habitat for elk exist within the proposed project area (WDFW, 2009). Elk habitat is shown to the northeast of the proposed project area, across the Teanaway River. This likely represents known winter range because the area is at lower elevation and is south-facing. Mark Teske of WDFW states, "The location of the proposed solar reserve is a location that WDFW would submit for designation as a critical area and a habitat of local importance for wintering deer and elk. Currently, Kittitas County code recognizes winter range only on public lands."

Based on phone conversations with WDFW Biologist Gary Koehler, elk inhabit forested areas east of the project area on south-facing slopes along the Teanaway River in the winter and avoid the higher elevation portions of the Cle Elum ridge where the proposed project is located and the snow is deep in the winter. Koehler stated that elk can be anywhere on the ridge, but prefer the lower ridge slopes, especially the east side (south face) slopes facing the river (Koehler, 2009). Elk in the proposed project area likely migrate to lower-elevation habitats located along the Teanaway River in October (WDFW, 2009a). Mark Teske/WDFW stated that the proposed project area is a habitat of local importance for wintering deer and elk (Teske, 2009).

In the Teanaway drainage, to the east of the project area, elk typically move onto irrigated hay (timothy, alfalfa) fields in August as the range dries, and stay in the area through fall if permitted. In the winter, as snow depth builds, haystack damage can be a problem as a result of elk. In the southern portion of GMU 335, some individuals are feeding elk and

encouraging animals to reside next to agricultural fields that elk damage. Local Teanaway farmers and ranchers have reported recent increases in elk populations (WDFW, 2006).

4.2.2 Local Landowner Observations

Elk have been reported by landowners to occupy the northeast corner of the proposed project area along south facing slopes (see Appendix C). Reported elk movements in this area coincide with research that suggest elk often travel parallel to ridgelines and sometimes along stream drainages (Kie et al., 2005).

4.3 Elk Food and Cover Requirements

In spring and summer, when food is plentiful, elk are mainly grazers – eating grasses, sedges, and a variety of flowering plants. In fall, elk increasingly become browsers, feeding on sprouts and branches of shrubs and trees, including conifers as a last resort when snow covers other plants. During fall and winter, elk continue to eat grasses when these are available and not covered by deep snow. Elk require a mix of open meadow habitat for foraging, and dense stands of mature forest for thermal regulation, shelter, and hiding cover. Foraging habitat is usually composed of open areas with less than 40 percent tree canopy closure.

Elk are hardy animals that have few physiological needs for cover. They do, however, use cover during extreme weather, to assist with thermoregulation on sunny winter days, to avoid hunters, or when they are harassed. Cover also conceals newborn calves from predators. Hiding cover is used year round but is critical during calving, the first months of a newborn calves life, and during the hunting season. Elk typically use hiding cover when resting. Adequate cover consists of vegetation patches that will conceal 90 percent of a standing elk's body at a distance of approximately 200 feet or less. Thermal cover is most often used during the winter to moderate extreme temperatures. Forest stands typically consist of trees 40 feet or more in height, with 70 percent or greater canopy closer. Ideal elk habitat includes productive grasslands, meadows, or clear cuts, interspersed with closed-canopy forests. Research has found that elk avoid using clearings over 1,200 feet wide due to the lack of immediate cover (World Forestry Center, 1992).

4.4 Elk Avoidance of Roads

Elk avoidance of roads has been documented in many studies throughout the West (Lyon, 1979 and 1983; Perry and Overly, 1976; Rost and Bailey, 1979; Ward et al., 1973). Human presence along roads displaces big game species such as elk as well as other species sensitive to human presence from otherwise useable habitat, especially during the day. Elk in Montana prefer spring feeding sites away from visible roads (Grover and Thompson, 1986) and both elk and mule deer in Colorado prefer areas greater than 660 feet from roads during the winter (Rost and Bailey, 1979). Lyon (1983) studied the effects of roads on elk distribution and habitat use. He reported that within blocks of available elk habitat, road densities of only 2 miles of primitive (undeveloped) road open to vehicle traffic per square mile resulted in elk displacement from over 50 percent of the available habitat in the areas with roads present. The avoidance was due to human disturbance and the resulting lack of security for the elk.

5.0 Effects of the Proposed Action

Potential impacts on elk, and elk habitat associated with construction and operation of the proposed project includes removal and loss of habitat associated with clearing vegetation communities and construction activities. The primary effect from project construction would be the fragmentation, alteration, and removal of elk habitat. Due to the lack of knowledge regarding the potential impacts of solar energy development on elk, it is difficult to predict with certainty the effects of the proposed project on elk. The potential effects of the proposed project on elk is summarized below and was based on a thorough understanding of the proposed project and a review of the existing scientific literature and best available science on the habitat and migration preferences of the species.

Approximately 477 acres of potential habitat will be utilized within the proposed 982-acre project area. Solar arrays will be placed on approximately 399 acres. The 477 acres is considered a direct impact that will last the duration of the project. The literature and best available science suggest that elk behavior may be adversely impacted indirectly within an additional 312 acres by project developments and human activity. Therefore, the direct and indirect impacts resulting from the proposed project will occur within 789 acres of the 982-acre project area. The remaining 193 acres will be preserved as onsite habitat mitigation for the term of the lease (see Appendix A, Figure 3).

During construction, elk would likely avoid the site due to disturbance associated with construction equipment and other human activity. Construction-related disturbance is expected to be limited to the construction period time frame. Clearing vegetation would eliminate and modify existing elk habitat. Such impacts on habitats would displace and/or eliminate elk that currently depend on this vegetation. Once vegetation has been removed, elk displaced into adjacent habitats may be unsuccessful in colonizing nearby suitable habitats because these areas could already be occupied. The increased stress of competition for limited resources and susceptibility to predation may cause displaced animals to perish or to displace other individuals that in turn may perish. Elk currently using the project area would be adversely affected by this loss of habitat

There are very few estimates of carrying capacity for herbivores in the literature because they can fluctuate two- to threefold on an annual basis due to changes in precipitation, which directly effects growth of vegetation (Edge, 2009). Therefore, it is difficult to accurately determine how the loss of foraging habitat due to the placement of the solar panels will impact on the Colockum elk herd. Based on the lack of shelter (sparse tree canopy), and relatively high elevation (2,200 to 2,600 feet), the 982-acre proposed project area may be interpreted as being less suitable winter elk habitat than surrounding areas that contain denser tree stands (not recently logged), and lower elevations where less snow accumulates.

Phillips et al. (2001) documented that high disturbance levels during the elk calving season, decreased productivity by 27 percent (WDFW, 2002). The proposed project area occurs approximately 3 miles southeast of mapped elk calving areas. During project construction, quality wintering, calving, and migration corridor habitat typically associated with elk (river bottom, floodplain, riparian, and forested upland habitat) will not be disturbed.

However, as indicated earlier, elk avoidance of roads due to human disturbance is well documented. This type of disturbance would be greatest in more open areas of the project area where line-of-sight distances are longer and escape cover is limited. Lyon (1983) reported that within blocks of available elk habitat, road densities of only 2 miles of primitive (undeveloped) road open to vehicle traffic per square mile resulted in elk displacement from over 50 percent of the available habitat in the areas with roads present. The 982-acre project area includes about 7 miles of existing roads, or 4.5 miles of roads per square mile. This is more than double the road density cited by Lyon (1983) that displaced elk from over 50 percent of the available habitat in the areas with roads present. Additional new roads would be constructed and maintained. Therefore, elk would likely be displaced from those parts of the project area where humans perform daily maintenance and security operations. Displacement from a buffer area around human activity would also occur.

At the completion of construction, spacing between solar panels, open travel corridors and access to existing wetlands, and native plant revegetation may permit elk the opportunity to graze and traverse areas within the proposed project's boundaries at night when humans are absent. Elk were observed grazing, resting and walking, with few observations of running or alarmed behavior at the Wild Horse Wind and Solar Facility during the first year of post-construction monitoring. Elk were observed on ridges and or in ravines and near turbines, or directly underneath turbines (Erickson et al., 2008).

5.1 Proposed Impact Avoidance and Mitigation Measures for Wildlife and Habitat

5.1.1 Measures Intended to Avoid and Minimize Impacts

The proposed design of the project incorporates numerous features to avoid and/or minimize impacts on elk and elk habitat. These features are based on site surveys, experience at other similar projects, and recommendations from consultants, agencies, and experts performing studies at the site. TSR has reached an agreement with WDFW on mitigation measures, as outlined in the settlement agreement in Appendix G. Features of the project that are designed to avoid or minimize impacts on elk and elk habitat include:

- Ongoing coordination with agency, and private landowner's will be pursued to find ways that further minimize TSR-related impacts to the Colockum elk herd and enhances elk habitat within the vicinity of the TSR project area.
- The project footprint is designed to avoid possible migration routes identified by landowners and densely forested winter habitat along the Teanaway River corridor in an effort to minimize impacts to elk movement.
- No project facilities will be placed within any riparian corridor, wetland, or stream, essentially leaving these areas undisturbed for elk forage and movement use. However, the narrow width of these areas and the fact that they would be surrounded by the solar array would likely limit use by elk.
- Artificial lighting will be directed toward project facilities to avoid light disturbance to surrounding wildlife mitigation areas and potential wildlife corridors.

- TSR has been designed to use existing transmission corridors and roads to the maximum extent possible. Linear facilities (such as collector cable routes, transmission line routes, or access roads) will be located in or adjacent to existing disturbed corridors in order to minimize project footprint, habitat fragmentation, and habitat degradation.
- Electrical conductors between solar modules will also be installed underground to minimize impacts to elk movements. Electrical conductors from the array field to the field inverters will be supported above-ground within the solar module framework and installed per National Electrical Code standards. Collector lines between the field transformers and the substation will be below grade.
- Overall site selection will avoid all areas with documented endangered, threatened species.
- Following joint recommendations from USFWS and WDFW, no fencing will be erected along the project boundary (Draft Meeting Notes, 2009). Both agencies raised concerns in a July meeting regarding maintaining access to important elk calving and foraging habitats and migratory corridors on the TSR.
- A planned solar panel located between the two major solar array fields in the southwest portion of the project area was removed to allow local elk movement between the two major arrays.
- The proposed project site will be restored to approximate or improved pre-project conditions including removal of solar modules and infrastructure when the project ceases operation. Surrounding lands with similar habitat will be used as reference sites to guide restoration.
- Protect all trees, shrubbery, and other vegetation not designated for removal from damage during project construction.
- Install filter bags, sediment fences, sediment filter fabric traps, and graveled construction accesses as necessary for erosion control.
- Prepare and implement a Stormwater Pollution Protection Plan (SWPPP)
- Reseed all areas temporarily disturbed by construction activities, as agreed upon with landowners or as required to meet elk habitat goals. Where installed, sediment fences and check dams will remain in place until the affected areas are well vegetated and the risk of erosion has been eliminated.
- During project construction, vehicle servicing and refueling will occur offsite in a temporary staging area equipped for fuel or oil spills.
- Onsite vehicles will be monitored for petroleum leaks.
- Spills will be cleaned up immediately upon discovery and reported to the appropriate agency.
- Any hazardous waste material generated by project construction or operation will be disposed of in a manner specified by local and state regulations or by the manufacturer. Concern has been expressed by WDFW that the panels may contain hazardous

materials. TSR contacted the manufacturer regarding the contents of the panels and a response letter from REC Solar is included as Appendix F.

- Cleanup materials will be kept readily available onsite, either at the equipment storage area, O&M building or on the construction contractor's trucks.
- Speed limits on access roads will be reduced to 20 miles per hour in order to minimize vehicle strikes.

5.1.2 Proposed Mitigation Measures

The *Washington Department of Fish and Wildlife Wind Power Guidelines* (WDFW, 2009c) suggest two fundamental mitigation approaches for mitigating permanent impacts to habitats by wind energy projects: Mitigation "by fee" and, secondarily, acquisition of replacement habitats. The project will permanently impact 477 acres of Class II habitat, requiring a mitigation value of 2:1, or 954 acres, under the Guidelines. Approximately 193 acres of the remaining 505 undeveloped acres within the project area will be considered mitigation habitat. Accordingly, the Guidelines require that TSR provide mitigation for 761 acres through fee or habitat acquisition ("Mitigation Obligation").

Consistent with the *Wind Power Guidelines* (WDFW, 2009c), TSR may satisfy its Mitigation Obligation either by purchasing mutually acceptable mitigation habitat and deeding it to WDFW or a mutually acceptable third party, contributing money to a mutually acceptable third-party that owns or will purchase mitigation habitat, or by paying to WDFW a fee of \$1450.00 per acre in lieu of other offsite mitigation. WDFW and TSR agree that in utilizing any of the proceeding approaches for TSR to satisfy its Mitigation Obligations, proximity and similarity of the mitigation habitat to the habitat permanently impacted by the project shall be a priority. If TSR has not satisfied its Mitigation Obligation prior to commencing construction, TSR will provide a letter of credit to WDFW in an amount sufficient to provide financial security for its obligation. TSR will be required to satisfy its Mitigation Obligation prior to commencing commercial operation of the project. A Settlement Agreement has been drafted and is pending review by WDFW. Once WDFW review and approval is received, this Settlement Agreement will be mailed to Kittitas County to be included as part of the record. A placeholder for the Settlement Agreement is included as Appendix G to this document.

5.1.3 On-Site Mitigation

TSR proposes to protect, for the life of the project, one Category II area of similar elk habitat within the proposed project area. This privately owned parcel, approximately 193 acres in size, is located in the northeastern portion of the proposed project area. The proposed mitigation area is adjacent to the largest wetland complex and only perennial water source within the proposed project area, allowing elk access to water (Figure 3). This proposed area was chosen based on discussions with WDFW personnel and a review of WDFW guidelines for appropriate mitigation for elk habitat (Harvester, 2010).

Several existing roads located within the northeast parcel which are not used to access WDNR property, will be restricted for general use to minimize human impacts on elk. Elk use of lands adjacent to the TSR project area would also be restricted to some degree by daily human presence and activity within the TSR project area. This would increase the

effective size of the impact area by limiting the value of existing habitat and any habitat enhancement actions within several hundred feet of the project area. Therefore, a visual barrier will be planted and maintained along the northern boundary that will consist of local native trees and shrubs.

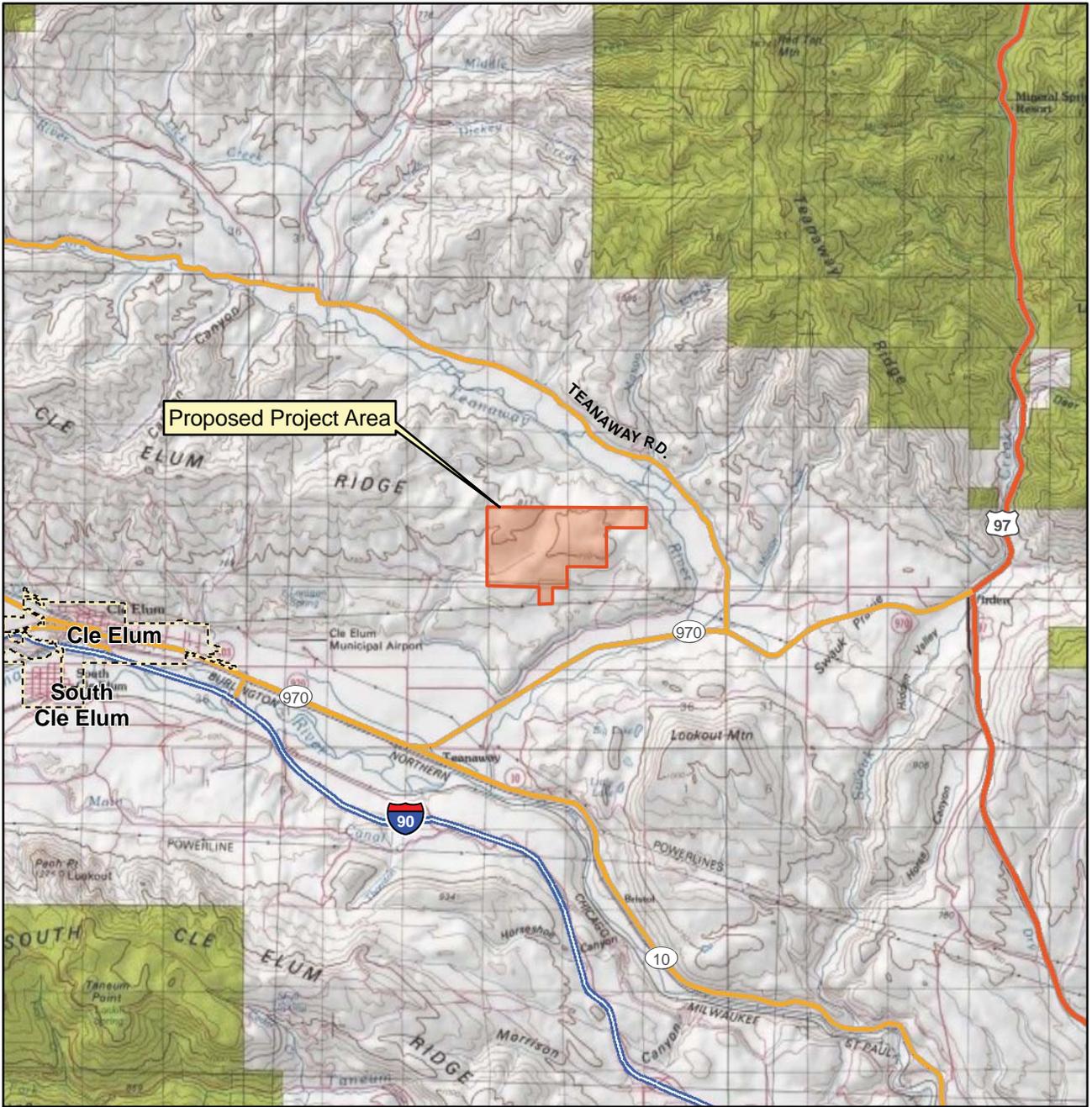
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APPENDIX A
Figures



VICINITY MAP

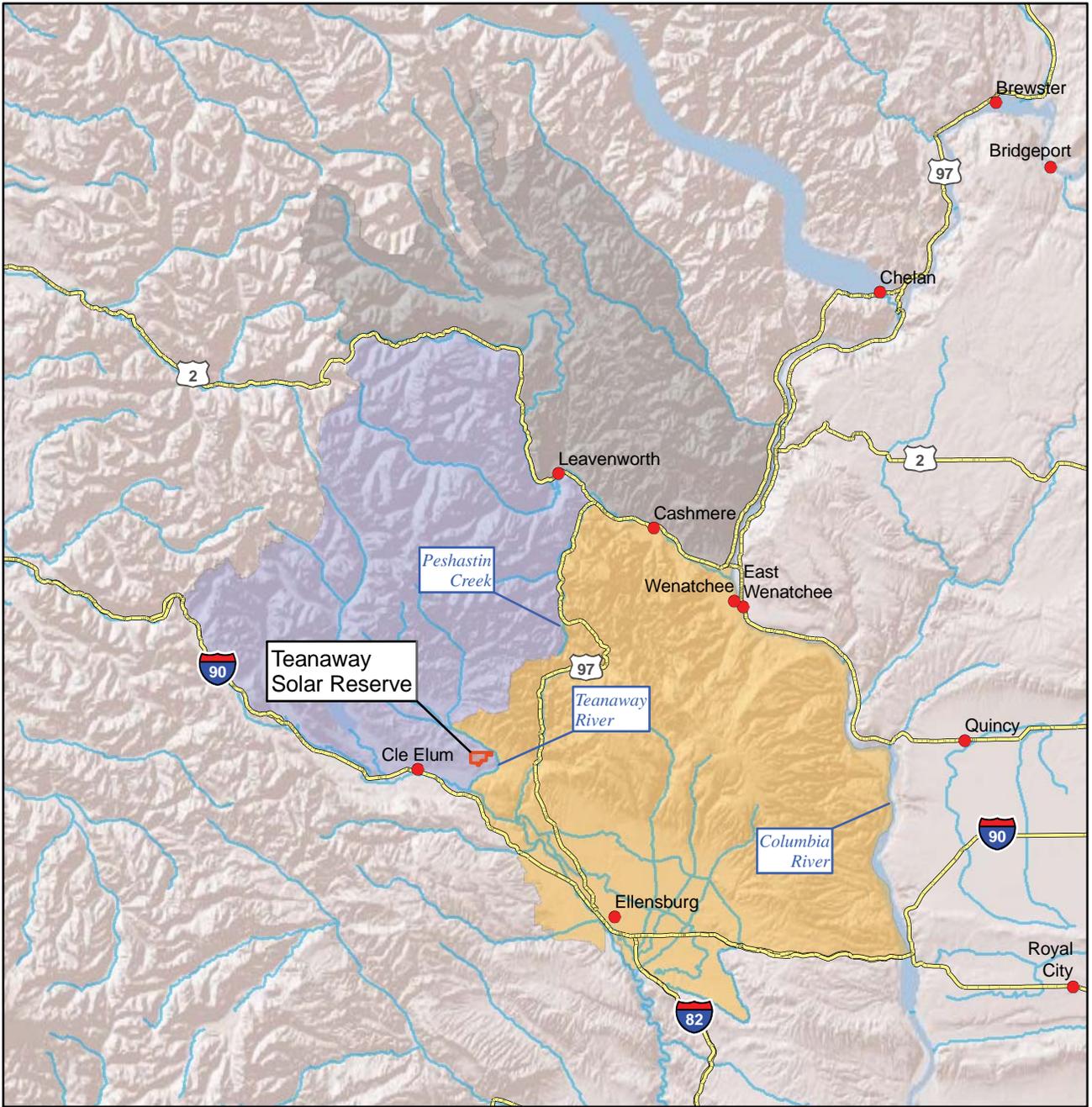
LEGEND

-  Proposed Project Area
-  City Boundary
-  Interstate
-  Highway
-  Major Road

Note:
1. USGS 100K Quadrangle: Wenatchee.



FIGURE 1
Vicinity Map
Wildlife Mitigation Plan
Teanaway Solar Reserve
Kittitas County, Washington



VICINITY MAP

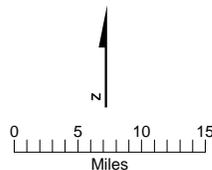
LEGEND

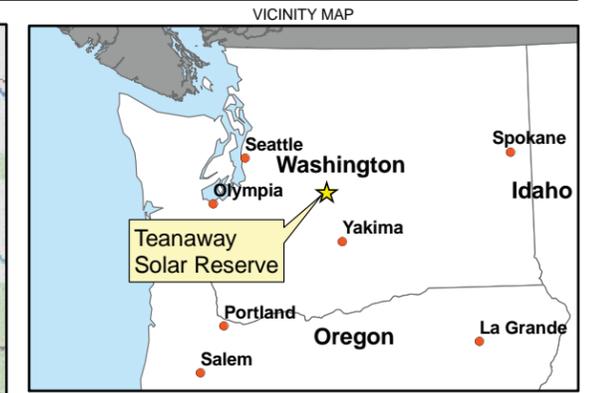
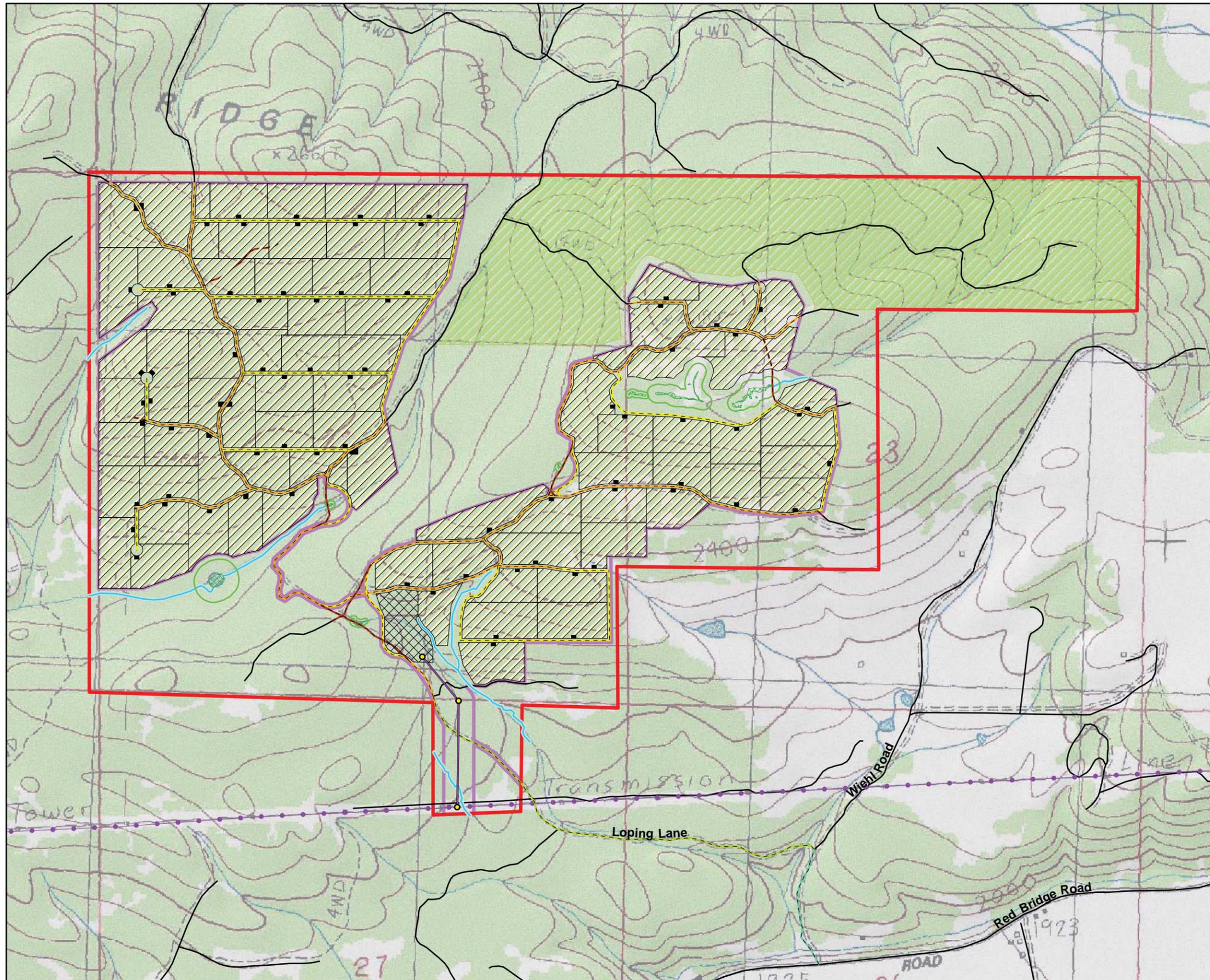
-  Proposed Project Area
-  City
-  Highway
-  River or Stream
- Colockum Herd Area
 -  15% Use (614,450 acres)
 -  85% Use (759,195 acres)
 -  Managed to Minimize Elk (510,225 acres)



FIGURE 2
Colockum Herd Map

Wildlife Mitigation Plan
Teanaway Solar Reserve
Kittitas County, Washington





- LEGEND**
- On-site Mitigation Area (193 Acres)
 - Proposed Project Features**
 - Proposed Project Site (477 acres)
 - Proposed Project Area (982 Acres)
 - Proposed PV Array Block
 - Proposed Field Inverter and Field Transformer
 - Proposed Substation/O&M Facility
 - Proposed Transmission Line
 - Proposed Transmission Structure
 - Proposed Maintenance Road
 - Proposed Improved Maintenance Road
 - Existing Maintenance Road (Planned Decommissioning)
 - Proposed Improved County Access Road
 - Proposed Improved Private Access Road
 - Existing Features**
 - Existing BPA Transmission Line and ROW
 - Existing Road
 - Stream
 - Stream Buffer
 - Wetland
 - Wetland Buffer

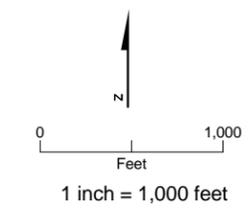


FIGURE 3
On-site Mitigation Area
 Wildlife Mitigation Plan
 Teanaway Solar Reserve
 Kittitas County, Washington

APPENDIX B

**Washington State Department of Fish
and Wildlife Correspondence**



State of Washington
Department of Fish and Wildlife

1701 South 24th Avenue • Yakima, Washington 98902-5720 • (509) 575-2740 FAX (509) 575-2474

September 28, 2009

Ms. Anna Nelson
Kittitas County
Community Development Services
411 N. Ruby St. Suite 2
Ellensburg, WA 98926

RE: Supplemental Explanation of Attachment to Teanaway Solar Reserve comments submitted on September 16th (CU -09-00005).

Concern has been expressed regarding what is depicted in the map titled “*Cougar locations in vicinity of proposed solar reserve*”, which was attached to and submitted with our comment letter. The data is from “Project CAT”, a research project, involving Washington Department of Fish and Wildlife (WDFW) scientists, a carnivore research institute, and the Cle Elum School District. There were 2116 total cougar locations (shown as red dots) identified from GPS collars in the map. The collars were set to provide location signals at four to six hour intervals. The data has not been analyzed or interpreted yet.

The map included 1693 locations from two females between 2003 and 2008 (Cougar #1, 2003-2007 and Cougar #2, 2005 -2008). Of these, 72 percent of the locations occurred between November and April (winter), and 28 percent of the locations occurred from May through October (summer).

The map also included 423 locations from five male cougars between 2002 and 2008. However, only two of the five males were major contributors to the location data points as the others were on the periphery of the map. Of the male cougar locations, 76 percent occurred between November and April (winter) and 24 percent of the locations occurred between May and October (summer).

Thank you for the opportunity to provide these comments. If you have any questions regarding these comments, please feel free to contact me at (509) 457-9314.

Sincerely,

Perry Harvester
Region 3, Habitat Program Manager

APPENDIX C

Landowner Correspondence

September 17, 2009

Ms. Anna Nelson
Kittitas County Community Development Services
411 N. Ruby, Suite 2
Ellensburg, WA 98926

RECEIVED

SEP 18 2009

Kittitas County
CDS

3-20-09

Re: Application of Teanaway Solar Reserve LLC
For Conditional Use Permit (CUP)
Teanaway Solar Reserve (CU-09-00005)

Statement of Position: The Application to site a massive photovoltaic solar generating project, including 400,000 solar panels on 1.5 square miles of beautiful and productive forest land which is prime habitat for many birds and animal species, including the large Teanaway elk herd, is inappropriate and should be denied. A 15 day public comment period for this Application is totally inadequate and should be extended to 90 days. In addition, the expanded SEPA checklist filed by the Applicant is inadequate and flawed. The Applicant should be required to conduct a full environmental impact study (EIS) for its proposed project with ample opportunity for public review and comment before any determination on the Conditional Use Permit is made.

Dear Ms. Nelson:

This letter is written in response to the Notice of Application of Teanaway Solar Reserve LLC for a CUP to build a major industrial solar reserve power plant on 982 acres of land, which is located on land zoned Forest and Range. Pine Hills Ranch is the owner of 500 acres immediately adjacent to the east boundary of the proposed solar site. While we recognize the importance of solar and other alternative energy technologies for meeting our future energy needs, we believe the site chosen is inappropriate and incompatible with the historical character of the whole area, with the current uses of the site, with the important wildlife habitat that the site and surrounding area provide and with the current uses of the surrounding property ownerships.

The project area as described by the Applicant consists of 982 acres, or about 1.5 square miles. The surface of the panels alone would cover about 160 acres (400,000 panel x 17.1 square feet per panel / 43560 square feet per acre) without even considering the added panel structures, posts, concrete footings, substations, access roads and other infrastructure related to the project, which will be sited on south sloping (in some cases steep) terrain. This industrial project will have a devastating impact upon the wildlife and mixed Ponderosa forest and meadows on the site and cause severe impacts on its surrounding neighbors and the general area, including potentially the Teanaway River.

In light of these impacts, it is totally inappropriate to allow only 15 days for comment on the CUP Application and expanded SEPA checklist for this project, which will be huge in scope and, according to the Applicant, will be the largest of its kind in the United States and possibly

world. The current comment period should be enlarged to 90 days to give the public reasonable opportunity to comment. It is also inappropriate for the County to apparently prejudge the SEPA review by stating in the Notice that "the County expects to issue a Determination of Non-Significance (DNS)" when the Application with its hundreds of pages of documentation was just received on August 18, 2009, and other parties have not even had a chance to comment, let alone read it. This statement is particularly egregious because the Applicants filing contains many "conceptual" representations, which make analysis of the impacts of where and how the proposed improvements will actually be constructed difficult, if not impossible, for both the County and impacted property owners to evaluate. Many of the SEPA responses provided by Applicant are either incomplete or inaccurate, and the Applicant has made no attempt to verify their data.. The construction of a huge industrial energy production facility in the middle of a beautiful and productive forest and meadow ecosystem which hosts a large wildlife population is not appropriate. This type of project requires the undertaking of a full environmental impact review (EIS) for the project.

Given the short time period for responses and the unclear dividing line between issues relating to the Conditional Use Permit, the Development Agreement, and the SEPA review, our comments will be general and will apply to all of these documents. Pine Hills Ranch, specifically and without limitation, reserves the ability to raise new issues as they arise. Further, Pine Hills Ranch, specifically and without limitation, reserves and does not waive its ability to appeal all aspects of this project, including the County's procedural and substantive SEPA decisions, the Board of Adjustments approval of the project and the County's entry into the Development Agreement.

A. Pine Hills Ranch. Pine Hills Ranch LLC consists of 3 cabins located on about 500 acres of forest and meadow, extending from Weihl Road on the south to the Teanaway River on the north. Our road access is from Weihl Road.. We abut the solar reserve as proposed on its east and northeast borders. Our property, which has been used for forestry, open space, agriculture and recreation is owned by 11 families. The property was acquired in the late 1960s, so we have a long term familiarity with the proposed solar site, as well as our own property. In the early years, cattle were grazed on our property and the solar site (Boise Cascade property then) by a local rancher. Over the years we have hiked, skied, and biked on the proposed site. We have also held or hosted a number of orienteering meets using the site in conjunction with our own property. In fact, the Cascade Orienteering Club created a very detailed and expensive map (with several recent updates) of the whole area for a national meet held there and for many subsequent meets, all done with the permission of the land owner. In excess of 2000 participants have crossed the site during these events. A copy of the revised 1994 orienteering map with Applicant's Figure 5 Conceptual Site Layout placed on it is provided as Attachment A. (Please note that an arrow indicates True North, while the map's vertical lines are oriented to magnetic north for orienteering purposes). Over the years, Boise Cascade did some of the logging on our property, and on several occasions we allowed them to move their logs across our property. We love the land and try to manage it in an environmentally sound manner. We do not allow hunting on our property, and it therefore is somewhat of a sanctuary for the abundant wildlife that lives on and crosses our property, much of it coming from or going to or through the proposed solar site.

B. Proposed Solar Site. Contrary to the discussion in some of the Applicant's supporting materials, the proposed site is a special property with an open pine forest with lovely wetlands and meadows. In the spring, the land is green and full of flowers. As discussed in a later section, birds and animals can be found throughout the area. This land has always been used as commercial forest with some cattle grazing. In recent years, the pine forest has been badly overcut in our opinion, and particularly on the south, dry slopes it has suffered. Trees grow slowly at this elevation, but the property is beginning to heal, with many new seedlings coming up. Aerial photographs of the site provided by the Applicant give the appearance of very few trees, but there is much more cover when viewed from ground level. As noted previously, the site has been overcut, but there are still many trees of various ages, and it remains an open Teanaway ponderosa forest. Looking at aerial photographs in the Applicant's filing, our property line is obvious because of the denser forest cover on our side. See Attachment B (Applicant's Figure 5, Conceptual Site Layout). Forestry requires a long term horizon in the Teanaway area. As detailed in the next section, in addition to its uses as a commercial forest, the property has been and is continuously used for recreation by neighbors and many in the Cle Elum community.

C. Recreational Uses. As opposed to the discussion in Applicant's Application (see SEPA Checklist p.36), the site area has been used by neighbors and people from the Cle Elum community for recreation in ways that don't interfere with forestry operations for as long as we have been neighbors, and probably long before. The site is often hiked, biked and visited by bird and flower enthusiasts. Many ride horses through it, including Flying Horseshoe Ranch down in the valley and other horse groups. Hunters frequent the site during hunting season, looking for deer, elk and bear, which has on occasion caused us problems when they stray on to our property where we do not allow hunting. As previously discussed, many orienteering meets have been held on the property. Thus, if the Applicant actually enforces a prohibition on public access to the site, there will be a significant loss of public access and recreational opportunities.

D. Plant Life. We are not in a position in this short comment period to comment on endangered plants on the site (unlike the Applicant, we have not had unlimited time to prepare materials for this proceeding). However, as noted by Applicant, there are a number of meadows and wetlands on the site. Some of these areas dry up with the heat of late summer and some stay wet. In many areas the plant life stays green and the soil damp long after the surface water is gone. They again recharge with the fall rains. These areas are frequented by wildlife. If these areas are surrounded by arrays of solar panels, roads and other solar infrastructure, they will be substantially impacted either by the flash run-off of water from solid surfaces or by the diversion of water resulting from these structures. (See also G. Hydrology). It is also doubtful that these sites will continue to attract the deer and elk, and this issue should be studied as part of an EIS.

E. Animals. The area of the proposed solar site has sizable populations of birds, reptiles and mammals. The site is generally similar to our property in terms of the wildlife on the site. Wildlife are not concerned with property lines, unless there is fencing, and there currently is no fencing. During the day, one regularly sees red-tail hawks soaring over the site looking for mice or other small animals, and at night it is the sound of owls hooting. All sorts of birds, raptors including hawks, owls and occasional eagles, quail, wild turkey, deer, elk, coyotes, cougar and bear frequent the site. We do not know if there are spotted owls or other endangered birds on the

site, but Applicant's brief and superficial survey does not adequately address this possibility.

Applicant's wildlife field studies also failed to establish wildlife baselines for the different seasons of the year, even though the variety and numbers of a given species can change dramatically by season. For example, that is a major reason why in Applicant's SEPA checklist, its consultants found few deer and elk on the site. They conducted animal field studies on June 16-19 and July 9, 2009, which is the beginning of the hot summer months, particularly on the site's south facing slopes. While the many small mammals may stay put during the day and wait for cooler evenings, the larger mammals such as deer and elk that do stay around simply move back and forth to avoid the heat of the day. They will then move through Applicant's site, as they do on our property, in the evening or in the early morning and then move to the cooler, more heavily forested areas on the north facing slopes or down to the Teanaway River during the heat of the day. Consequently, it is not surprising to see few deer or elk, let alone predators, during the day during hot summer months.

Of course, some of the deer and many of the elk do migrate to the higher country during the summer months, but they are on the proposed solar site and our property more months than they are gone. We typically see the larger herds move back in early October, and many remain into June, with some stragglers staying through most of the summer. Animal field studies done in late June and July will therefore miss, as they did in this case, the big herds that are resident for much of the year.

Applicant's characterization that the elk winter down by the Teanaway River is also only partially true, and it depends a great deal on the snow cover. With increasing development in the valley and along the Teanaway River, they appear to have moved more into the uplands, which include the solar site. The south facing slopes of the solar site often lose their snow cover early which provides easier access to food. It is not unusual to count 40-50 elk in our field, and on one occasion I lost count at 130 elk. The elk don't care about property lines, and they move daily across our property and the solar site, as well as other properties. The tracks from the herd leading in to the solar site are easy to spot in the snow.

The solar site also provides habitat for predatory animals such as coyotes, cougar and bear, which frequent the proposed site along with our property. I have observed a coyote den on the site within the proposed eastern setback area near our property line. We have also observed cougar tracks and bear scat on the site. Cougar have large territories and tend to follow the movements of the deer and elk herds. We have seen them on our property, and I have confirmed their presence on our and the adjacent site through the tracking program of Project CAT. We found 5 winter kills of deer or baby elk on our property alone this spring.

The bottom line of this discussion is that deer and elk and their associated predators are far more prevalent on the solar site for much more of the year than indicated by Applicant's field studies. And the species and number of birds will also vary with the season. For example, we see and hear more owls in the late fall and winter when the Great Horned Owls move south. If the Applicant's animal study had been done at various intervals throughout the year, there would have been significantly more large mammals observed. We believe that Applicant's study conducted over a five day period in one year is wholly inadequate to truly gauge the impact of this huge project on animals in the area .

F. Fencing/Access. The issue of fencing is a very important issue in the discussion of the effects of the project on wildlife. As we have already discussed, there are large populations of deer and

elk, as well as the predators that follow them, that move on a daily basis on and across the site. Some of these animals also seasonally migrate in the late spring to the higher country and return in early fall. The 982 acre project site extends from the populated south side located around the upper end of Wehl Road up across Cle Elum ridge and down to the Teanaway River, or about a mile. The site extends east-west almost 2 miles at its widest point. If the site was fenced, the wildlife on and around the site would be decimated.

On the other hand, Applicant states that there will not be public access to the site and that the gate will be locked. Without fences, how will the Applicant keep out the same public that has traditionally used the site in the past, when they state that the same 'no public access' policy was in effect?. A major difference, of course, is that in the past there were only trees on the site. The proposed project will place millions of dollars of solar panels, wiring, buildings, transmission lines and other equipment on the site. How will this be protected from vandalism, theft, target shooting? Will Applicant seek to change this policy in the future?

This issue cannot be addressed in a 'conceptual' manner. If Applicant agrees that no fences will ever be built on the site, this must be explicitly stated as an enforceable condition of the permit.

Even in the absence of fencing, Applicant has provided no evidence that deer and elk will spend much time walking or grazing under huge arrays of solar panels and between thousands of supporting structures, with maintenance and security vehicles in the area. Fire protection will require cleared areas around and under the equipment. Thus wildlife, both birds and mammals will effectively be displaced from 500+ acres of the site. The impacts of this displacement must be evaluated as part of an EIS, which addresses the issues of wildlife corridors, buffers and open areas in designing the project. We have been informed by WFW that the elk herd is currently below target levels and that there is a shortage of habitat. Applicant's project would further reduce that habitat.

In an attempt to be more specific about elk movements, regardless of the season, I have marked on attachment B (Applicant's Figure 5 Conceptual Site Layout0) our general observations of the main elk movements, both daily and seasonally, which cross our property on to the east/northeast corner of the solar site. Although they cross at virtually all points, in a general sense they move up Cle Elum ridge to the upper meadows and also onto the north facing slopes above the Teanaway River. The deer cross on to the site in more random fashion.

As attachment B shows, Applicant's "conceptual" design shows about a 500 foot setback along its eastern boundary and very little development proposed in the northeast part of their site. This fact is probably due primarily to the north facing nature of the land as it slopes down toward the Teanaway River in much of this area. Regardless of the reason, if the CUP is approved, this setback along its boundary and the northeast part of the site should be left in its natural state and set aside as wildlife corridor and wildlife open space to protect the elk, deer and predator populations. We are not very familiar with the western portions of Applicant's site and therefore do not comment on it specifically, other than to note that it is all part of the same ecosystem, and it also should be studied as part of an overall EIS.

G. Forestry. As discussed previously, the solar site has been used over the years primarily to grow timber, and the site has been logged many times. The site currently suffers the result of over-aggressive logging, but it remains valuable for forestry as well as habitat, as long as one takes a long term view of forestry. It is our understanding that the land owner wanted to cut more aggressively on the south facing slopes of the site, but was not allowed to do so. Consequently,

there remain quite a few trees serving both as seed trees and animal habitat. The solar project would presumably remove most of the remaining trees on these slopes to make way for solar panel arrays, roads and other solar infrastructure, thus eliminating valuable animal habitat, eliminating views and buffers, and creating substantial water run-off issues, which have not been addressed by Applicant.

The "artist's conception" pictures of the site distributed by Applicant as part of its public relations program show a lovely pine forest with intermingled solar panels. This is not the real life view of what this industrial site would look like after construction.

H. Hydrology. Applicant's depiction of the developed portion of its site places the majority of its panel arrays on the south facing slopes, which makes sense for photovoltaic power generation. In fact, some of these south facing slopes are quite steep. However, Applicant hardly mentions the water run-off and siltation issues that will result from the construction and maintenance of this solar facility. This run-off and silt will ultimately end up in the Teanaway River, a river that has species of fish, including Bull Trout, that are listed as threatened and/or endangered under the Endangered Species Act. Both the Teanaway and Yakima Rivers are also currently the focus of state and federal efforts to restore salmon runs.

Picture a heavy rain or snowfall, or even a combination of the two, falling on these slopes denuded of most of their trees and covered with about 160 acres of solar panels plus many additional acres of impervious surfaces for roads and other structures. The water will sheet off of the site on to properties downhill and ultimately to Red Bridge Road, the valley and the Teanaway River.

If this scenario sounds familiar, it is exactly what happened last January when the large Chinook or Pineapple Express hit the upper County, causing extensive damage to Red Bridge Road, Weihl Road, and surrounding properties and access roads, including our road. The whole hillside was a river of water and snow flowing toward the Teanaway and Yakima Rivers. And this occurred before any solar project was built! Although last January's 'event' was extreme, we have seen a number of January/February Chinooks over the years, and global warming projections indicate that there will be more of them.

The flash run-off effect of the project may also negatively impact ground water recharge. Water running rapidly off of this huge site, which has been denuded of tree cover, will not percolate slowly into the ground water, where it slowly will work its way to the valley and the Teanaway River, feeding wells along the way. This issue is already a major issue of contention between the County and the Department of Ecology, with the resulting ban on new wells.

Finally, we also have serious concerns with pollutants from the metal, alloys, plastics, lubricants, glues, etc. which may wash off of the solar structures from this huge scale project into surface water, into the wetland areas, and potentially into ground water. We have the same concern with the herbicides used to control brush and grass around and under the panels that will wash off the site.

Applicant has failed to address these issues in any meaningful way and they need to be addressed in an EIS..

I. Access. The proposed road access to the solar site comes up the lower portion of Wiehl Road and then branches west on to Loping Lane past a number of homes and undeveloped properties before reaching Applicant's gate. Weihl Road continues beyond Loping Lane for a substantial distance and provides access to a large number of homes, plus a number of subdivided lots which

have not yet been developed. Weihl Road is a public right-of-way, but it is not currently maintained by the County. It is a gravel road maintained intermittently by various land owners, but it has been in very poor condition since the January storm. We do not know the ownership of Loping Lane. Applicant paints a picture of very few homes and very little traffic on Weihl Road, which is not correct.

The proposed development of the solar site would have a very damaging impact on both Weihl Road and Loping Lane. The transit of large numbers of trucks and other heavy equipment making thousands of vehicle trips on these gravel roads over a number of years of construction and then ensuing maintenance of the facility will tear them up in the long mud and ice season and will turn them to dust storms in the dry season.

If the County decides to approve the solar project, it must require the developer to improve Weihl Road to paved County standards and the County should then accept the road and maintain it. Logic would suggest that the same should be done for Loping Lane, but we will let those owners address that issue. It should also require that Applicant provide a secondary access to its site as it requires in other developments.

J. Proposed Setbacks. Applicant has only provided a "conceptual" view of the actual solar panel placement on its site and the related project setbacks from its property lines. This conceptual representation is included as Attachment B. This attachment shows about a 500 foot setback along our joint property line. Because this is only a conceptual representation, we have no way to determine if this setback is adequate to mitigate the impacts to our property.

We believe that a larger setback will not only help to shield our property from some of the negative effects of the project but also help to provide a buffer and corridor for deer, elk and other wildlife to move up the slope to the north facing areas of the site, where Applicant shows no construction and where we have observed the most deer and elk activity. These setbacks should be made a condition of any permit and not something to be applied in Applicant's discretion.

Applicant also shows only a minimum setback of 100 feet along portions of its southern boundary which pass close to a number of substantial homes. Although we assume that this issue will be addressed by those neighbors, this minimum setback seems unreasonable in light of its direct visual impact.

K. Noise. Applicant is silent on issues about noise resulting from the project. Obviously, if the project is approved, there will be considerable machinery noise from excavators, cement trucks, dump trucks and other equipment working on, in some cases, steep hillsides during the years of the construction phase. This issues needs to be addressed.

However, nothing has been said about the noise that might be generated by 15,000 solar panel arrays moving to track the sun, resetting at the end of the day, and potentially turning in unison to dump snow load in the winter. And do 400,000 solar panels producing power on a sunny day produce a sound?

In addition, anyone familiar with the upper County is aware of the strong winds that regularly blow through the area and along the hillsides of the proposed site. Just the afternoon wind is almost a daily occurrence. What noise does the wind make when it blows through 400,000 solar panels and 15,000 solar panel arrays? Does it whistle, shriek or just sound like the wind? We don't know the answer, and Applicant hasn't addressed it, but it could have a very serious impact on neighbors, surrounding land values and wildlife.

Applicant has bragged about the size of this project as being the biggest in the United States

and maybe the world, yet it has said nothing about the noise which may be generated by the size of its project. The noise issues are required to be addressed now under our understanding of the SEPA process. Applicant should be directed to address these noise issues as part of a full Environmental Impact Study.

L. View. Applicant downplays the visual impact of its constructed solar facility in its Application. This is definitely not the case for neighbors along the south line of the project who will be looking directly at a hillside lined with solar arrays with minimal setbacks or screening. As best as we can ascertain, the visual impact of the project should not be a major issue for us, once we are on our property, provided that adequate setbacks are imposed. However, it will be very apparent to us or anyone driving on the upper portion of Weihl Road. Attachment C is a panorama picture taken from our gate on Weihl Road looking up the ridge in a northwest direction. It shows several of the homes along the south border of the project, and more are out of sight up the hill to the west. It appears that most of the trees on and close to the ridge line in the right center portion of the picture will be removed and replaced with solar panel arrays.

In addition, since we can see our property from several high points along I-90 going to or from Ellensburg, the site will be visible from a large distance once the trees adjacent to us are replaced with massive arrays of solar panels. The site will also be visible to many properties that have an elevated view of Cle Elum Ridge, which covers a considerable territory. These issues should also be evaluated in the context of a full EIS.

M. Fire Danger. Fire is a concern to all who live in or near the woods and grasslands in the Teanaway area, particularly with its summer hot, dry and windy conditions. Applicant will have a huge number of wires, electrical connections, transformers, electric substations, a transmission intertie and other electrical equipment in close proximity with acres of dry grass under its approximately 160 acres of solar panels. What facilities such as water storage, pumping facilities and fire response equipment will Applicant have on site to respond to any fires that may start on its site, so that they do not quickly spread to adjacent properties before the fire district can respond? Applicant should be required to respond to this concern as part of a full environmental impact study.

Conclusion: Applicant promotes this huge solar project as a 'green' project. We submit that it is not a 'green' project, since it displaces a productive, carbon-fixing forest and meadow ecosystem containing important and healthy wildlife habitat, including large herds of deer and elk. If this project were located in the open, arid lands by Vantage or further east or on the Hanford Reservation, it would be 'green'. Since Applicant has chosen to place its project on this inappropriate site, its proposed project and the many damaging impacts that it would create must be fully examined with a thorough environmental impact statement.

Respectfully submitted



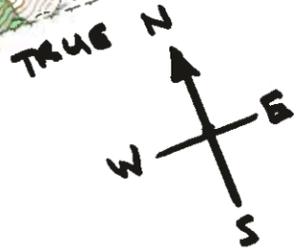
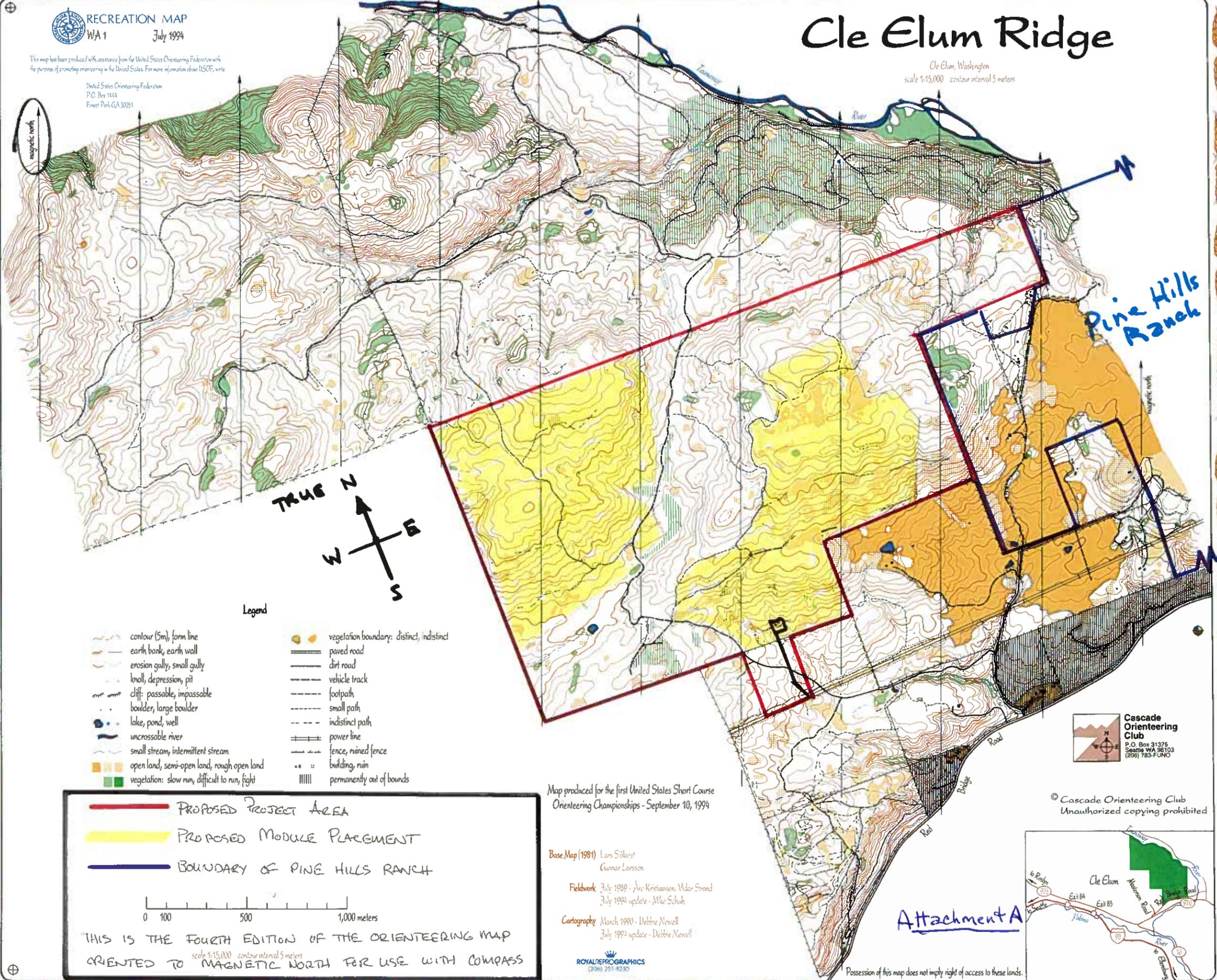
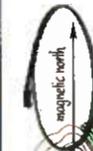
Charles Adams
General Manager
Pine Hills Ranch LLC

This map has been produced with assistance from the United States Orienteering Federation with the purpose of promoting orienteering in the United States. For more information about USOF, write:

United States Orienteering Federation
P.O. Box 1644
Forest Park GA 30051

Cle Elum Ridge

Cle Elum, Washington
scale 1:15,000 contour interval 5 meters



Legend

- | | |
|---|---|
| contour (5m), form line | vegetation boundary: distinct, indistinct |
| earth bank, earth wall | paved road |
| erosion gully, small gully | dirt road |
| knoll, depression, pit | vehicle track |
| cliff: passable, impassable | footpath |
| boulder, large boulder | small path |
| lake, pond, well | indistinct path |
| uncrossable river | power line |
| small stream, intermittent stream | fence, ruined fence |
| open land, semi-open land, rough open land | building, ruin |
| vegetation: slow run, difficult to run, fight | permanently out of bounds |

PROPOSED PROJECT AREA

PROPOSED MODULE PLACEMENT

BOUNDARY OF PINE HILLS RANCH

0 100 500 1,000 meters

THIS IS THE FOURTH EDITION OF THE ORIENTEERING MAP
scale 1:15,000 contour interval 5 meters
ORIENTED TO MAGNETIC NORTH FOR USE WITH COMPASS

Map produced for the first United States Short Course Orienteering Championships - September 10, 1994

Base Map (1981) Lars Silovst
Cunnar Larsson

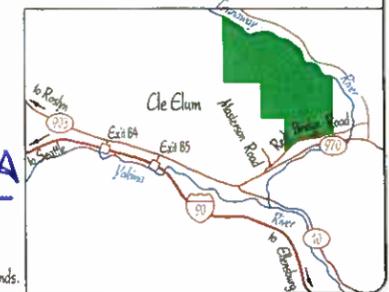
Fieldwork July 1989 - Åke Kristiansen, Vidar Strand
July 1994 update - Mike Schuh

Cartography March 1990 - Debbie Newell
July 1992 update - Debbie Newell



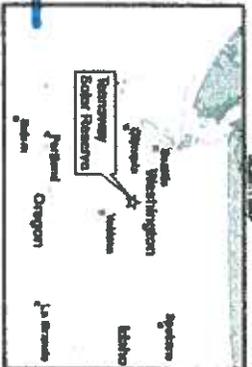
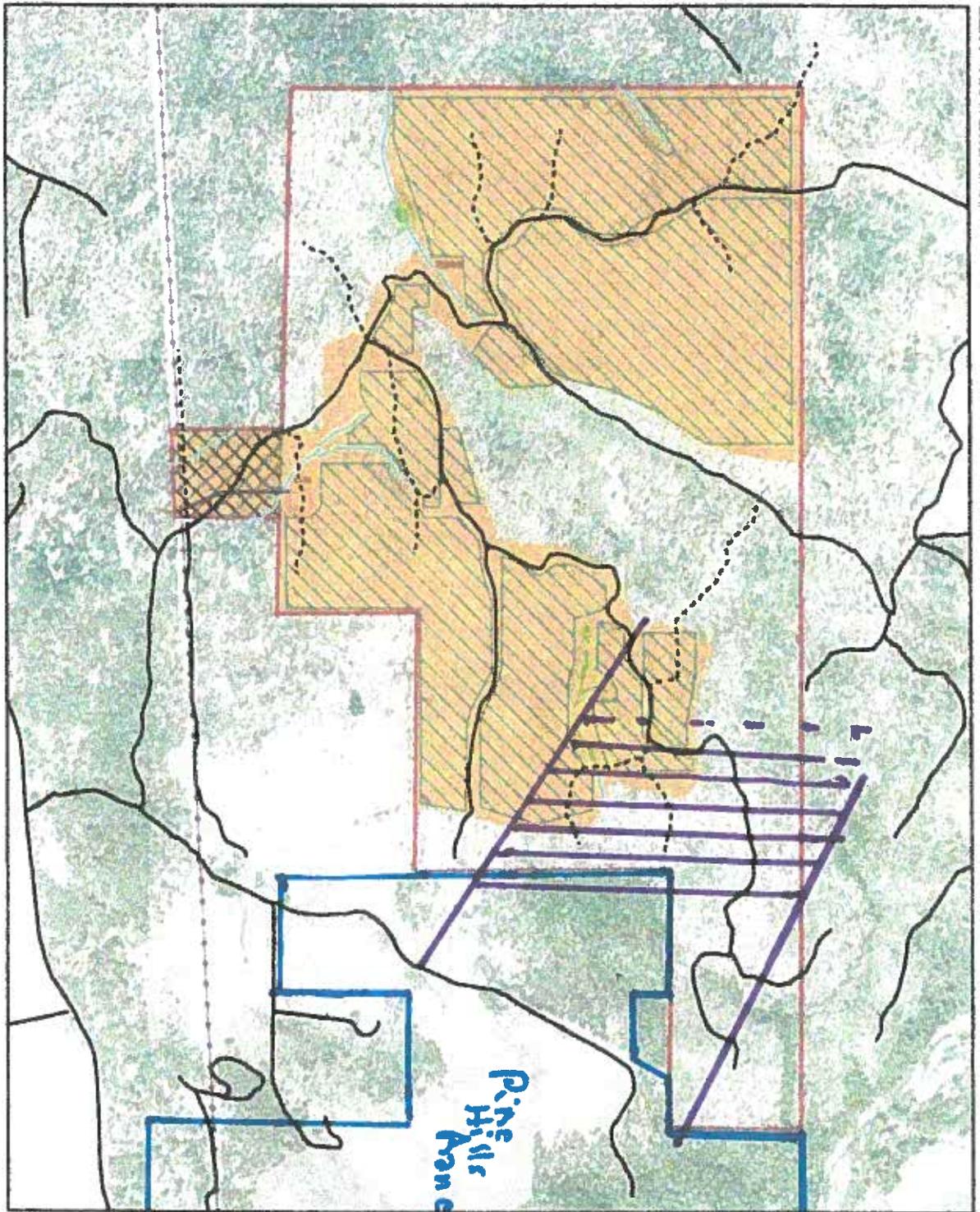
Cascade Orienteering Club
P.O. Box 31375
Seattle WA 98103
(206) 783-FUNO

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Attachment A

Possession of this map does not imply right of access to these lands.



- LEGEND**
- Proposed Project Area
 - Proposed Project Site (560 acres)
 - Proposed Powerline Route to Grid
 - Potential Module Placement Area
 - Proposed O&M Facility
 - Proposed Substation
 - Proposed Switchgear
 - Transmission and Access Corridor
 - Existing Transmission Line
 - Road
 - Minor Dirt Road
 - Wetland
 - Wetland Buffer
 - Stream
 - Stream Buffer
- Note:
1. Aerial Imagery: 2000 1m NAIP.
- Scale:
1 inch = 1,000 feet

FIGURE B
Conceptual Site Layout
Washington State Reserve
Franklin County, Washington

Attachment B

Large Panarama Picture from Pine
Hills Ranch gate looking at hillside
of solar site.

Not attached.

Attachment C

APPENDIX D

**Washington State Elk Herd Plan
Colockum Elk Herd**

Washington State Elk Herd Plan

COLOCKUM ELK HERD

**Washington Department of Fish and Wildlife
Wildlife Program
600 Capitol Way North
Olympia, WA 98501-1091**

Prepared by

Jeff Bernatowicz, District Wildlife Biologist

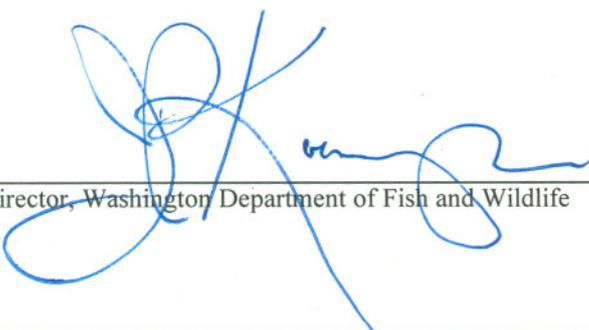
October 2006

Washington State Elk Herd Plan

COLOCKUM ELK HERD

Washington Department of Fish and Wildlife
Wildlife Program
600 Capitol Way North
Olympia, WA 98501-1091

OCTOBER 2006



Director, Washington Department of Fish and Wildlife

3/06/07
Date

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ACKNOWLEDGMENTS

The original draft of Colockum Elk Herd plan was written by John Musser (retired), Roger McKeel (retired), and Tom McCall of the Washington Department of Fish and Wildlife. Tom McCall, Jeff Bernatowicz, Edd Bracken, Pete Lopushinsky, Beau Patterson, Leray Stream (retired), Scott McCorquodale, and George Tsukamoto (retired) updated the original draft.

COLOCKUM ELK HERD PLAN

EXECUTIVE SUMMARY

The Colockum Elk Herd is the fifth largest of ten herds identified in the State. It is an important resource that provides significant recreational, aesthetic, cultural, and economic benefits to recreationists, local communities, and Native Americans. The purpose of this plan is to provide direction for the management of the Colockum elk resource for the next 5 years. The plan is subject to amendment. Priority management activities will be implemented as funding and resources become available.

There are three primary goals for the Colockum Elk Herd: (1) To preserve, protect, perpetuate, and manage elk and their habitats to ensure healthy, productive populations; (2) to manage elk for a variety of recreational, educational and aesthetic purposes including hunting, scientific study, cultural and ceremonial uses by Native Americans, wildlife viewing, and photography; and (3) to manage the elk herd for a sustainable yield.

Specific elk herd and habitat management goals, objectives, and strategies have been identified in the plan. These are priority objectives identified to address specific problems in elk management. To accomplish each objective a variety of strategies have been developed. The following objectives have been identified:

- Maintain the population objective at 4,500 animals +/- 5% in the surveyed portion of the winter range. Assess the long-term social tolerances and habitat limitations for the Colockum elk herd and if necessary, adjust the population objective accordingly.
- Maintain the post-season elk population composition ratios in the surveyed area of the Colockum Herd within the objectives of the Game Management Plan, currently at 12-20 bulls: 100 cows, with 2-10% of bull sub-population made up of mature animals, and total bull mortality of less than 50%.
- Improve elk habitat quality and minimize disturbance to the elk herd during critical times of the year.
- Minimize complaints and damage caused by elk, thereby improving landowner support for Colockum elk management.
- Work cooperatively with the Yakama Nation to collect and share data pertaining to the Colockum herd.
- Increase public awareness of the Colockum herd and develop elk viewing opportunities.
- Work with public land managers to improve and protect elk habitat on state and federal lands including WDFW, DNR, and USFS. Work with private land managers to improve and protect elk habitat on private lands.
- Conduct research where needed to provide essential data for improving management of Colockum Elk.

Spending priorities have been identified for the first year and the next 5 years. Achieving spending levels will be contingent upon availability of funds and creation of partnerships. The recommended annual priority expenditures for the Colockum herd are as follows:

<u>Priority</u>	<u>1st year cost</u>	<u>5 year cost</u>
Herd population/composition surveys	\$14,000	\$70,000
Reduce burden of elk on private landowners	\$112,000	\$480,000
Work with landowners and livestock operators to enhance elk forage	\$25,000	\$75,000
Access Management	\$65,000	\$215,000
Habitat Management	\$30,000	\$90,000
Purchase critical elk habitat	\$1,000,000	\$5,000,000
Research	\$75,000	\$350,000
TOTAL	\$1,321,000	\$6,280,000

INTRODUCTION

The Colockum Elk Herd Plan is a step-down planning document under the umbrella of the Final Environmental Impact Statement for the Game Management Plan (WDFW 2002). For management and administrative purposes, the State has been divided into Game Management Units (GMUs). Logical groups of GMUs are described as a Population Management Units (PMU). The Colockum elk herd is one of ten herds designated in Washington. In this context a herd means a population within a recognized boundary as described by a combination of PMUs. The Colockum Elk Herd is in south portion of PMU 26 (GMUs 249 and 251) and PMU 32 (GMUs 328, 329, 330, 334 north of Interstate 90, 335). The core population resides in PMU 32 and most elk in this area exhibit a typical seasonal migration from high elevation summer ranges to lower elevation wintering grounds.

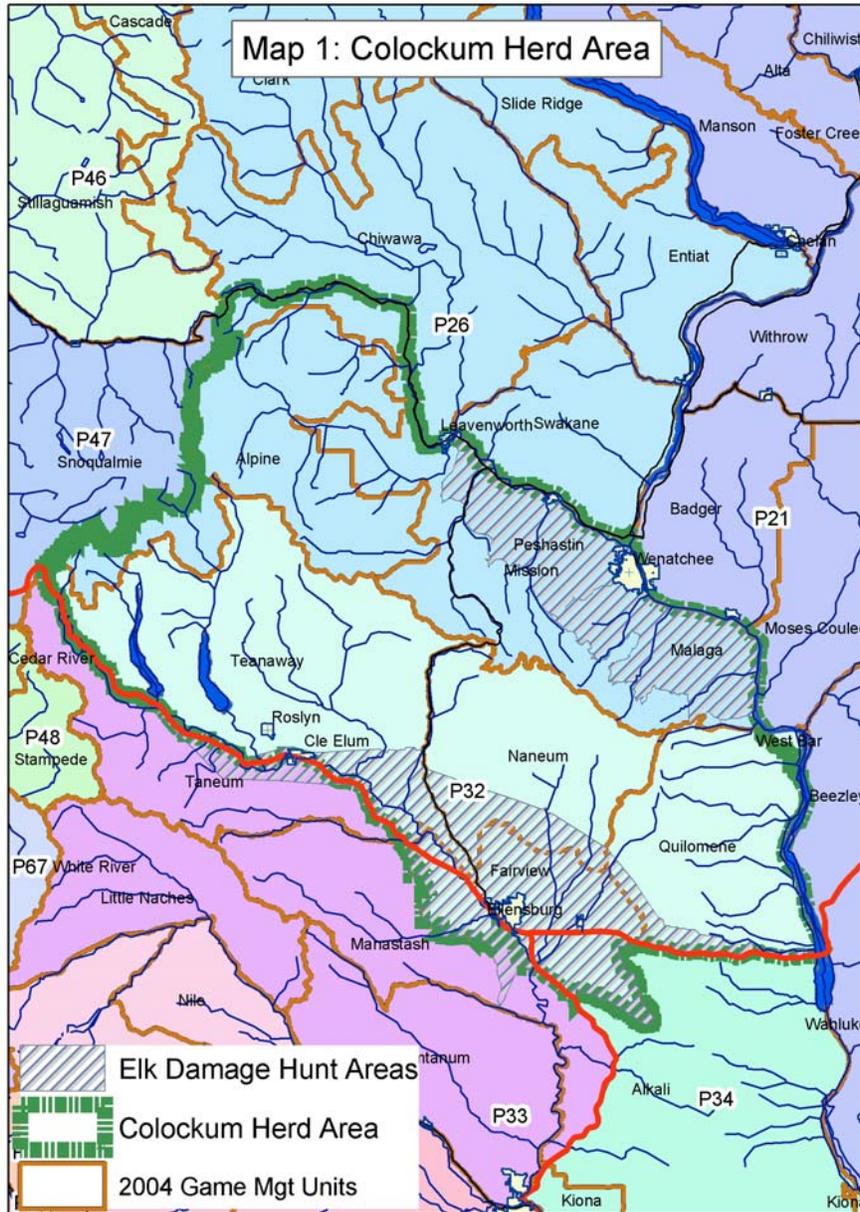
The Colockum Elk Herd Plan is a five-year planning document subject to annual review and amendment. The Washington Department of Fish and Wildlife recognizes the sovereign status of federally recognized treaty tribes. This document recognizes the responsibility of the Washington Department of Fish and Wildlife and Yakama Nation to work cooperatively in achieving elk management goals and objectives. It also recognizes the role of private landowners and public land management agencies in providing habitat for elk, notably the U.S. Forest Service, Bureau of Land Management, Washington Department of Fish and Wildlife, and Washington Department of Natural Resources.

HERD AREA DESCRIPTION

Location

The Colockum elk herd ranges over 1,600 mi² between the Columbia River to the east and the Cascade crest to the west and U.S. Highway 2 to the north and Interstate 90 to the south. Areas north of Highway 2 are within the herd range, but are managed to minimize elk. Approximately 85 percent of the elk use occurs on the eastern half of this area; east of the Teanaway River and Peshastin Creek (Map 1). The western half has about 15 percent of the elk use (Bracken and Musser 1993). The Game Management Units (GMUs) that comprise the Colockum elk herd area include 249 (Alpine), 251 (Mission), 328 (Naneum), 329 (Quilomene), 330 (West Bar), 334 (Ellensburg) north of Interstate 90, and 335 (Teanaway).

Map 1: Colockum Elk Herd Area



Land Ownership

Land within the Colockum herd's range is of mixed ownership and includes lands owned by Washington Department of Fish and Wildlife, U.S. Forest Service's Wenatchee National Forest, Washington Department of Natural Resources, U.S. Timberlands, Plum Creek Corporation, Longview Fiber Corporation, and many private landowners. Timber, livestock, mining, oil and gas exploration, irrigation, hydroelectric power, winter sports, and a variety of outdoor recreation pursuits are all industries and activities important to the economy of the area. During spring, summer, and fall when elk are widely distributed, the U.S. Forest Service manages the greatest percentage of the elk habitat. The Washington Department of Fish and Wildlife manages the greatest proportion of the Colockum elk herd winter range. Depending on the season, individual private landowners collectively control about one-quarter of the core elk habitat identified by Bracken and Musser (1993) (Table 1). Bracken and Musser did not evaluate land ownership in GMU's 249 (all USFS wilderness), the west portion of 251, or the western majority of 335.

Table 1: Percentage of area managed by ownership and season for the Colockum elk herd

(Bracken and Musser 1993).

Season	WNF/BLM ^{a,b}	WDFW ^a	DNR/PARKS ^{a,b}	Corporate	Private
Spring	28	23	9	19	21
Summer	38	16	8	21	18
Fall	21	30	22	8	19
Winter	2	49	11	14	25

^aWNF = Wenatchee National Forest, BLM = Bureau of Land Management, WDFW = Washington Department of Fish and Wildlife, DNR = Washington Department of Natural Resources, Parks = Washington State Parks.

^bThe BLM and PARKS manage relatively little land used by Colockum elk. In winter, State Parks manages 2% of the elk winter range. In other seasons, these ownerships total less than 1%.

Topography

The Colockum herd area varies in elevation from 584 feet on the Columbia River to over 9,000 feet in the Alpine Lakes Wilderness. Physiographically, the area is part of the Northern Washington Cascades and the Columbia Basin Provinces as described in Franklin and Dyrness (1973).

Climate

During the summer, afternoon temperatures in the lower valleys occasionally reach over 100°F. In winter, average maximum temperatures are from 30° F to lower 40° F, while minimums range from between 10-20° F. During some of the coldest winters, minimums have dropped to -20° F.

Precipitation is light in summer, increases in the fall, and reaches a peak during the winter. Annual precipitation ranges from less than 10 inches along the Columbia River to over 100 inches in the Cascade Range. Average winter snowfall ranges from 10 to 40 inches in the lower elevations, 30 to 70 inches in the intermediate areas, and 100 inches or more in the Cascade Range. Snow seldom remains on the ground longer than six weeks in the lower elevations (Donaldson 1979).

Vegetation

The east facing slopes of the Cascade Range are a diverse mosaic of forest cover-types. On drier low-elevation sites ponderosa pine (*Pinus ponderosa*) and Douglas fir (*Pseudotsuga menziesii*) are the most conspicuous over-story species. Canopy cover typically ranges between 20-50 percent on these relatively dry, low-elevation sites. At mid-elevations, grand fir (*Abies grandis*) is the climax species, with Douglas fir, lodgepole pine (*Pinus contorta*), ponderosa pine, and western larch (*Larix occidentalis*) as minor components. At higher elevations, sub-alpine fir (*Abies lasiocarpa*) is the climax tree species. Canopy cover at higher elevations is generally greater than 40 percent. Other tree species commonly found in the sub-alpine fir zone include Engelmann spruce (*Picea engelmannii*), lodgepole pine, and western larch.

The under-story component of the forest cover types varies greatly with precipitation, aspect, elevation, and canopy cover. Under sparse canopy cover, the under-story often resembles shrub steppe communities with antelope bitterbrush (*Purshia tridentata*), ocean spray (*Holodiscus* spp), Oregon grape (*Berberis nervosa*), sagebrush (*Artemisia* spp), snowbrush (*Ceanothus velutinus*), and Spiraea (*Spiraea* spp) in the shrub component. At higher elevations additional shrubs include barberry (*Berberis* spp), currant (*Ribes* spp), huckleberry (*Vaccinium* spp), mountain snowberry (*Symphoricarpos albus*), and mountain boxwood (*Paxistima myrsinites*). Forbs commonly found in under story communities include arrowleaf balsamroot (*Balsamorhiza sagittata*), cinquefoil (*Potentilla* spp), heartleaf arnica (*Arnica cordifolia*), lupine (*Lupinus* spp), milk-vetch (*Astragalus* spp), and western yarrow (*Achillea millefolium*). Pine grass (*Calamagrostis rubescens*) and elk sedge (*Carex geyeri*) are the major forage plants of the grass/sedge component.

The remaining area supports shrub-steppe plant communities characteristic of the Columbia Basin physiographic province (Franklin and Dyrness 1973). Bunchgrass and sagebrush communities are the typical vegetation types on deep gently sloping upland soils (Daubenmire 1970). Common shrubs include antelope bitterbrush, big sagebrush, gray rabbitbrush (*Chrysothamnus* spp), and spiny hopsage (*Gray spinosa*). Perennial bunchgrasses, such as basin wildrye (*Elymus cinereus*), bluebunch wheatgrass (*Agropyron spicatum*), Idaho fescue (*Festuca idahoensis*), and Thurber's needlegrass (*Stipa thurberiana*), are important forage species on relatively undisturbed sites. Alien grasses (e.g., cheat grass *Bromus tectorum*) and Kentucky bluegrass (*Poa pratensis*) and forbs (e.g., knapweeds, *Centaurea* spp) often are dominant on disturbed areas. On shallow soils, low-growing shrubs, such as stiff sagebrush (*Artemisia rigida*) and a variety of buckwheat (*Eriogonum* spp), and Sandberg bluegrass (*Poa secunda*) are the dominant species. Common forbs in the shrub-steppe zone include Carey's balsamroot (*Balsamorhiza careyana*), lupine (*Lupinus* spp), longleaf phlox (*Phlox longifolia*), western yarrow, and Indian paintbrush (*Castilleja* spp).

Human Influences

Humans greatly influence the Colockum elk herd. Timber and livestock management has altered much of the landscape occupied by elk. Recreational use has a major impact on the herd. Hunting accounts for much of the annual adult elk mortality. The core area has a high density of roads, and activities such as off-roading, deer and bird hunting, antler hunting, horseback riding, hiking, etc. greatly influences the distribution of elk. Elk seek refuge from disturbance in the

Coffin Reserve summer through fall where forage may be limited. In the spring, elk concentrate in remote areas or on private lands when large numbers of people descend on winter range

looking for antlers. Agricultural and horticultural crops attract elk to the periphery of the herd area where they tend to cause damage.

Other Ungulates

Mule deer (*Odocoileus hemionus*) use the entire range of the Colockum elk herd. Mountain goats (*Oreamnos americanus*) occupy portions of the high-elevation rugged terrain in GMU's 249, 251 and 335. California bighorn sheep (*Ovis canadensis californiana*) occur primarily along the breaks of the Columbia River in GMU's 251 and 329. Domestic horses, cattle, and sheep are common throughout much of the area. Exact numbers of domestic animals are unknown, but likely exceed the number of elk during the summer months.

HERD DISTRIBUTION

Historic Distribution

Zooarchaeological data from the Columbia Basin suggest elk were present and utilized by early inhabitants (McCorquodale 1985, Dixon et al. 1996). By the late-1800s elk may have been extirpated from the Region (McCorquodale 1985). The current Colockum elk population developed from the reintroduction of Rocky Mountain elk (*Cervus elaphus nelsoni*) from Yellowstone National Park in 1913 and 1915, which significantly contributed to any remnant animals in the area (Bryant and Maser 1982).

Current Distribution

Most Colockum elk display distinct seasonal migrations. They generally move northwest to higher elevation during summer (Bracken and Musser 1993). With the progression of winter, snow accumulation causes elk to move southeast and use more arid, lower-elevation ranges. Elk are usually concentrated on winter-spring range from mid-November through March. The main concentration of elk is in GMU's 251, 328, 329, 330, and 335 (Map 1). Bracken and Musser (1993) estimated 90% of the Colockum elk winter in an area bounded by Colockum Creek, the Columbia River, Rocky Coulee, and the 1,281 meter (4,200 feet) elevation contour west to Naneum Creek. Small subherds also winter near Cle Elum, between Peshastin and Colockum Creeks, and along the Wenatchee River. The majority of elk summer in the Naneum, Swauk, and Teanaway Drainages. Some of the Cle Elum elk may migrate north, but surveys and casual observations suggest the majority do not make long movements. Bracken and Musser (1993) believed elk wintering between Colockum and Peshastin Creeks probably stayed within GMU's 251 and 249.

The majority of elk summering east of Naneum Creek move into the Aurthur Coffin Game Reserve (ACGR) as soon as hunting starts in early September. The ACGR elk probably start moving toward the area as soon as activity (scouting, setting up camps) begins in August. Roughly 50% of the Colockum herd is thought to be in or around the ACGR by early September. The ACGR is about 5 square miles and does not have enough forage to support the high density

of elk sometimes seeking refuge there. Some of the ACGR elk move to GMU 330, which is not open to modern firearm and muzzleloader general season elk hunting. Elk seeking refuge on ACGR often move off at night to feed and return by sunrise.

The distribution of Colockum elk is managed through hunting. The amount of hunting pressure which is directed toward different sub-populations at various times of the year is determined by the following considerations: (1) maximizing hunting recreation, (2) maintenance of desired elk population level, (3) control of damage to commercial agricultural or horticultural crops, and (4) reduction of competition with mule deer during the winter in Chelan County.

Proposed Distribution

No major change in the distribution of Colockum elk is proposed. The Washington Department of Fish and Wildlife will continue to encourage elk use on public lands south of Highway 2 and discourage elk use of private lands where damage to agricultural areas is a problem. The Washington Department of Fish and Wildlife will continue to discourage elk in the Kittitas and Teanaway Valleys.

HERD MANAGEMENT

History, Current Status, and Management Activities

The main Colockum herd developed from 45 Montana Rocky Mountain elk released near Boylston and driven north at Vantage in 1915 (Pautzke, 1939). In 1939, the Colockum herd was estimated at 300-350. In contrast, the Yakima herd was initiated in 1913 with 50 elk and had expanded to 3,000 by 1939. Elk from the rapidly expanding Yakima herd probably contributed to the Colockum population. There was no mention of damage being an issue for Colockum elk in 1939.

The elk population continued to expand in the 1940's and 50's. Interest in securing elk habitat was also increased. The Colockum Wildlife Area was purchased in the mid 1950's, followed by the Whiskey Dick and Quilomene Wildlife areas in 1966 and 1972-74. Together, these Wildlife Areas total approximately 228 mi². Almost half of this total area is controlled through DNR lease or agreement. Wheat farming on the Colockum Wildlife area was reduced from 1,890 acres in 1986 to about 100 acres today. Most livestock grazing on the Quilomene, Whiskey Dick, and Colockum WRA's was eliminated in 1972, 1980, and late 1990's. The range of the Colockum Elk Herd has a long history of domestic stock use that continues on lands near the WAs.

In the 1960s, the 3,000 acre Coffin Reserve was established in the Colockum Wildlife Area as a refuge for elk. Elk concentrate on and around the Coffin Reserve from spring through early winter when snow pushes them out of the higher elevations. The main concentration occurs during the hunting seasons from September to November. Up to one-half of the Colockum elk herd can be found on the Reserve during the fall based on radio-telemetry data (J. Musser, Wash. Dept. Fish and Wildl., unpubl. data). The impact of the high density of elk has become a concern in recent years. Cattle utilization surrounding the reserve is also high. The combination of a high density of elk and cattle has the potential to influence vegetation and animal health.

West Bar (GMU 330) has also been a semi-reserve since the late 1970's. Elk would concentrate on wheat fields on the ~3,500 acre bar. The unit is bounded mostly by cliff and river. There were times when hunters would push elk across the river to the east where either sex elk were legal. Elk were shot in the river and from the highway. GMU 330 was created to reduce unethical hunting behavior. Large concentrations of elk are not desired during the fall, so small numbers of permits have been used to control elk numbers on West Bar.

In recent years, the emphasis has been on minimizing elk numbers in agricultural areas. Liberal antlerless permits and seasons resulted in a declining herd. To reduce the overall population decline and maintain pressure on depredating elk, archery antlerless harvest was eliminated in the core range of the herd in 2005.

Hunting

Kittitas County had its first either-sex elk hunting season in 1927 (Appendix A). In 1929, harvest was restricted to bulls only. In 1939, Pautzke et al. (1939) estimated the Colockum elk population at 300 to 350 animals. The next either-sex seasons did not occur until 1944, when Chelan County and the Teanaway area of Kittitas County were opened in a special early-December season to address elk damage. In 1951, the special either-sex elk season lasted for 65 days. The first special permit-controlled elk hunting season was established in 1955 in two areas of the Colockum herd with 100 permits each.

From 1940 to 1994, hunting for any antlered bull was allowed during general hunting seasons. This strategy resulted in low post-hunting season bull:cow ratios with few adult bulls in the population. In 1994, the harvest strategy was changed to a spike-only general season with branch-antlered bull hunting limited to special permit.

A review of Appendix A shows a steady progression in complexity of elk hunting seasons from 1927 to the present. We now have seasons for archery, muzzleloader, and modern firearm hunters; general, special and permit-only seasons; stratified or early and late seasons; area tags and various legal animal descriptions. All of these strategies are used to provide maximum hunting opportunity, manage damage, and maintain a healthy and productive elk population.

Elk Surveys

Population and Composition

Surveys prior to 1999 focused on estimating composition (i.e., calf:cow:bull ratios), and therefore provide limited inference to total elk abundance. Most surveys were conducted post-season (January, February, or early March). Ground and aerial surveys were attempted in September, but were found to be of limited utility, especially for estimating bull numbers.

A protocol for estimating the post-hunt elk population using aerial surveys and a sightability model (Unsworth et al. 1994) was established in 1999. Initial surveys returned wide confidence intervals around the estimated population parameters. More precise estimates have been obtained the last few years by increasing the amount of area flown, using previous survey information to better stratify the sampling units, and focusing efforts on higher density units. Post-hunt herd data from the Colockum area 2000-2004 indicated that sampling 70 percent of the units yielded a confidence interval at the herd level that has improved from $\pm 20\%$ of the

estimate in 2000, to $\pm 5\%$ of the estimate in 2004. The precision of estimates of cow numbers and estimates of calf numbers were $\pm 3\%$ and $\pm 10\%$ respectively in 2004.

It is difficult to obtain good estimates of the post-hunt bull population because bull groups in late winter are relatively small in size and have a clumped distribution. Small groups of elk that are not evenly distributed across the landscape and using heavy cover can be difficult to see from the air. Precision of the bull estimates has ranged from $\pm 18\%$ to $\pm 38\%$. The bull estimates represent those animals on the traditional winter range that is routinely surveyed. There are indications that a number of bulls in timbered areas outside the surveyed winter range may be missed.

The landscape encompassing all bull range is widespread and bull groups are small and unevenly distributed, which requires a substantial investment in flight time with minimal return on bull groups sighted. Another confounding factor is survey timing. In the Colockum, surveys conducted during the fall rut seem to be less effective as dominant bulls tending harems are more likely to be seen than subordinate bulls on the periphery.

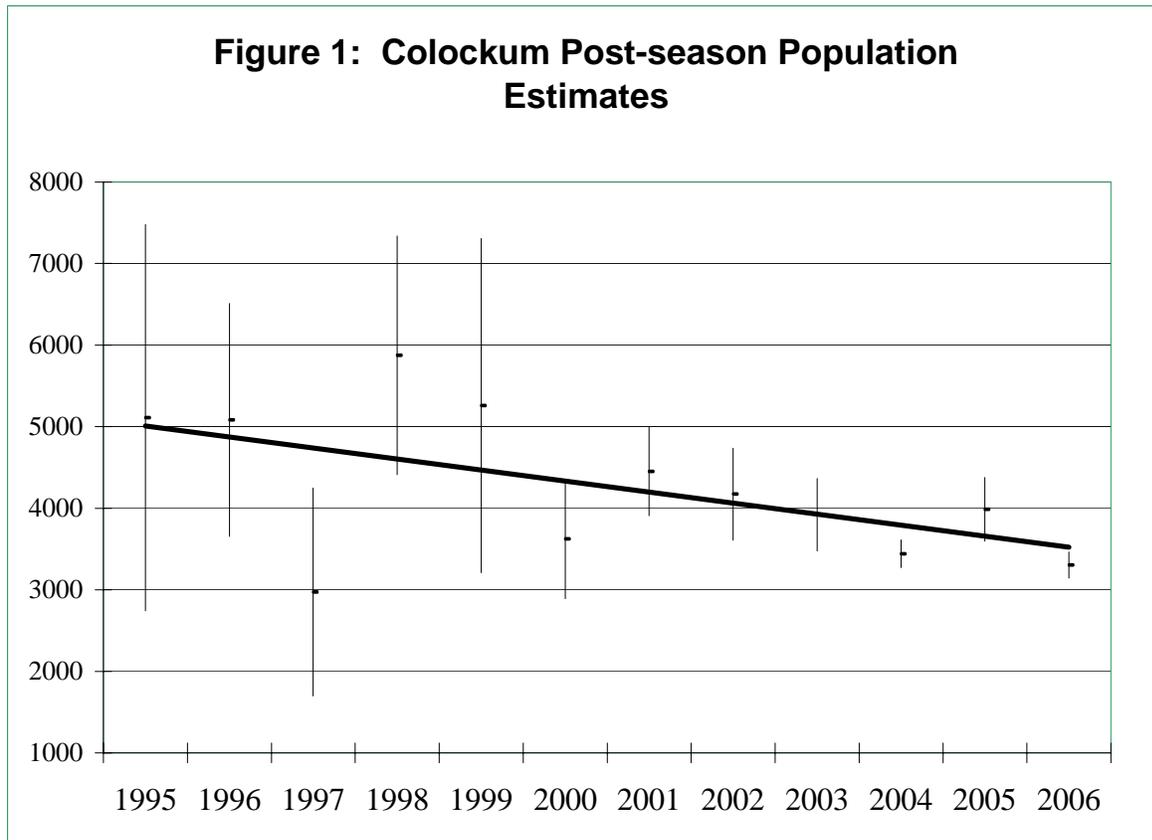
Reproductive performance, body condition, and population status

Determining an elk population objective is difficult. A wide variety of population metrics for elk have been used by western, state wildlife agencies over the years. Cook et al. (2004) documented that there is a positive correlation between elk diet, body condition, and reproductive performance. Cow elk on a high nutritional plane will reproduce consistently from year to year, while those on low nutrition may not even enter estrus. Measuring body condition, pregnancy, and lactation rates should give an indication of where the herd is in relation to carrying capacity. Bracken and Musser (1993) collected reproductive tracts, udders, and fetuses from cow elk to measure reproductive performance. Pregnancy rates were also measured using rectal palpation and blood serum on captured elk in 1987–88. Cook et al. (2001) developed models to predict elk body condition from elk organs. Elk organs and lactation status were collected from hunter-harvested elk for 2002-2005.

Estimated Population Size

A population objective of 4,275 to 4,725 animals was identified for the Colockum elk herd in the Game Management Plan (WDFW 2003). Since 2001, the number of animals estimated on the surveyed winter range has declined (Figure 1). The February 2006 estimate on the surveyed winter range was 3,145 to 3,465 elk. The survey data suggests a declining trend since 1995, but wide variances for estimates prior to 2000 make analysis difficult. Bull harvest (Figure 2) suggests recruitment has declined approximately 40% from historic levels. The decline is probably related to high antlerless harvest and hard winters in the early 1990s.

Figure 1: Population Estimates



Herd Composition

Bull Population/Ratios: Post-season aerial surveys for composition were begun in 1990. Observed bull ratios were 2-4 bulls per 100 cows prior to the 1994 spike-only general season. They increased to 18 in 2002, and decreased to 4 in 2005 (Table 3). As noted previously, the bull population is very difficult to estimate and the estimates have a wide variance (Figure 3). Adult bulls are typically segregated from cows and more difficult to detect (McCorquodale, 2001). Bulls 2+ years and older don't always use traditional winter range and are probably often under-represented in the surveys. Harvest report cards from 1987-93 indicate 100-250 bulls >3 point in the harvest, which had to be alive during post-season surveys the previous winter. Assuming approximately 3,500 cows in the population, the post-season bull ratio prior to 1994 was 3-7 bulls per 100 cows.

From February 1997-2002, the bull segment of the population was likely increasing as recruitment exceeded harvest. Few permits for adult bulls were issued 1996-2000, and no permits 2000-01. In fall 2002, bull permits were issued for the core of the Colockum herd and the bull population started declining. The estimate for adult bulls in 2002 was probably high due to survey stratification errors. Since 2002, surveys have been refined to address potential biases. An extremely light snow pack in 2005 probably resulted in a low estimate as some bulls probably stayed in timber outside the normal winter range. In 2006, conditions were ideal for surveys and a large portion of the range surveyed.

One of the main problems with maintaining an adult bull population is recruitment of yearling bulls through the hunting seasons. The herd has been producing an estimated average of 430 yearling bulls since 2002, but only 60-70 survive the hunting seasons. The majority of the survivors are non-legal (2-3 pt) or had antler characteristics that made it difficult to tell that they were legal game. Natural mortality, accidents, and poaching would reduce the actual recruitment of fully mature bulls to about 50. Damage hunts, general season permits, and tribal harvest had been removing 80-100 adult bulls per year since 2002. While the survey data may not be perfect, the collective data suggest the trend seen in Figure 3 is accurate.

Figure 2: Colockum Antlerless vs. Bull Harvest (1960-2004)

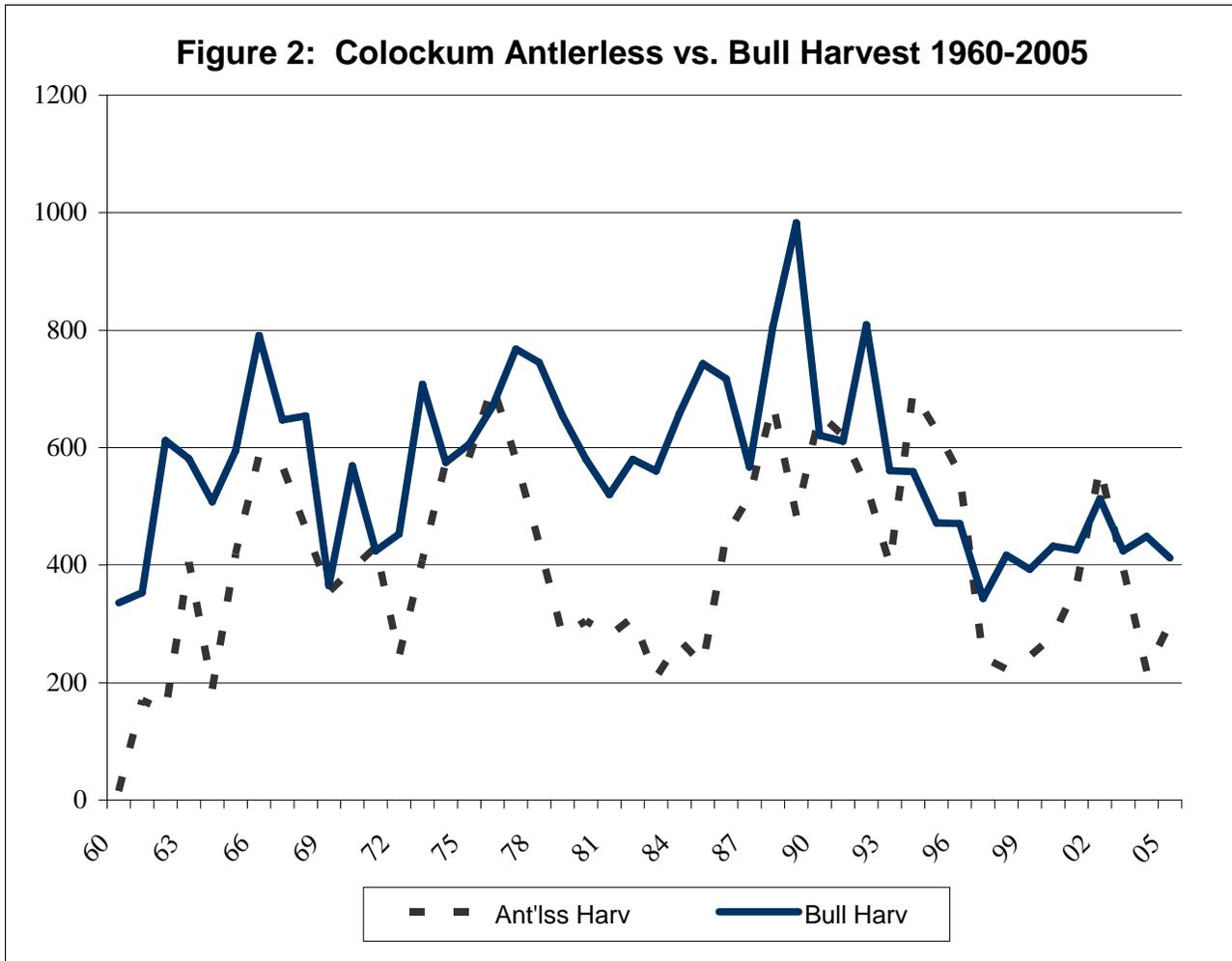
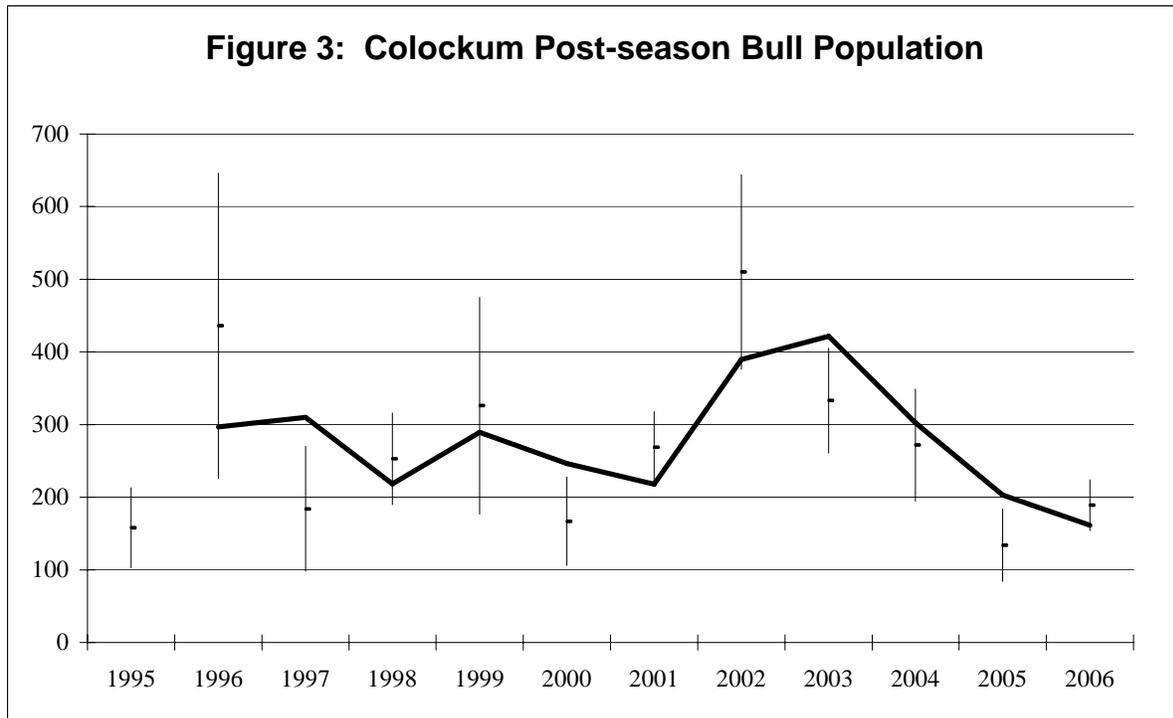


Figure 3: Colockum Post-season Bull Population



Calf Population/Ratios: Calf recruitment is indexed in two ways. Direct counts of calves from the air or ground are made. Typically these data are converted to an index of calves as a ratio of calves per 100 cows (Table 2). In addition, since 1995, WDFW has been able to use these direct counts to estimate the actual calf population (Figure 4). Calf ratios and calf population estimates have declined.

A second way to index calf recruitment is through bull harvest (Figure 2). In a heavily exploited bull population such as the Colockum, the majority of bulls harvested are yearling bulls. While there may be some increases in harvest due to weather, over the long-term, the average harvest of 662 bulls from 1974-1994 should equate to an annual average of at least 1,324 calves produced. Since 1994, harvest has been concentrated on yearling bulls because of spike management. All data suggests that a high proportion (~85%) of the yearling bulls are harvested annually and harvest should index calf recruitment.

In theory, calf estimates should correlate with harvest (i.e., strong calf cohorts should predict high harvests of spike bulls the following fall and weak calf cohorts should predict lower spike harvest). However, the data depict an ambiguous relationship between observed calf ratios and yearling bull harvest (Figure 5) or estimated calf population and harvest (Figure 6). In years when there were major changes in the calf ratio ('92,'93,'00), the yearling bull harvest actually showed an inverse relationship to calf ratio. Since 2000, yearling bull harvest has typically been higher than predicted based on surveys. The confidence intervals on calf population estimates have been fairly narrow and averaged 702 calves from 2000-05. Back-calculating the calf population from spike harvest and spike recruitment suggests the actual calf population is closer to 1,000.

Figure 4: Colockum Post-season Calf Population

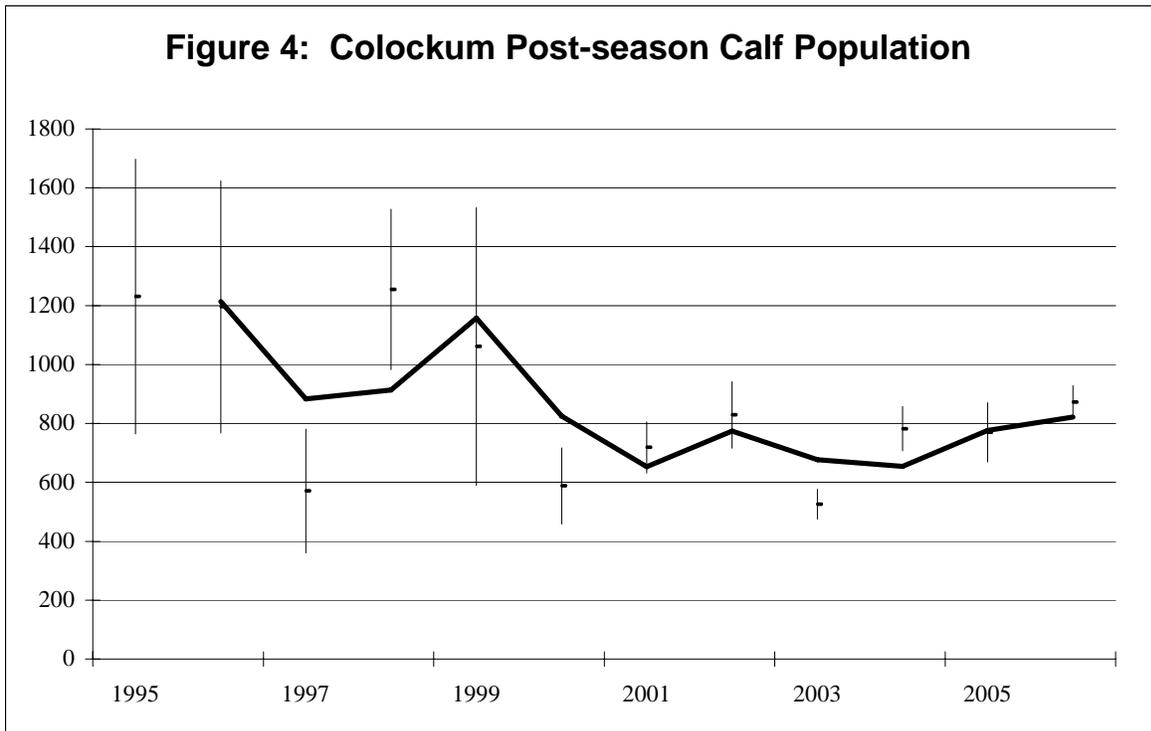


Figure 5: February observed calf ratio compared to fall yearling bull harvest

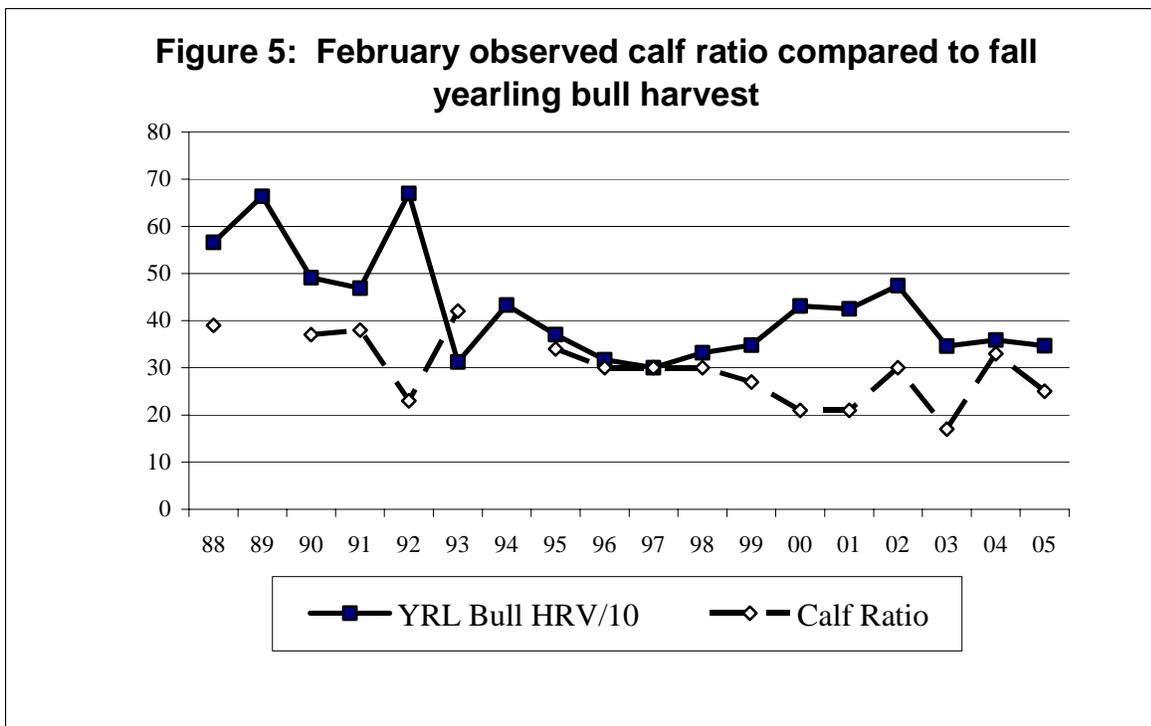
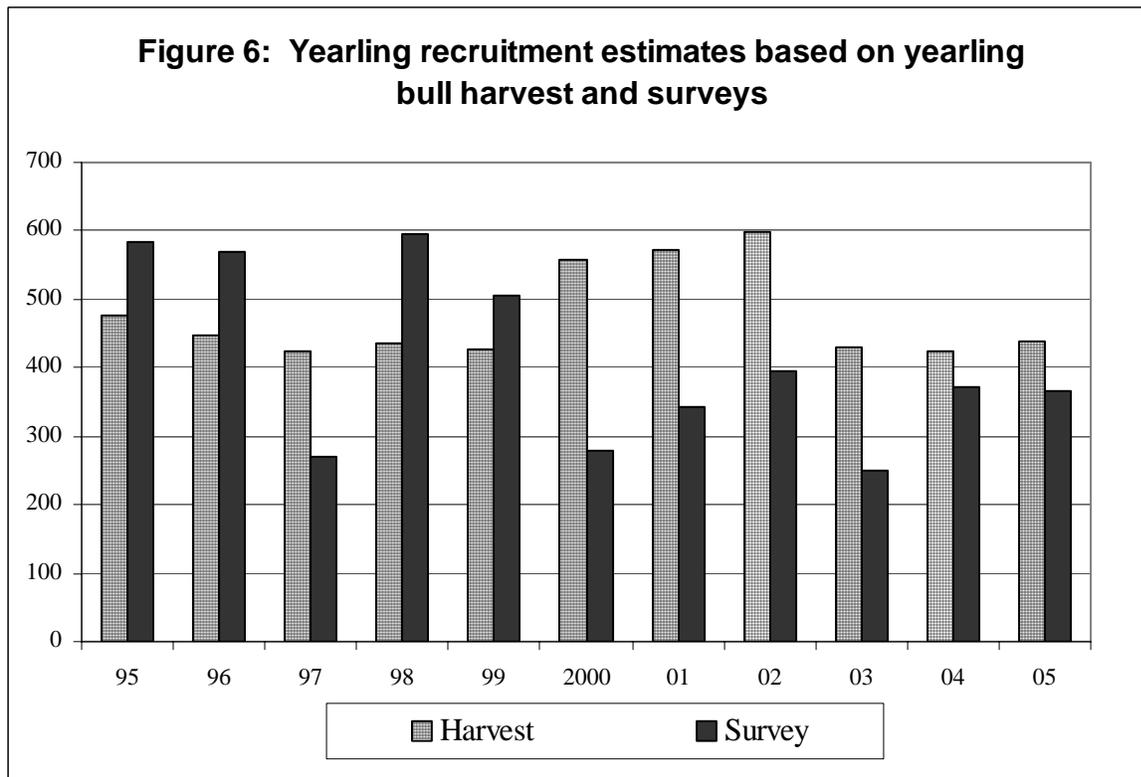


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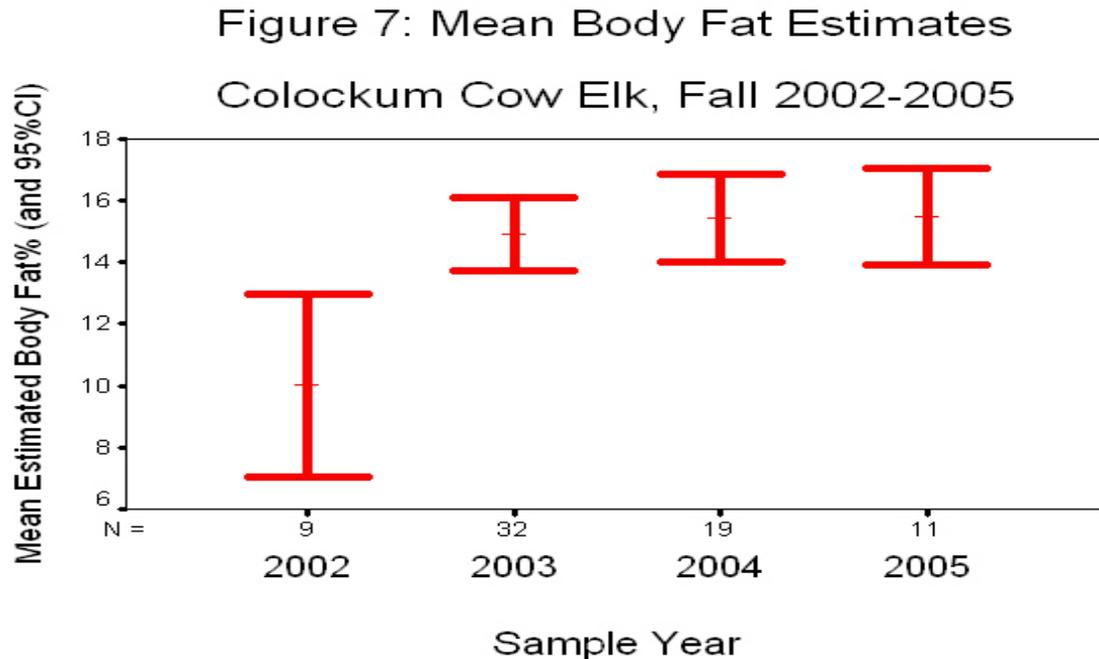
Figure 6: Yearling recruitment estimates based on yearling bull harvest and surveys



There are a number of possibilities for the discrepancies between calf ratios and yearling bull harvest. The calf ratio might have remained stable or increased, while total recruitment decreased because the overall population was decreasing (i.e., high antlerless harvest). Weather can also be a confounding variable by impacting the number of elk on the winter range, harvest (by affecting hunter success), and calf survival. There may be significant numbers of elk wintering outside the surveyed range. While a growing number of elk may be wintering in GMU 335, only 23-29 yearling bulls have been harvested in the area annually since 1999. Elk wintering in GMU 329 do migrate into 335 and contribute to the harvest, which averaged 121 bulls from 1989-94. It is unlikely elk wintering in GMU 335 are migrating east in large numbers and being harvested in GMU 328 and contributing to the harvest discrepancy. Elk wintering in GMU 251, which is also not surveyed could migrate into 328 or 329, but studies to determine potential movements have not been conducted.

Another contributing factor could be systematic misclassification of calves during surveys. Accelerated growth in calves, attributable to environmental variation (i.e., good forage years), could contribute to misclassification. Bonenfant et al. (2005) found young:female ratios were unreliable in estimating actual recruitment in red deer. Cook et al. (2004) found that calves on a high nutritional plane were 40-70% larger than those on a low and medium diet. In years of abundant forage, some calves could be gaining enough mass by February to be classified as adult (yearling) cows. In years of poor nutrition, all the calves may be small and easily classified. Lactation data collected 1987-88 (86% lactating) and 2002-2005 (~70% lactating) suggests the actual calf ratios may be lower than ratios estimated from surveys.

Figure 7: Mean Body Fat Estimates (Fall 2002-2005)



Reproductive performance, body condition and population

Bracken and Musser (1993) estimated 86% of cows >2 years old were lactating and 92% pregnant in fall 1982. In 1988, 95% of elk captured were pregnant with most (72%) conceiving early in the rut. The fall herd was estimated at 6,500 animals (estimate 5,000-5,500 in February based on harvest). The data collected by Bracken and Musser suggested Colockum elk were in excellent condition and one of the most productive herds in the country, despite having the lowest bull:cow ratio.

Lactation rates averaged 66% (milk)-70% (fluid) (N=92) from 2002-2005. The rates are considered good, even though it's lower than the 1980s. Musser and Bracken collected udders, while data from 2002-2005 depended mostly on hunters to report lactation. Field checks 2002-2005 indicated hunter reported lactation rates were low, but the extent of the bias is unknown. Body condition 2002-2005 (Figure 7), suggests cow elk were in good condition from 2003-2005. Cook et al. (2004) found that elk over 10% body fat probably come into estrus. Data 2003-2005 was mostly from elk harvested in early October, although a sub-sample from September 8-9, 2003 indicated elk were in better condition than 2002. There was also a change in domestic grazing from 2002 to 2003 that may have affected forage availability and nutritional status of elk. The long-time cattle lessee ended operation after fall 2002. Cattle did not utilize the majority of the range in 2003, and a new lessee took over in 2004. Photo plots documented an obvious increase in available forage when the range was rested in 2003 that carried over into 2004 and 2005.

Body condition and reproductive performance data suggests the Colockum herd is currently in good condition and getting adequate nutrition from the summer and fall range. More data would

need to be collected later in fall and winter to make a better estimate of carrying capacity, but it appears the goal of 4,275-4,725 elk is reasonable in terms of observed habitat condition.

Mortality

Bracken and Musser (1993) found all Colockum radio collared elk mortalities from 1988-91 were attributed to hunters during the hunting season. Smith et al. (1994) used the same data to calculate annual mortality estimates for bulls and cows of 66% and 13%. Sample sizes were small for sources of mortality other than legal hunting. One bull and cow were killed illegally with modern firearms and one cow died from an archery wound. No deaths were attributed to predation or winter mortality.

Mortality rates in recent years may not be the same as 12 years ago. There is a perception that illegal bull harvest and crippling loss are much higher under spike-only management. Many also believe predation is becoming a factor, particularly by cougars. Smith et al. (1994) determined adult mortality due to natural causes was 9%. Of the 9% natural mortality, only 16% was due to predation. Ballard et al. (2001) found predator control was often ineffective at increasing deer populations or harvest. Ballard et al. recommended that predator control only be considered when populations are well below carrying capacity and predators are known to be a limiting factor. Neither is currently known to be true for Colockum elk.

Harvest

Figure 2 shows the harvest since 1960. It should be noted that changes in harvest estimation probably caused inflated harvest estimated prior to 1984. While fluctuations occurred, the harvest (and theoretically, the population) seems to have gradually increased from 1960-1989. Since 1992, there has been an obvious decrease in bull harvest. Some of the decrease is possibly from spike-only general season, which was implemented in 1994. In 1977, 84% of the antlered harvest was yearlings. Yearling bulls comprised 73% of the Colockum bull harvest from 1987-93 and 84% from 1994-2000. Interestingly, the bull harvest did not decline in 1994 when a “spike only” general season was implemented. The small increase in the 1998 bull harvest was due to a regulation change that allowed muzzleloaders to harvest any bull in a damage area between Ellensburg and Cle Elum. Muzzleloaders reported taking about 140 branched antlered bulls in 1998. The 1997-2001 bull harvest was the lowest 5-year average bull harvest in recent history. Harvest has increased slightly since 1998, but is still well below average.

The reasons for the decline in the late 1990's may have been due to over harvest and hard winters. Prior to 1987, antlerless harvest was relatively low compared to bull harvest (Figure 2), which should have led to an increasing population if herd size was limited by harvest. Bracken and Musser (1993) reported the Colockum herd was one of the most heavily harvested western herds from 1987-91 with low post-season bull ratios and the highest antlerless harvest rate (90 antlerless/100 antlered). Winter mortality in 1992-93 was apparently severe as yearling bull harvest declined from a record high of 670 in 1992 to 312 in 1993. The hard winter was followed by high antlerless harvest from 1992-96 (108 antlerless/100 antlered). Another hard winter hit in 1996-97. The lowest yearling bull harvest in recent history occurred in 1997. The reduction in antlerless harvest may be the reason bull harvest increased 1999-2002. High antlerless harvest in recent years may have again reduced recruitment.

Tribal Hunting

The Yakama Nation has treaty hunting rights within the boundaries of the Colockum Herd. In the 1990's, tribes other than Yakama were also documented hunting Colockum herd elk, but recent court decisions have limited non-Yakama activity. The Yakama's set a year-round elk hunting season for tribal members, but their season is restricted to bull-only from January 1-August 31. WDFW works with the Yakama Tribe to ensure the herd is managed cooperatively. There is considerable interest in tribal harvest of mature bulls from the general public. Tribal harvest for the herd is not available, but it is not believed to be significant relative to non-tribal harvest. Of 25 documented mortalities of radio-collared elk, Bracken and Musser (1993) found only one to be from tribal hunting. Since 2000, non-tribal bull harvest has averaged 443 annually. Field checks, meat locker forms, and population surveys/modeling all suggest tribal harvest is less than 40 animals annually over the last 5 years.

Social and Economic Values

Number of Hunters and Hunter Days

In the 1990's, an average of 10,373 state authorized hunters spent an estimated 50,306 days afield hunting Colockum elk (Appendix B). This represents a decrease of 823 hunters compared to the 1980's average. Hunter numbers seem to have declined further the last 3 years averaging 8,490. The largest decline occurred in 1997 when 33% fewer hunters went after Colockum elk compared to 1996. The decline followed several years of declining harvest, a severe winter, and reduction in special permits.

The Colockum elk herd provides economic value to the State and local communities. The value of elk to the state economy is estimated to be as high as \$1,945 per harvested elk in the Blue Mountains (Meyers 1999). The *2001 National Survey of Fishing, Hunting and Wildlife-Associated Recreation* reported that trip-related and equipment expenditures for hunting big game averaged \$925 per hunter (U.S. Department of Interior et al. 2001). Using the \$925 average expenditure per hunter from the national survey, Colockum elk hunters have averaged spending \$7.8 million from 2000-02. It is clear that Colockum elk-centered recreation has considerable economic value and contributes to local community economies.

Hunter participation during any given year is influenced by many factors. During 1984-2000, the Department annually tracked hunter participation and hunter effort through a harvest questionnaire (Table 3). Since 2001, hunter statistics have been tracked through mandatory reporting. Season structure, license and tag fees, climatic conditions, season forecasts, and previous year's hunter success rates, etc. has influenced hunter participation. Similarly, hunter days in the field can be highly variable from one year to the next. The movement of hunters between the Yakima and Colockum herds is very likely.

Harvest Strategies

General hunting seasons are set every three years as a part of the current Washington Fish and Wildlife Commission's policy of adopting hunting seasons for a three-year period and annually establishing permit seasons and necessary amendments to manage populations or control damage. The three-year hunting package serves as the state's harvest plan. Tribal participation

in formulating specific recommendations and harvest strategies begins at the regional level. The WDFW's regional and field personnel meet with tribal representatives periodically to coordinate harvest strategies, share harvest data, and discuss elk management activities.

Elk hunting seasons for the Colockum elk herd prior to 1994 generally allowed archery hunters to take any elk; muzzleloader hunters to take any elk until 1983 and any elk or bull-only depending on the unit during 1984-94 (Appendix A). Modern firearm hunters were restricted to any bull elk with antlerless elk by special permit. These seasons and regulations resulted in low bull escapement. In 1994, the strategy for bull harvest was changed to spike-only general season with branched antlered bulls by permit-only for all hunters. Archery and muzzleloader hunters have seasons that allow for antlerless harvest in designated units and modern firearm antlerless hunting opportunity remains by permit-only.

Hunter density is managed by offering multiple seasons for various weapon types. Washington elk hunters are required to select one elk tag area and hunt with one of three types of weapons (archery, modern firearm, or muzzleloader).

Access Management

The negative effect of roads and human disturbance on elk has been well documented and summarized (Rowland et al. 2005, Wisdom et al. 2005a, Wisdom et al. 2005b). The negative effects include loss of habitat, and increased energy loss and vulnerability to mortality. Peek et al. (2002) in a report to the Washington Fish and Wildlife Commission stated "Most authorities recommend restrictions in human activity to reduce displacement and energy loss in winter..". Phillips et al. (2001) documented that high disturbance levels during the elk calving season, decreased productivity by 27%. Body condition data suggests most Colockum elk should be coming into estrus, but fall lactation rates have decreased ~23% since 1987-88. Colockum harvest data suggests extremely high vulnerability to harvest mortality.

The negative impact of roads generally increases with increased human use (Wisdom et al. 2005a, Pedersen et al. 1980, Perry and Overly 1976). Wisdom et al. (2005b) found ORVs had the greatest negative impact on elk compared to other recreational activity. The avoidance of roads in open habitat is greater. Powell and Lindzey (2003) found elk avoid areas within 1.2 miles of major roads in summer and 0.6 miles in winter in open habitat in Wyoming.

The number of people recreating in the outdoors has increased dramatically in the last 20 years (The Interagency Committee for Outdoor Recreation (IAC) (2003)). Many of the activities overlap. For example, there are now 400,000-500,000 people using off road vehicles (ORVs) in Washington. Many people are using ORVs to get to destinations or participate in hiking or nature activities. The ORVs have made much of the range accessible year round. Snowdrifts and mud used to limit use of the winter range until mid-spring. It is now common to see ORV activity on the range February, March, and April. The late-winter/early spring activity is largely due to people looking for shed antlers.

Increasing recreational use of the Colockum elk is likely disturbing elk and affecting movements. Elk avoiding disturbance on public lands often seek refuge on private lands (Wertz 2001, Burcham et al. 1998). Private landowners around the Colockum herd have noticed such a movement and have requested WDFW address the situation. Wertz (2001) found that by reducing road densities on public lands in Oregon, they were able to get 48% of radio-collared animals to move from private to public land for at least a portion of the season. In the Colockum, reducing road densities and restricting seasonal motorized or all access would likely help keep elk off private lands.

Most of the Colockum elk range has some form of road management in place. The largest of these is the Naneum Green Dot Road Management System, which covers approximately 334 mi². Within this system, open roads are posted with green reflective dots on white posts. All other roads within the system are closed to vehicle travel. However, road densities on much of the Colockum elk herd area probably exceed statewide objectives for road densities set forth in RCW 77.12.210 and WAC 232-12-177. The objectives (≤ 1 mi/mi² on spring and winter range and ≤ 1.5 mi/mi² on summer and fall range) are based on old studies in forested habitat and need to be revised. The high harvest of yearling bulls and movement of animals onto private lands suggest the current system is inadequate. An assessment of current road densities is needed on the Colockum range, as well as the development of a plan for managing on-road and off-road vehicle access.

Damage

Almost since the inception of the modern eastern Washington elk herd in 1913, conflicts with the agricultural industry have occurred. Most historic accounts refer to contention over Yakima and Blue Mountains elk. Few references to problems with Colockum elk were noted prior to about 1970 and no fences have been constructed in the range of Colockum elk to prevent elk damage. Hunters have desired larger elk populations while many agricultural interests desire lower elk numbers. The Washington Department of Fish and Wildlife currently has responsibility to address elk damage complaints (Appendix B). In the Kittitas and Wenatchee Valleys, in 2000 and 2005 damage complaints averaged 12 and 37 respectively, and is becoming a chronic problem. By working with landowners, WDFW enforcement has been able to keep claims to a minimum (Table 4). Officers averaged 37 man-days on Colockum elk complaints/damage 2000-2001. Damage to alfalfa fields, grass, fruit trees, and fences are the most common complaints. In the Kittitas Valley and the Teanaway drainage, elk typically move onto irrigated hay (timothy, alfalfa) fields in August as the range dries. If elk are permitted to stay in the area through fall, damage to a new seeding can be significant. In the winter, as snow depth builds, haystack damage can be a problem. More elk are also moving into the area earlier as antler hunters push elk off public lands. The long elk season in elk area 3911, and the August through February special permit hunts in elk areas 2032 and 2033, have been used to reduce damage. Elk damage control in some portions of the area is getting more difficult as open lands are converted to vacation resorts and residential development with greater restrictions on hunting. Herding elk off of private property is often ineffective, especially if human use of surrounding public lands is high. Some landowners have expressed considerable frustration with the number of elk using the valley areas. Targeting the problem elk with special permits and hunts in elk area 3911 may be

the most effective short-term solution. In the longer term, reducing disturbance and increasing habitat quality on public lands is needed.

A potential major problem is emerging in the southern portion of GMU 335. Recreational and residential development is creating reserves for elk. Some individuals are feeding elk and encouraging animals to reside next to agricultural fields the elk damage. Local Teanaway farmers and ranchers are reporting an increasing elk population. Some of the land that is currently in the Conservation Reserve Program (CRP) may go back into grain production. Muzzleloader and modern firearm antlerless permit holders had relatively poor success in 2003. Hunter access agreements, permits, or special hunts designed to target local animals will probably be needed in the near future.

In the Wenatchee Valley, damage to fruit trees, alfalfa fields, and fences are the most common problems. Landowners report an increasing number of elk in the area. The Malaga and Peshastin permit hunts are designed to address some of the problems. The size and location of damage hunt areas should be adjusted as the need arises. Special landowner permits may be needed to target specific problems. Fencing individual orchards or constructing long drift fences are potential options for reducing damage.

Historically, West Bar has been a source of problem animals. The geography of the bar makes it possible for hunters to drive animals across the river where they become fair game and potentially cause damage in orchards. However, WDFW does not want West Bar to become a reserve. The solution has been to issue small numbers of permits. The permits keep large numbers of elk from gathering on the bar, but the number of hunters small enough so that the elk do not swim the river.

Table 2: Colockum Elk Herd Damage Claimed and Paid (1980-2005)

Year	County	No. Claims	Species	Crops	Total Amount Claimed	Total Amount Paid
2005	Kittitas	5	Elk	Hay, Pasture	\$86,375	
2004	Kittitas	6	Elk	Hay, Pasture	\$13,601	\$10,339
2003	Kittitas	6	Elk	Hay, Oats	\$62,307	\$22,857
2002	Kittitas/Chelan	4	Elk/Deer	Hay, Range, Trees	\$7,738	\$1,585
2001	Kittitas/Chelan	4	Elk/Deer	Hay, Range	\$29,000	\$5,430
2000	Kittitas	3	Elk	Hay	\$4,000	\$1,000
2000's AVG		5			\$33,837	\$8,242
1999	Kittitas	2	Elk	Hay	\$1,550	\$961
1998	Kittitas/Chelan	5	Elk	Hay, Trees	\$3,701	\$2,705
1997	Kittitas/Chelan /Grant	10	Elk/Deer	Hay, Trees	\$187,641	\$12,885
1996	Kittitas/Chelan	2	Elk/Deer	Hay, Trees	\$3,204	\$1,829
1995	None	0			0	0
1994	Kittitas/Chelan	3	Elk	Orchard	\$2,980	\$2,980
1993	Kittitas/Chelan	6	Elk/Deer	Hay, Orchard, Oats	\$30,026	\$6,098

1992	Kittitas/Chelan	3	Elk	Hay, Pasture	\$4,412	\$1,584
1991	Kittitas/Chelan	9	Elk/Deer	Hay, Orchard, Oats	\$41,151	\$42,194
1990	Kittitas	5	Elk	Hay, Oats, Ditch	\$8,352	\$5,520
1990's AVG		4			\$28,302	\$7,676
1989	None	0			0	0
1988	Kittitas/Grant	3	Elk	Hay, Trees, Oats	\$2,975	\$2,955
1987	Kittitas/Chelan	6	Elk	Hay, Orchard, Trees	\$11,561	\$3,314
1986	Kittitas	4	Elk/Deer	Hay, Grain	\$9,990	\$2,490
1985	Kittitas	1	Elk	Grain	\$220	\$220
1984	None	0			0	0
1983	None	0			0	0
1982	Chelan	1	Elk	Orchard	\$800	\$800
1981	Kittitas	1	Elk	Hay	\$425	\$0
1980	Kittitas	2	Elk	Hay, Pasture	\$790	\$790
1980's AVG		2			\$2,676	1,057

Non-consumptive Uses

Viewing elk is becoming an increasingly popular activity, which has a positive impact on local community economies. Wildlife viewing economic contributions to the state's economy exceed \$1 billion per year (U.S. Department of Interior et al. 2001). The IAC (2003) estimated about 18% of Washington residents participated in observing/photographing wildlife and projected a 23% growth in 10 years. Wildlife viewing is often a secondary activity associated with primary trip such as hiking or camping. However, there has been a noticeable increase of people on winter range since 1994. The increase in the numbers of large bulls has encouraged spring "shed-antler hunting" and viewing/photographing as a primary activity. The popularity has raised concern over the harassment of elk.

HABITAT MANAGEMENT

Winter Range

Approximately 80% of the core winter range is in public ownership. The Washington Department of Natural Resources (DNR) owns approximately 30% of the core winter range and has proposed trading these properties for land that has higher income potential. WDFW acquisition of these DNR lands is a high priority.

Slightly over 20% of the core winter range is in private ownership. Unfortunately, a large percentage is in the middle of the winter range, fragmenting the continuity of the public lands. Development is moving into the area. Long-term development of the lands could be detrimental to the stability of the herd and further complicate management. Acquiring either the land or development rights to as much of the private land in the core winter range is a priority.

Cow/calves and adult bulls are somewhat segregated in the winter (McCorquodale, 2001; Bracken and Musser, 1993). Cows and calves are much more likely to winter in the open shrub-steppe than bulls. However, in late winter as green-up occurs, bulls seem to move into similar habitat. The forage on the winter range is mostly seasonal grass, most of which are low in digestibility. Sporadically, adequate fall moisture and temperatures stimulate a fall green-up, providing high quality forage. An effective strategy for elk is to fatten up in the fall, then conserve energy during the winter. On winter range, habitat improvements may be helpful, but limiting disturbance so elk make more effective use of existing forage may be more critical.

Spring/Transition Range

The spring range is a geographically dynamic area that varies with snow conditions and human use. Elk would likely spend more time on winter range if not for the influx of antler hunters. On the south end of the range, large numbers of animals are concentrating on private lands, some of which are just being developed for residential and recreational use. Land conservation measures would be helpful long term. However, the tolerance of the landowners in the area is reaching an upper limit, and many are asking that WDFW reduce spring use of our lands in an attempt to stop the early movement of elk onto private property. Habitat improvements could be helpful if used in conjunction with reduced disturbance.

Summer/Fall Range

Managing the summer/fall range is probably one of the most important factors for the long-term stability of the herd. Most of the damage complaints for the Colockum herd occur during August-October. Elk in good condition in the fall are more likely to breed and survive the winter (Cook et al. 2004). The majority of summer range has four major ownerships with multiple uses.

There are three particularly important factors relating to human activities that affect summer habitat quality for elk: Timber harvest, livestock grazing, and disturbance (open road density). From late summer through fall, approximately half of the Colockum elk are heavily concentrated in and near the ACGR. The majority of the remainder are scattered west, typically in areas of low human use. Only a small portion of the herd remains on the winter range. Recent timber harvest throughout the summer range has produced forage, but reduced security cover, potentially causing even heavier concentrations in the reserve during peak human use. These concentrations have raised concerns over long-term habitat quality in the reserve. The area south, west and east of the reserve has received heavy utilization from sheep and cattle. Range studies suggest a rest rotation grazing system can be beneficial to wildlife (Ganskopp et al. 2004, Danvir and Kearl 1996, Yeo et al. 1993) the Colockum would likely benefit from such a system. The Coffin Reserve is fenced to exclude cattle. Maintaining the fence is costly. The best management may involve closing numerous roads to better disperse the elk and improving forage in and around the reserve. Grazing options that better disperse the cattle, rest pastures, and improve forage quality on WDFW lands should be considered.

The Washington Department of Fish and Wildlife has a partnership in the operation of Mission Ridge winter ski area on the Colockum Wildlife Area. Year-long operation and a summit lodge had been proposed by the owners of Mission Ridge. These requests would have negatively impacted elk and were withdrawn. Proposals have also been submitted for access to the ski area

from the south. While winter use might not impact elk, having a major road through the summer/fall range could have substantial impacts.

Use of Livestock to Improve Forage

Much of the range of Colockum elk has had a long history of livestock use dating from early settlement of the area. At present, there is one livestock-grazing permit issued on a portion of the Colockum WA. While livestock does not currently graze most of the Colockum and Quilomene WAs, the available forage resources are annually utilized by wild ungulates and other wildlife. Off the WA, within the range of Colockum elk, domestic grazing by sheep and cattle is common. Some people have suggested that WDFW should increase the area available for livestock grazing on WAs to improve forage quality. The relationship between elk forage quality and livestock grazing is complicated, and results of research on this relationship are mixed. Some studies have suggested that livestock can have a positive effect on condition (crude protein, digestibility) of forage for elk (Ganskopp et al. 2004, Taylor et al. 2004, Danvir and Kearn 1996, Yeo et al. 1993, Grover and Thompson 1986) when the timing, intensity, and duration of livestock grazing are controlled. Other research (Skovlin et al. 1983, Wambolt et al. 1997, Westenkow-Wall et al. 1994) has failed to find forage improvements or increases. Spring livestock grazing that results in improved nutritional quality of forage also results in reduced fall standing crop (Ganskopp et al. 2004). Livestock can also have a negative influence on vegetation and wildlife (Carrier and Czech 1996, Ohmart 1996) and have frequently been found to displace elk on the range (Coe et al. 2005, Danvir and Kearn 1996, Yeo et al. 1993, Mackie 1970). Any livestock-grazing program aimed at improving forage quality for elk will have to take into account all potential impacts.

RESEARCH NEEDS

1. Refinement of elk population monitoring strategies is needed and would be aided by better data on seasonal elk movements and experimentation on sources of error inherent in current survey methods.
2. Data are needed to better define the interactions between the core Colockum elk herd and developing sub-herds along the periphery of the historical core herd range (e.g., Kittitas Valley, rural Cle Elum, Wenatchee Valley).
3. Data are needed on the dynamics and movements of elk in areas where landowner complaints are becoming chronic.
4. Better data on the effects of human disturbance on seasonal elk movements would be useful in refining strategies to manage elk distribution.
5. Data are needed to evaluate the effects of recent and current livestock herbivory on leased rangelands within the core Colockum elk herd range (i.e., effects of livestock grazing on seasonal elk forage availability and elk movement).
6. Better data on the consequences of elk use of the Arthur Coffin Reserve on elk nutritional dynamics and productivity would be useful in long-term Colockum elk herd management planning.

HERD MANAGEMENT GOALS

The Colockum Elk Herd Plan provides a historical background and current condition of the herd. The plan is an assessment document that identifies management problems, suggests solutions, and sets direction. The plan outlines goals, objectives, problems, strategies, and helps establish priorities for managing the elk herd. It provides readily accessible resource and biological information from the herd and identifies inadequacies in scientific information. Fundamental goals for the management of the Colockum elk herd are to:

1. Preserve, protect, perpetuate, manage, and enhance elk and their habitats to ensure healthy, productive populations and ecosystem integrity.
2. Manage elk for a variety of recreational, educational, and aesthetic purposes, including hunting, scientific study, wildlife viewing, photography, and use by Native Americans.
3. Manage the Colockum elk herd for a sustained yield.

MANAGEMENT OBJECTIVES, PROBLEMS, AND STRATEGIES

Herd Management

Objective #1

Manage for 4,275 to 4,725 elk in the surveyed portion of the winter range, consistent with the Game Management Plan (WDFW 2003).

Problem: The elk population on the core winter range appears to be declining and is below objective.

Strategies:

1. A reduction in antlerless harvest opportunity in the core range is necessary to meet population objectives.
2. Hunting pressure must be kept on damage causing elk, including bulls, in GMU's 335 and Elk Areas 2032, 2033, and 3911.
3. Conduct annual herd composition surveys to determine annual recruitment and estimate population levels.
4. Use harvest data and ground survey data to cross check aerial survey estimates of recruitment.
5. Monitor antlerless harvest and adjust to meet population objectives.
6. If below population objective, attempt to increase recruitment and decrease animals in damage areas through habitat enhancements, hunting seasons, and damage permits.
7. Allow hunting of either sex in select damage areas.

Objective #2

Manage for post-hunting season bull ratios consistent with the Game Management Plan of 12 to 20 bulls per 100 cows post season (WDFW 2003).

Problem: The annual variation in measured bull:cow ratios has been high. The dispersed nature of small, bull groups has led to ambiguity in estimates of bull abundance. Bulls causing damage to orchards must be harvested. Recruitment of yearlings into adult bull class appears to be low.

Strategies:

1. Continue steps to improve surveys designed to measure bull/cow ratios, such as conducting surveys later in the spring over a wider area.
2. Explore using other, independent methods to estimate bull populations and bull survival.
3. Adjust branch-antlered bull permits to obtain goal 12-20 bulls per 100 cows.

Objective #3

Improve elk habitat quality and reduce disturbance of elk.

Problem: Maintaining herd objectives will be difficult if large numbers of elk move onto private lands and cause damage. Improving habitat quality may help keep elk out of agricultural areas, but not if human disturbance is high. Recreational use of the Colockum elk herd area is increasing and may be causing elk to move onto private lands. Road densities exceed optimal levels in many areas and violations of the green-dot road management system are common. Timber harvest has probably reduced security cover, magnifying the impact of increased human use. People looking for antlers may be causing extra winter stress on elk and pushing them off the range prematurely.

Strategies:

1. Look for areas to improve elk forage through clearing, fertilizing, livestock management, and other vegetation management techniques. Consider a CRM within the Wildlife Area Plans.
2. Cooperate with other public land agencies and private landowners to develop a cooperative road management system that addresses the need for security for elk.
3. Close some roads permanently (e.g., gates or tank traps) or maintain seasonal closures of roads during critical periods. Use gates where access for specific uses is needed, such as fire control.
4. As part of the road management plan, address road densities on winter range on the Colockum and Quilomene wildlife areas.
5. Increase enforcement on road management systems and/or potential closures. Emphasize patrols on weekends during spring and winter.
6. Maintain key areas of timber to provide security cover for elk.
7. Identify where on the landscape road density needs to be addressed.
8. Determine which roads should be targeted to best manage road densities to benefit elk, given the limited funding available.

Objective #4

Minimize conflicts caused by the Colockum elk herd and improve Washington Department of Fish and Wildlife relations with landowners.

Problem: Elk damage complaints are a chronic problem. The WDFW is required to address damage complaints. The Enforcement Program has historically been responsible for mitigating elk damage. The response to landowner complaints has been below expectations in some areas due to changes in Enforcement priorities, limited human resources, and funding.

Strategies:

1. Continue to use general seasons and special permits in the three elk damage areas to put pressure on elk that are using private agricultural lands.
2. Where it is justified and can be implemented safely, use hot-spot hunts, kill permits, and/or landowner preference permits to remove elk causing crop damage and other specific damage problems. Adjust seasons, area boundaries, and permits to target problem elk.
3. Implement a program with Wildlife Conflict Specialist positions, which are devoted specifically to resolving wildlife damage problems.
4. Redistribute elk where desirable by reducing human disturbance and increasing habitat quality.
5. Work closely with landowners who are experiencing elk damage to alleviate conflicts. Develop solutions to elk/agriculture conflicts through The Kittitas Big Game Management Roundtable (BGMR) and Coordinated Resource Management Planning (CRMP) process.
6. Provide information to landowners about WDFW cost-share fencing program. Encourage fencing of individual farms to reduce damage problems. Evaluate the feasibility of a drift fence in Kittitas Valley.

Objective #5

Work cooperatively with the Yakama Nation, U.S. Forest Service, Department of Natural Resources, Bureau of Land Management, and private landowners to manage the Colockum elk herd.

Problem: Communication should be improved between the Yakama Nation and the Washington Department of Fish and Wildlife on management of the Colockum elk herd. Other agencies, timber companies, and private individuals control the majority of summer range and access. Successful management of the Colockum elk herd is dependent on good communication among agencies and private landowners.

Strategies:

1. Meet at least once a year with tribal, agency, and private landowner's representatives to review the status of the herd, share management information, and discuss options.
2. Encourage tribal participation in studies and surveys of elk.

3. Continue working with the Big Game Management Round Table and consider developing Private Lands Access Programs to better manage the herd.

Objective #6

Increase public awareness of the Colockum herd and develop elk viewing opportunities.

Problem: Non-consumptive appreciation of elk is becoming more and more popular. Those involved with non-consumptive uses may not realize that their activities may impact the Colockum elk herd, especially during winter and spring.

Strategies:

1. Increase efforts to educate public on management of Colockum elk, especially on how disturbance can negatively affect elk and increase damage.
2. Promote elk viewing that has the least impact, especially to wintering elk.

Objective #7

Conduct research where needed to provide essential data for improving management of the Colockum Herd.

Problem: A number of significant management issues relating to the Colockum elk herd require new or better data for adequate resolution. These needs include refinement of strategies to monitor abundance and structure of the elk herd. Some ambiguity exists in currently available data used to infer trends in productivity of the herd and relative abundance of a harvestable surplus of cows and branch-antlered bulls.

Related to questions about general trends in productivity are questions regarding the effects of concentrating elk use on the Arthur Coffin Game Reserve (ACGR) during hunting seasons on cow elk nutritional condition and calf recruitment. Data on body condition of cow elk that use the ACGR would clarify any negative impacts of the Reserve on herd productivity.

Among the most pressing questions surrounding the Colockum elk herd is uncertainty regarding the relationship between the core population and what appear to be growing subherds in areas peripheral to the historic core range of the herd. Chronic human-elk conflicts may develop and be difficult to manage if these subherds grow and elk avoid areas where general season elk hunting occurs. Management options could be clarified by a better understanding of the movement patterns and interactions of the core Colockum elk and these subherds.

Strategies:

1. Continue to evaluate the geographic scope of the aerial survey design to assure good coverage of the winter distribution of Colockum elk.
2. Experiment with survey replication to evaluate the reliability of the current sightability-based estimation protocol.

3. Explore other means of estimating elk recruitment (e.g., lactation rates from hunter-killed cow elk).
4. Collect data from hunter-killed elk and possibly assess condition of live radio-marked live elk to quantify landscape-referenced nutrition dynamics among Colockum cow elk (e.g., relative to use of the ACGR, public lands, and agricultural lands).
5. Monitor survival of priority sex and age classes in the core elk population.

SPENDING PRIORITIES

The following is a prioritized list of projects and expenses for managing the Colockum elk herd.

Priority #1

Herd Population/Composition Surveys.

The Washington Department of Fish and Wildlife needs to conduct annual population surveys, with the objective of obtaining precise and accurate data on population size and composition.

Post-season surveys: Current post-season aerial surveys require approximately 15 hours of helicopter flight time in order to cover >70 percent of the core winter range. Helicopter charter time has increased 50% in 5 years, while the budget has remained static. There are a number of potential problems with the current surveys. The discrepancy between survey and harvest data raises questions about the accuracy of the surveys. Light winters and increased recreation maybe increasing the percentage of elk residing outside traditional winter range. Surveys have been designed mostly to estimate total population, and may not be accurately estimating bull numbers.

Priority: High - Basic biological data collection is essential for responsible management of the Colockum Elk Herd.

Time-line: Annually

Cost: \$14,000/year; \$70,000 for 5 years (\$450/hr for helicopter)

Priority #2

Reduce burden of elk on private landowners.

The enforcement division has historically been responsible for mitigating elk damage. Changes in priorities and other factors have left the response to landowner complaints below expectations in some areas. Dedicated wildlife conflict specialists should be hired to address landowner complaints. Funds should also be identified to hire herder/hazers to decrease damage claims.

Priority: High

Time-line: Annually

Full-time Control Specialist: \$65,000/year; \$325,000 for 5 years

Seasonal Herder/Hazers: \$17,000/year, \$85,000 for 5 years

Equipment: \$20,000 first year

Cost Share Fencing: \$10,000/year; \$50,000 for 5 years

Priority #3

Range Management

Forage utilization across the range of Colockum elk appears to vary with elk and livestock densities. Cattle interests would like to see more grazing on state lands. The cost of excluding cattle from WDFW lands is fairly high. There may be an opportunity to develop a grazing system that would benefit wildlife and reduce WDFW's cost of maintaining fences. The first step is to document current utilization, then develop a grazing system and measure the change in utilization. The most efficient means of documenting range condition might be through a university run project.

Priority: High

Time-line: 2006-2010

Monitoring Costs: \$25,000 in 2006; \$75,000 for 3 years

Materials for measuring utilization: \$5,000

Priority #4

Access Management

The year round road density and disturbance is higher than desired. The human use is making it difficult to keep elk on public lands. Some roads need to be closed permanently, others seasonally. Enforcing any closures is key to success. One of the most common criticisms of road management is lack of enforcement. Physically closed roads are more effective than posted roads. Flight time, especially in the spring, would greatly aide the enforcement capabilities.

Priority: High.

Time-line: 2007-2010

Develop Road Management Plan: \$65,000

Implement Plan (Gates, Signs, Maps) and Monitor: \$150,000

Priority # 5

Habitat Enhancement

There are various habitat enhancements that have/can take place. These include maintaining meadows, burning, weed control, and fertilizing. Develop a prioritized list of projects and seek partnerships to implement.

Priority: Medium

Time-line: 2006, 2008, 2010

Cost: \$30,000 every other year; \$90,000 for 5 years

Priority #6

Gain management control of critical elk habitat.

Development is moving into areas that have been used by elk historically. As land use changes, elk "refuges" near agricultural lands can develop, limiting ability to control problem elk. Large-scale development has the potential to completely displace elk. Habitat should be secured

through purchases, leases, easements, or incentives. Funds would also be needed for operation and management of these areas. The winter range is a top priority.

Priority: Medium

Time-line: 2003-2008

Cost: The estimated cost is \$1,000,000-\$5,000,000 total.

Priority #7

Elk Study

There are numerous questions that need to be addressed regarding the Colockum herd. Data are needed on: 1) Movements of subherds in relation to damage and contribution to herd objectives; 2) impacts of recreational use on elk distribution; 3) effects of management actions (grazing, habitat improvements, road closures, etc.) on elk distribution; 4) survival of priority sex and age classes; 5) impacts of the ACGR reserve on vegetation and elk.

Priority: Medium

Time-line: 2007-2010

Cost: \$350,000 for 5 years

Plan Review and Amendments

The Colockum Elk Herd Plan is identified as a five-year document subject to annual review and amendment. As new information is gathered and conditions change it will be necessary to maintain a free exchange of communication between the Washington Department of Fish and Wildlife, Yakama Nation, and cooperators. Washington Department of Fish and Wildlife's Regions 2 and 3 will meet on an annual basis to discuss pertinent issues related to the Colockum herd. An annual review meeting with delegates from Tribes will be arranged by the Washington Department of Fish and Wildlife's Region 3 Wildlife Program Manager. Emergent issues can be addressed, as needed either at the technical or policy level.

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APPENDIX A. Elk hunting seasons in the Colockum herd area

Year	GMU # & Permit (#s)	Approx. Dates	Days	Legal Animal	Hunt description and Tag
1927-8	Kittitas County	10/21 – 10/31	11-12	One elk	First elk season
1929-2	Kittitas County	11/01 – 11/05	5-6	One bull elk	
1933-4	Kittitas County	11/01 – 11/10	6-11	1 male / branched antlers	
1935	Kittitas County	11/03 – 11/15	13	1 bull w/ >2" horns	
1936-9	Kittitas County	10/24 – 11/15	7-12	1 male / branched antlers	
1940-2	Kittitas County	10/30 – 11/11	11-13	1 male / visible horns	
1943-4	Chelan & Kittitas counties	11/10 – 11/21	12	1 male / visible horns	
1944	Elk area 4 Chelan/Teaway	12/03 – 12/10	8	Either-sex	Late season elk reduction hunt
1945-6	Chelan & Kittitas counties	11/04 – 11/13	10	1 elk / visible horns	
1946	Chelan Co. special elk season	11/17 – 11/30	14	Either-sex elk	
1947-8	Chelan & Kittitas counties	10/31 – 11/08	7-8	1 bull / visible horns	
1948	Chelan Co. special elk season	10/31 – 11/07	8	Either-sex elk	
1949	Chelan & Kittitas counties	10/31 – 11/07	8	1 bull / visible horns	
	Chelan Co. special elk season	10/31 – 11/07	8	Either-sex elk	
1950-1	Chelan & Kittitas Cos. Colockum	10/29 – 11/05	8	1 bull / visible horns	General hunting season
1951	Chelan Co. special elk season	10/28 – 12/31	65	Either-sex elk	
1952	Chelan & Kittitas Cos. Colockum	11/02 – 11/11	8	bull / visible horns	General hunting season
	Teaway, Chelan Co. N. of Squilhuik – Mission Rd., Kittitas Co. Elk Area 2	11/02 – 12/31 11/02 – 11/11	59 8	Either-sex elk	Open to all elk hunters
1953	Chelan & Kittitas; Chelan County	11/1–11; 11/1 – 12/31	11, 61	Bull, Either-sex elk	General hunting season
1954	Chelan/Kittitas; 5J, Chelan NW of 5J	11/7–14; 11/7–12/31	8, 54	Bull, Either-sex elk	General hunting season
1955	Chelan/Kittitas; 5J, Chelan NW of 5J	11/11–20; 11/11–12/31	10, 50	Bull, Either-sex elk	General hunting season
	Permit areas 4A & 4E (100 ea)	11/21 – 11/23	3	Either-sex elk	Permit Controlled Elk Hunting Season
1956	Chelan/Kittitas; 5J, Chelan NW of 5J	11/10–19; 11/10–12/31	10, 51	Bull, Either-sex elk	General hunting season
	4A & 4E (100-200 ea); Area 3 (150)	11/20 – 22; 12/16 – 18	3	Either-sex elk	Permit Controlled Elk Hunting Season
1957	Chelan/Kittitas; Chelan/Kittitas N. of 4E.	11/09 – 11/17	9	Bull, Either-sex elk	General hunting season
	Area 4 100; 4A & 4E (100-200 ea)	10/04–6; 11/18–20	3	Either-sex elk	Permit Controlled Elk Hunting Season
1958	Unit 4E Naneum	11/17 – 01/31	75	Either-sex elk	Bow and Arrow only season
	Chelan/Kittitas; Teaway/Chelan	11/08–16; 11/17–12/31	9, 45	Bull, Either-sex elk	General season
1959	Chelan/Kittitas; 5J, Chelan NW of 5J	11/1 – 15; 11/16 – 12/31	15, 46	Bull, Either-sex elk	General season
	Unit 4E (200)	11/16 – 11/18	3	Either-sex elk	Permit Controlled Elk Hunting Season
1960	Chelan/Kittitas; 5J, Chelan NW of 5J	11/05 – 11/16	12	Bull, Either-sex elk	General season
1961-4	Chelan/Kittitas; 5J, Chelan NW of 5J	11/04–12; 11/13–12/31	9, 49	Bull, Either-sex elk	General season; both 9 days in 1963
	Unit 4E Naneum (300-400)	11/18 – 11/20	3	Either-sex elk	Permits in 4A w/21 day season in 1964
1965	Unit 4E Naneum	11/28 – 12/13	16	Either-sex elk	Bow and Arrow only season
	Chelan/Kittitas; 5J, Chelan NW of 5J	11/13 – 11/21	9	Bull, Either-sex elk	General season
	Unit 4A Teaway (350)	11/15 – 12/05	21	Either-sex elk	Permit Controlled Elk Hunting Season
1966	Unit 4E Naneum	12/03 – 01/31	60	Either-sex elk	Bow and Arrow only season
	Chelan/Kittitas; 5J, Chelan NW of 5J	11/05–20, 12/3 – 18	16, 16	Bull, Either-sex elk	General season
	Unit 4A, 4E & 4K (500-550)	11/07 – 11/18	12	Either-sex elk	Permit Controlled Elk Hunting Season
1967	Unit 4E Naneum; Elk Area 11 & 12	11/20–12/31; 12/11–17	42, 7	Either-sex elk	Bow and Arrow only season
	Chelan/Kittitas; 5J, Chelan NW of 5J	11/04–19, 12/3–18	16, 16	Bull, Either-sex elk	General season
	Unit 4A, 4E & 4K (500-550)	11/06 – 12/10	5-35	Either-sex elk	Permit Controlled Elk Hunting Season
1968	Unit 4E Kittitas; Chelan	11/20–12/31; 9/7–12/15	42, 99	Either-sex elk	Bow and Arrow only season
	Chelan & Kittitas counties	11/02 – 11/17	16	Bull / visible antler	General season
	Unit 4A, 4E & 4K (500-550)	11/04 – 11/29	5-26	Either-sex elk	Permit Controlled Elk Hunting Season
1969	Unit 4E Kittitas; Chelan	11/29–12/31; 9/7–12/15	33, 99	Either-sex elk	Bow and Arrow only season

Year	GMU # & Permit (#s)	Approx. Dates	Days	Legal Animal	Hunt description and Tag
	Chelan & Kittitas counties	11/01 – 11/16	16	Bull / visible antler	General season
	Elk area 3,4, 5J, Chelan N&W of 5J.	11/29 – 12/31	23-33	Either-sex elk	Open to all hunters
	Unit 4A, 4E & 4K (500-550)	11/03 – 11/28	5-26	Either-sex elk	Permit Controlled Elk Hunting Season
1970	4E; <i>Bow Area 1 Nason Creek</i>	11/28-12/31;9/12-12/20	34, 100	Either-sex	Archery Elk Season
	5J, 4A, 4E, 4K, 4P; <i>Area 3, 4</i>	11/07-22;11/28-12/31	16; 34	Bull, <i>Either-sex elk</i>	Modern Firearm General Elk Season
	4E/4K Kittitas (400)	11/09 – 11/13	5	Either-sex	Modern Firearm Elk Permit Hunts
1971-2	4E; <i>Bow Area 1 Nason Creek</i>	11/20-12/19,9/11-12/19	30, 100	Either-sex	Archery Elk Season
	4A Kittitas (Teaway)	11/15 – 11/21	7	Either-sex	Muzzleloader Elk Season
	5J, 4A, 4E, 4K, 4P; <i>Area 3, 4</i>	11/01-14;11/27-12/31	14;16,35	Bull, <i>Either-sex elk</i>	Modern Firearm General Elk Season
	4E Kittitas (500)	11/03 – 11/06	4	Either-sex	Modern Firearm Elk Permit Hunts
1973	Areas 9; 1, 4E	9/22–30, 9/8-12/26	9,33,100	Bull, <i>Either-sex elk</i>	Archery Elk Season
	ML Area 03 Teaway Area	11/ 22 – 11/30	9	Either-sex	Muzzleloader Elk Season
	5J, 4A, 4E, 4K, 4P; <i>Area 3, 4</i>	11/5-18;12/01-12/31	14;9,31	Bull, <i>Either-sex elk</i>	Modern Firearm General Elk Season
	4E Naneum (650)	11/06 – 11/09	4	Either-sex	Modern Firearm Elk Permit Hunts
1974	Areas 9; 1, 4E	9/14–29, 9/7-12/29	6,37,100	Bull, <i>Either-sex elk</i>	Archery Elk Season
	ML Area 03 Teaway Area	11/ 23 – 11/29	7	Either-sex	Muzzleloader Elk Season
	5J, 4A, 4E, 4K, 4P; <i>Area 3, 4</i>	11/4-17,11/30 – 12/29	14,9,30	Bull, <i>Either-sex elk</i>	Modern Firearm General Elk Season
	4E , Elk 19, Elk 20 (500,150,200)	11/04 – 11/15	4,4,11	Either-sex	Modern Firearm Elk Permit Hunts
1975	Area 9; 20, 328	09/13-10/5,11/22-12/28	23,16,37	Bull, <i>Either-sex elk</i>	Archery Elk Season
	ML Area 03 Cle Elum	11/ 22 – 11/28	7	Either-sex	Muzzleloader Elk Season
	5J, 4A, 4E, 4K, 4P; <i>Area 3, 4</i>	11/03-16,11/29-12/28	14,9,30	Bull, <i>Either-sex elk</i>	Modern Firearm General Elk Season
	328 (450), Elk Area 20 (200)	11/04 – 11/28	4, 25	Either-sex	Modern Firearm Elk Permit Hunts
1976	328, <i>Bow Area 9</i>	11/20-12/31,9/11-10/10	42, 30	Either-sex, <i>Antlered bull</i>	Archery Elk Season
	ML Area 03 Cle Elum	11/ 20 – 11/26	7	Either-sex	Muzzleloader Elk Season
	310 – 332; <i>Area 003, 004</i>	11/1-14;11/27-12/26	14;9,30	Bull, <i>Either-sex elk</i>	Modern Firearm General Elk Season
	328 (400), 332 (150), Area 20 (200)	11/02 – 11/12	4,4,11	Either-sex	Modern Firearm Elk Permit Hunts
1977	328, <i>Bow Area 9</i>	11/19-12/31, 9/10-10/9	43, 30	Either-sex, <i>Antlered bull</i>	Archery Elk Season
	ML Area 03 Lookout Mt.	11/ 19 – 11/21	3	Either-sex	Muzzleloader Elk Season
	310 – 332; <i>Area 003, 004</i>	10/31-11/13,11/26–2/25	14;9,30	Bull, <i>Either-sex elk</i>	Modern Firearm General Elk Season
	328 (400), 332 (75), Area 20(200)	11/01 – 11/11	4,4,11	Either-sex	Modern Firearm Elk Permit Hunts
1978	328, <i>Bow Area 9</i>	11/23–12/17, 9/9–10/8	55	Either-sex	Archery Elk Season
	ML Area 03 Lookout Mt.	11/ 25 – 12/03	9	Either-sex	Muzzleloader Elk Season
	310-332, <i>Area 033, 003, 004</i> Elk Area 003	11/06 – 12/25 11/25 – 12/03	14,5,31 9	Bull with visible antlers Either-sex	Modern Firearm General Elk Season
	328(400), Area 032 & 033 (75ea)	11/07 – 11/10	4	Either-sex	Modern Firearm Elk Permit Hunts
1979	328, <i>Bow Area 9</i>	11/23-12/16, 9/8-10/7	54	Either-sex	Archery Elk Season
	ML Area 10 Cle Elum	11/24 – 12/02	9	Either-sex	Muzzleloader Elk Season (MKWY)
	310-332 (exclude 320), <i>Area 033</i> Elk Area 004; 320	10/29-11/7,10/29 – 11/2 11/24-12/23; 11/4-18	10, 5 30;9,15	Bull with visible antlers Either-sex; <i>Bull</i>	Modern Firearm General Season (K) (Any elk tag); (<i>Y late, X early</i>)
	328 (350), Area 032 (50), <i>Area 033 (75)</i>	10/30 – 11/02	4	Either-sex, <i>Antlerless only</i>	Modern Firearm Elk Permit Hunts (K)
1980-1	328, <i>Bow Area 9</i>	11/22-12/14, 9/6-10/5	53	Either-sex	Archery Elk Season
	ML Area 10 Cle Elum	11/ 22 – 11/30	9	Either-sex	Muzzleloader Elk Season (MKWY)

Year	GMU # & Permit (#s)	Approx. Dates	Days	Legal Animal	Hunt description and Tag
1982	310-332 (exclude 320), Area 033 Elk Area 004; 320	10/27-11/5; 11/22- 12/21 11/02 - 11/16	12,30 9,15	Bull with visible antlers Either-sex; <i>Bull</i>	Modern Firearm General Season (K) (Any elk tag); (<i>Y late, X early</i>)
	328(275), Elk Area 032,33 (50,150)	10/28 - 10/31	4	Either-sex	Modern Firearm Elk Permit Hunts (K)
	328, Bow Area 809	11/20-12/12, 9/8-10/3	49	Either-sex	Archery Elk Season
	324	11/23 - 12/05	13	Either-sex	Muzzleloader Elk Season (MKWXY)
	314, 328, 329, 334 Elk Area 004 Wenatchee; 320, 324	10/25 - 11/05 11/07 - 12/19	12 30,9,15	Bull with visible antlers Either-sex, Bull	Modern Firearm General Season (K) Modern Firearm General (Y,X)
	328(275), Area 032(100), 330(150)	10/26 - 10/29	4	Either-sex	Modern Firearm Elk Permit Hunts (K)
1983	328, Bow Area 809	11/19-12/11,9/7-10/2	49	Either-sex	Archery Elk Season
	ML Area 910 Cle Elum	11/ 22 - 12/04	13	Either-sex	Muzzleloader Elk Season (MKWXY)
	314, 328, 329, 334 Elk Area 004; 320, 324	10/27 - 11/05 12/01-15; 11/6-20	6,10 6,9,15	Bull with visible antlers Either-sex; <i>Bull</i>	Modern Firearm General Elk Season (CL,K) (K or B); (<i>Y,X</i>)
	328 (175), 329 (50); 330 (50), 331 (50)	10/28-31; 10/30- 11/1	4, 3	Either-sex, Antlerless only	Modern Firearm Elk Permit Hunts(K)
1984	312, 316, 320, 324, 328-335	10/01-05, 10/6-12	12	Bull only, <i>Either-sex</i>	Early Archery Elk Season
	314, 328	11/20 - 12/02	11,13	Either-sex	Late Archery Elk Season (any archery tag)
	310, 314; Area 910, 003	10/06-11;11/20-12/15	6,11,26	Bull only, <i>Either-sex</i>	Muzzleloader Season (CM); (<i>CM or YM,CM</i>)
	310, 312, 314, 316, 328, 329, 334 Elk Area 004; 320, 324	10/28 - 11/06 12/01 - 15; 11/1 - 18	6,10 15,9,18	Bull with visible antlers Either-sex, <i>Bull</i>	Modern Firearm General (CL,CB) CE, CL or CM; <i>YL, YE</i>
	328(100), 329(50), 330(50), 331(50)	10/25 - 10/27	3	Antlerless only	Modern Firearm Elk Permit Hunts (CL or CM)
1985	312, 316, 320, 324, 328-335	10/01-04,10/05-11	11	Bull only, <i>Either-sex</i>	Early Archery Elk Season
	314,328	11/19 - 12/01	11,13	Either-sex	Late Archery Elk Season (any archery tag)
	310,314; Area 003, Area 910	10/1-11;11/20-12/15	11;26,15	Bull; <i>Either-sex, Antlerless</i>	Muzzleloader Season(CM);(<i>CM, YM</i>)
	310-316, 328, 329, 334; Area 004 320, 324	10/27-11/5;12/1-15 11/05 - 11/17	7, 9,15 9,12	Bull; <i>Either-sex</i> Bull with visible antlers	Modern Firearm Season CL,CB; <i>CE,CL or CM</i> Modern Firearm General (YL, YE)
	328(100), 329(50), 330(50), 331(50)	10/24 - 10/26	3	Antlerless only	Modern firearm Elk Permit Hunts (CL or CM)
1986	312, 316, 320, 324, 328-335	10/01-03, 10/4-10	10	Bull only, <i>Either-sex</i>	Early Archery Elk Season
	314, 328	11/18 - 11/30	12	Either-sex	Late Archery Elk Season (any archery tag)
	310,314 ML Area 910 Cle Elum	10/01 - 10/10 9/15-10/16,11/18-12/7	10 52	Bull only Antlerless only, Either sex	Early Muzzleloader Elk Season (CM) (CM, YM)
	Elk Area 003, 004	11/18 - 12/15	27,15	Either-sex	Late Muzzleloader Elk Season (CM)
	310,312,314, 316, 328, 329, 334 Elk Area 004 Wenatchee 320, 324	10/26 - 11/04 12/01 - 12/15 11/05 - 11/16	7, 9 15 9,12	Bull with visible antlers Either-sex Bull with visible antlers	Modern Firearm General (CL,CB) CE, CL or CM Modern Firearm General Season (YL, YE)
	328(150), 329(250), 330(75), 331(75)	10/23 - 10/25	3	Antlerless only	Modern Firearm Elk Permit Hunts(CL or CM)
1987	316,328-35; 314, 328	10/01-16, 11/25-12/6	28	Either-sex	Early Archery Season, <i>Late Archery Elk Season</i>
	302,314 ML Area 910 Cle Elum	10/10 - 10/16 9/15-10/16,11/16-12/6	7 53	Bull, Branched antler bull Antlerless only	Muzzleloader Elk Season (CM) (CM, YM)
	Elk Area 003, Elk Area 004	11/16,12/1 - 12/15	30,15	Either-sex	Late Muzzleloader Season (CM), (<i>CM, YM</i>)
	302, 314, 316, 328, 329, 334; 335	10/26-11/4; 11/1-12	7,9;9,12	Bull with visible antlers	Modern Firearm General (CL,CE); (<i>YL, YE</i>)

Year	GMU # & Permit (#s)	Approx. Dates	Days	Legal Animal	Hunt description and Tag
	328(150),329(250),330-31(75 ea),335(50) Elk Area 002 Caribou (250)	10/23-25, 11/13-15 11/21 - 11/30	3 10	Antlerless only Antlerless only	Modern Firearm Elk Permit Hunts(CL or CM) (CL or CM)
1988	316,328-35; 328	10/1-14, 11/23-12/4	26	Either-sex	Archery Elk Seasons (CA, YA in 335)
	302, 314 (portion closed) ML Area 910 Cle Elum	10/08 - 10/14 09/17-10/7, 10/8-14	7 21,7	Bull only Antlerless, Either-sex	Early Muzzleloader Season (CM or YM, CM) (CM, YM)
	Elk Area 003 Kingsbury ML Area 910 Cle Elum	11/16 - 12/15 11/16-25,11/26-12/4	30 10, 7	Either-sex Antlerless, Either-sex	Late Muzzleloader Elk Season (YM) (CM, YM)
	302, 314, 316, 328, 329, 330, 334; 335	10/26-11/4; 11/1-12	7,9;9,12	Bull with visible antlers	Modern Firearm General (CL,CE); (YL, YE)
	328(150), 329(250), 330(25) Area 002 (250), 005 (50)	10/23 - 10/25 11/19 - 11/30	3 12	Antlerless only Antlerless only	Modern Firearm Elk Permit Hunts(CL or BM) (CL or BM)
1989	316, 328-335; 328	9/30-10/13,11/22-12/3	26	Either-sex	Archery Elk Seasons (CA, YA in 335)
	302, 314 (only a portion of) ML Area 910 Cle Elum	10/07 - 10/13 09/16-10/6, 10/7-13	7 21, 7	Bull only Antlerless, <i>Either-sex</i>	Early Muzzleloader Season (CM or YM, CM) (CM, YM)
	Elk Area 003 Kingsbury ML Area 910 Cle Elum	12/02 - 12/10 11/17-26,11/27-12/3	9 10, 7	Antlerless only Antlerless, <i>Either-sex</i>	Late Muzzleloader Elk Season (YM) (CM, YM)
	302, 314, 316, 328, 329, 334; 335	10/25-11/03,11/5-13	9, 9	Bull with visible antlers	Modern Firearm Season (CL, CB; YL, YE)
	314(100), 329 (150) 330 West Bar A, B, C (25 ea) Elk Area 002 Caribou (100)	10/22 - 10/24 10/22, 23, 24 11/18 - 11/21	3 1 4	Antlerless only Antlerless only Antlerless only	Modern firearm Elk Permit Hunts (CL or BM) (CL or CM) (CL or CM)
1990	316, 328, 329, 330, 334, 335	10/6-10/12,9/29-10/12	7,14	Either-sex	Archery Elk Seasons (CA, YA in 335)
	328	11/21 - 12/02	12	Either-sex	Late Archery Elk Season (any archery tag)
	302, 314 (portion of). ML Area 910 Cle Elum Area 003 Kingsbury	10/06 - 10/12 9/15-10/12,11/17-12/ 12/08 - 12/23	7 44 16	Bull only Either-sex Antlerless only	Muzzleloader Seasons (CM or YM, CM) (YM, CM, YM) (YM)
	302,314,316,328,329,334,335	10/24-11/02; 11/5-13	7,9; 6,9	Bull with visible antlers	Modern Firearm Season (CL,CB); (YL, YB)
	314(100), 328(150), 329(150); 030 (75) Elk Area 032 (150), 033 (100) 330 West Bar A,B,C (25 ea) Elk Area 002 Caribou (175)	10/21-23; 10/6-12 09/15 - 10/23 10/21, 22, 23 11/21 - 12/02	3; 7 39 1 12	Antlerless only Antlerless only Antlerless only Antlerless only	Modern Firearm Elk Permit Hunts(CL or CM) (CL or CM) (CL or CM) (CL or CM)
1991	316, 335; 328, 329, 334	09/28-10/11; 10/5-11	14; 7	Either-sex	Early Archery Elk Season (CA), (YA in 335)
	328, 334	11/27 - 12/08	12	Either-sex	Late Archery Elk Season (any archery tag)
	302, 314 (only a portion of) ML Area 910 Cle Elum	10/05 - 10/11 10/5-11; 11/17-12/8	7 29	Bull only Either-sex, <i>Antlerless</i>	Muzzleloader Season (CM or YM, CM) (YM)
	302,314,316,328,329,334; 335	10/23-29; 11/5-13	4,7;6,9	Bull with visible antlers	Modern Firearm Season (CL,CB);(YL, YB)
	316, 302(in Chelan Co)	12/07 - 12/22	16	Antlerless only	Open to Tag Holders CE, CL, CM
	328 Naneum (150) Elk Area 030 A (75), B (75) Elk Area 032 Malaga A (150), B (150) Elk Area 033 Peshastin (100) 330 West Bar A, B,C (25 ea) Elk Area 002 Caribou (175)	10/20 - 10/22 10/05-11, 12/09-15 9/15-10/7, 10/30 -11/6 09/01 - 10/04 10/20, 21, 22 11/20 - 12/01	3 7, 7 7, 23 34 1 ea 12	Antlerless only Antlerless only Antlerless only Antlerless only Either-sex Antlerless only	Modern Firearm Elk Permit Hunts (CL or CM) (CL or CM) (CL or CM) (CL) (CL or CM) (CL or CM)

Year	GMU # & Permit (#s)	Approx. Dates	Days	Legal Animal	Hunt description and Tag
1992	328-330; 316, 335	10/5-14; 10/1-10/14	10, 14	Either-sex	Early Archery Elk Season (CA), (YA in 335)
	328	11/25 - 12/08	14	Either-sex	Late Archery Elk Season (any archery tag)
	302, 314 (only a portion of) ML Area 910 Cle Elum	10/08 - 10/14 10/05-14, 11/17-12/8	7 32	Bull only Either-sex, <i>Antlerless</i>	Early Muzzleloader Season (CM or YM,CM) (CM), (YM)
	302,314,316,328,329,334; 335	10/28-11/3; 11/5-13	4,7; 6,9	Bull with visible antlers	Modern Firearm General (CL, CB); (YL, YB)
	328 (250), 329 (200) Elk Area 033 A (100), B (150) 330 West Bar A, B, C (25 ea) Elk Area 034 Parke Cr. (25)	10/25 - 10/27 9/15-10/7,11/4-20 10/25, 26, 27 11/25 - 12/15	3 23,17 1 22	Antlerless only Antlerless only Antlerless only Antlerless only	Modern Firearm Elk Permit Hunts (CL or CM) (CL or CM) (CL or CM) (CL or CM)
	Elk Area 032 A (200); B (200)	9/15-10/14; 11/4-12/20	30; 47	Antlerless only	Muzzleloader Only Permit Hunts (CM)
1993	316, 335; 328, 329, 330	10/01-14; 10/4-14	14; 11	Either-sex	Early Archery Elk Season (CA), (YA in 335)
	328	11/24 - 12/08	15	Either-sex	Late Archery Elk Season (CA)
	302, 314 (only a portion of) ML Area 910 Cle Elum	10/08 - 10/14 10/04-14; 11/17-12/8	7 33	Bull only Either-sex; <i>Spike/antlerless</i>	Muzzleloader Elk Season (CM, YM; CM) (YM)
	302,314,316,328,329,334; 335	10/27-11/02; 11/5-13	4,7; 6,9	Bull with visible antlers	Modern Firearm General (CL, CB); (YL, YB)
	328 (100), 329 (150) Elk Area 032A (150); 032 B (150) Elk Area 033 A (150), B (150) 330 West Bar A, B, C (25 ea) Elk Area 034(25)	10/24 - 10/26 09/01-10/7; 11/4 - 12/31 9/1-10/7, 11/4-12/31 10/24, 25, 26 11/24 - 12/15	3 76; 58 7,58 1 22	Antlerless only Antlerless; <i>Either-sex</i> Antlerless only Antlerless only Antlerless only	Modern Firearm Elk Permit Hunts (CL or CM)
1994	316; 328, 329, 330, 335	09/01 - 09/14	14	<i>Either-sex</i> ; <i>Spike/antlerless</i>	Early Archery Elk Season (CA), (YA in 335)
	328, 335	11/23 - 12/08	16	Spike bull or antlerless	Late Archery Elk Season (CA), (YA in 335)
	302; 314 (portion of). ML Area 910 Cle Elum	10/06 - 10/12 10/1-12, 11/16-12/8	77 35	Any Bull; <i>Spike bull</i> Spike bull or antlerless	Early Muzzleloader Season (CM, YM); (CM) (YM)
	314,316,328,329; 302, 335	10/26-11/03; 11/5 -15	7/9;8/11	Any bull (304), Spike bull	Modern Firearm Season (CL/CB); (YL/YB)
	316 et al., Chelan (40) 328A(100),329A(200);328B(100),329B(80) Elk Area 032 (150) Area 033 (150) Elk Area 032 (150) Area 033 (150) 330 West Bar A, B, C (25 ea) 302/335 Swauk (60)	10/15 - 11/01 10/23-25; 10/26-11/1 09/01 - 10/06 11/02 - 01/15 10/23, 24, 25 10/25 - 11/13	18 3, 7 36 75 1 ea 19	Any elk Antlerless; <i>Any bull</i> Antlerless only Either-sex Antlerless only Any bull	Modern Firearm Elk Permit Hunts (CL or CM)
	314 Mission (55) ML 910A (75), ML 910B (75)	10/07 - 10/12 10/1-12,11/16-12/8	6 12, 23	Any bull Any elk	Muzzleloader Bull Permit Hunts (CM) (YM)
	328, 329 Colockum (130)	09/01 - 09/14	14	Any elk	Archery Bull Permit Hunts (CA)
	329, Quilomene C (10)	11/01 - 11/13	13	Antlerless only	Persons of Disability Only Permit (CC or CM)
	1995	316; 328, 329, 330, 335	09/01 - 09/14	14	Either-sex; <i>Spike/antlerless</i>
328, 335.		11/22 - 12/08	17	Spike bull or antlerless	Late Archery Elk Season (CA), GMU 335 (YA)
302, 314 (only a portion of) ML Area 910 Cle Elum		10/05 - 10/11 10/1-11,11/16-12/8	7 34	Spike bull Spike bull or Antlerless	Early Muzzleloader Elk Season (CM) (YM)
314, 316, 328, 329; 302, 335		10/26-11/3; 11/5 -15	7, 9;11	Any bull (304), Spike bull	Modern Firearm Season (CL/CB); (YL/YB)

Year	GMU # & Permit (#s)	Approx. Dates	Days	Legal Animal	Hunt description and Tag
	316 et al., Chelan A (20), B (10) 328A(150),329A(225);328B(40),329B(30) Elk Area 032A (150); B (150) Elk Area 033 A (150),B (150) 330 West Bar A, B, C (25 ea) 302/335 Swauk (20)	10/15 - 11/01 10/23-25; 10/26-11/01 09/01-10/6;11/2 - 01/15 09/1-10/6,11/2 -1/15 10/23, 24, 25 10/25 - 11/13	18 3; 7 36; 75 36,75 1 19	Antlerless (A), Any bull (B) Antlerless; <i>Any bull</i> Antlerless only Either-sex , <i>Antlerless</i> (B) Antlerless only Any bull	Modern Firearm Permit Hunts (CP or CM)
	314 (25); ML 910A (30), B (30)	10/1-12, 11/16-12/8	7;12,23	Any bull; <i>Either-sex</i>	Muzzleloader Permit Hunts (CM); (YM)
	328, 329 Colockum (130)	09/01 - 09/14	14	Either-sex	Archery Bull Permit Hunts (CA)
	329, Quilomene C (10)	11/01 - 11/13	13	Antlerless only	Persons of Disability Only Permit (CC or CM)
1996	316, 334; 328, 329, 330, 335	09/01 - 09/14	14	Either-sex; Spike/antlerless	Early Archery Elk Season (CA), (YA in 335)
	328, 335	11/21 - 12/08	18	Spike bull or antlerless	Late Archery Elk Season (CA), GMU 335 (YA)
	314 (only a portion of) ML Area 910 Cl Elum	10/03 - 10/09 9/1-15,11/16-12/8	7 38	Spike bull Spike bull or antlerless	Early Muzzleloader Elk Season (CM) (YM)
	316 (East of Hwy 2)	12/09 - 12/16	8	Either-sex	Open to Specified Tag Holders (CG, CP, CM)
	302, 314, 316, 328, 329, 335; 304, 334	10/26 - 11/03	6, 9	Spike only; <i>Any Bull</i>	Modern Firearm Elk Seasons (CP, CG)
	316 et al., Chelan A (20), B (20) 328A(150),329A(150); 328B(40),329B(30) 032A(150),033B(50);032B(150),033A(75) Elk Area 035 Brushy (75) 330 West Bar A, B, C (25ea) 302, 335 Swauk (20)	10/15 - 11/01 10/23-25;10/26-11/01 A9/1-10/6,B11/2-1/15 9/1-10/6, 11/2-01/15 09/21 - 09/23 10/23, 24, 25	18 3; 7 36,75 75,36 3 1 ea	Antlerless (A), Any bull (B) Antlerless; <i>Any bull</i> Antlerless, <i>Either-sex</i> Antlerless only Antlerless only Any bull	Modern Firearm Elk Permit Hunts (CP or CM)
	314, Mission (25)	10/03 - 10/09	7	Any bull	Muzzleloader Bull Permit Hunts (CM)
	328, 329 Colockum (130)	09/01 - 09/14	14	Either-sex	Archery Bull Permit Hunts (CA)
	329, Quilomene C (10)	11/01 - 11/13	13	Antlerless only	Persons of Disability Only Permit (CP or CM)
1997	334; 328, 329, 335	09/01 - 09/14	14	<i>Any elk</i> ; Spike or antlerless	Early Archery Elk Season (CA), (YA in 335)
	328	11/26 - 12/08	13	Spike bull or antlerless	Late Archery Elk Season (CA)
	314(portion of), 316 ML Area 910	10/04 - 10/10 9/1-14,11/26-12/8	7 27	Spike bull Spike bull or antlerless	Early Muzzleloader Elk Season (CM)Early Muzzleloader Elk Season (YM)
	302(Chelan), 314-329, 335	10/25 - 11/02	9	Spike bull	Modern Firearm Elk Season (CP,CG)
	328A (25), 329A (13)	10/20 - 11/02	14	3 Pt. minimum	Modern Firearm Bull Permit Hunts (CP)
	302,335 Wenatchee Mts. (24) Elk Area 032 A (75), 33 A (25) Elk Area 032 B (75), 33 B (25) Elk Area 035 Brushy (50) 330 West Bar A, B, C (10ea)	10/01 - 10/10 09/01 - 10/03 11/07 - 12/31 09/20 - 09/22 10/22, 23, 24	10 33 21,55 3 1 ea	3 Pt. minimum Antlerless only Antlerless, <i>Any elk</i> Antlerless only Antlerless only	Modern Firearm Elk Permit Hunts (CP or CM)
	328 C (21), 329/330 C (22)	10/01 - 10/10	10	3 Pt. minimum	Muzzleloader Bull Permit Hunts (CM)
	328 D (85), 329 D (68)	09/01 - 09/14	14	3 Pt. minimum	Archery Bull Permit Hunts (CA)
	329 Quilomene E (5)	11/01 - 11/07	7	Antlerless only	Persons of Disability Only Permit (CP or CM)
1998	334; 328, 329, 335	09/01 - 09/14	14	<i>Any elk</i> ; Spike or antlerless	Early Archery Elk Season (CA), (YA in 335)
	328, 335	11/25 - 12/08	14	Spike bull or antlerless	Late Archery Elk Season (CA) GMU 335 (YA)

Year	GMU # & Permit (#s)	Approx. Dates	Days	Legal Animal	Hunt description and Tag
	314 (only a portion of), 316 (S Hwy2) ML Area 910	10/10 - 10/16 08/15 - 09/14	7 31	Spike bull Any elk	Early Muzzleloader Elk Season (CM) Early Muzzleloader Elk Season (YM)
	302,314,316(S Hwy 2),328 ,329, 335	10/31 - 11/08	9	Spike bull	Modern Firearm Season(CG), GMU 335 (YG)
	328 A (19), 329 A (10)	10/25 - 11/08	15	3 Pt. minimum	Modern Firearm Bull Permit Hunts (CG)
	302,335 Wenatchee Mts. (18) Elk Area 032 Malaga A (75), B (75) Elk Area 032 C (75), 033 B (25) Elk Area 033 Peshastin A (25)	10/01 - 10/10 9/1-10/3,10/11-31 11/10 - 12/31 09/01 - 10/03	10 33,21 51 33	3 Pt. minimum Any elk Any elk Antlerless	Modern Firearm Elk Permit Hunts (CG or CM)
	328 C (2), 329/330 C (4)	10/01 - 10/10	10	3 Pt. minimum	Muzzleloader Bull Permit Hunts (CM)
	328 D (77), 329/330 D (23)	09/01 - 09/14	14	3 Pt. minimum	Archery Bull Permit Hunts (CA)
	1999	334; 328, 329, 335	09/01 - 09/14	14	Any elk; Spike or antlerless
328, 335		11/24 - 12/08	15	Spike bull or antlerless	Archery Elk Season (CA), GMU 335 (YA)
314, 316 (S of Hwy2) ML Area 911		10/09 - 10/15 08/1409/12;11/24-12/7	7 30; 14	Spike bull Any elk; AHE only	Early Muzzleloader Elk Season (CM)
302,314,316(S Hwy 2), 328,329, 335		10/30 - 11/07	9	Spike bull	Modern Firearm Season (CF), GMU 335 (YF)
328 A (21), 329 A (9)		10/24 - 11/07	15	Any bull	Modern Firearm Bull Permit Hunts (CF)
Elk Area 032 Malaga A (75), B (40)		9/1-10/3,11/10-12/31	33,52	Antlerless	Modern Firearm Permit Hunts (CF or CM)
328 B (2), 329/330 B (1)		10/01 - 10/10	10	Any bull	Muzzleloader Bull Permit Hunts (CM)
Elk Area 032 Malaga C (75)		10/09 - 10/29	21	Antlerless	Muzzleloader Elk Permit Hunts (CM)
328 C (17), 329/330 C (9)		09/01 - 09/14	14	Any bull	Archery Bull Permit Hunts (CA)
2000	334; 328, 329, 335	09/01 - 09/14	14	Any elk; Spike or antlerless	Early Archery Elk Season (EA)
	328, 335	11/22 - 12/08	17	Spike bull or antlerless	Archery Elk Season (EA), GMU 335 (EA)
	ML Area 911	8/19-9/10,11/24-12/7	30,14	Any elk; AHE only	Early Muzzleloader Elk Season (EM)
	250(S of Hwy 2), 251, 328, 329, 335	10/28 - 11/05	9	Spike bull	Modern Firearm Season (EF)
	Elk Area 032 Malaga A (63), B (37)	9/1-10/1,11/11-12/31	31,51	Antlerless	Modern Firearm Permit Hunts (EF or EM)
	Elk Area 032 Malaga C (75)	10/07 - 10/29	23	Antlerless	Muzzleloader Elk Permit Hunts (EM)
2001	249, 250, 334; 328, 329, 330, 335	09/01 - 09/14	14	Any elk; Spike or antlerless	Early Archery Elk Season (EA)
	328, 335	11/21- 12/08	18	Spike bull or antlerless	Late Archery Season (EA)
	249, 250, 251 ML Area 911, 911 AHE only	10/06-12 8/19-9/10, 11/24-30	7 30,14	Any elk Spike bull or antlerless	Early Muzzleloader Elk Season (EM)
	249,250 (S Hwy 2), 251, 328, 329, 335	10/27 - 11/04	9	Spike bull	Modern Firearm Season (EF)
	Elk Area 032 Malaga A (65), B (75) Elk Area 033 Peshastin A (5) GMU 330 A (10), B (10)	9/1-10/1,11/10-12/31 12/01-31 10/22-31,11/01-04	31,51 31 10, 5	Antlerless Any elk Antlerless	Modern Firearm Permit Hunts (EF or EM)
	GMU 330, West Bar C (10) Elk Area 032 D (75); 033 (20)	10/01-12 10/6 - 25; 8/18 - 09/23	12 20, 37	Antlerless Antlerless	Muzzleloader Elk Permit Hunts (EM)
	249, 250, 334; 328, 329, 330, 335	09/01 - 09/14	14	Any elk; Spike or antlerless	Early Archery Elk Season (EA)
2002	328, 335	11/20 - 12/08	18	Spike bull or antlerless	Late Archery Season (EA)
	250; ML Area 911	10/5-11; 8/19 - 9/10	7; 23	Spike bull; Any elk	Early Muzzleloader Elk Season (EM)
	ML Area 911	12/01 - 12/31	31	Spike bull or antlerless	Elk Hunts Open AHE only (EM)
	249,250(S Hwy 2), 251, 328, 329, 335	10/26 - 11/03	9	Spike bull	Modern Firearm General Elk Season (EF)

Year	GMU # & Permit (#s)	Approx. Dates	Days	Legal Animal	Hunt description and Tag	
	328 A (6), 329 A (8), 335 A (6) 032 Malaga A (75), C (75) 032 Malaga B (10), Malaga E (5) 033 A (20), C (20), E (20) 033 B (5), D (5), F (5) GMU 330 A (10), B (10)	10/21 - 11/03 8/17-9/29,11/4-12/31 9/7-15, 11/11-17 08/17-, 9/16-, 11/30- 08/19-,9/21-,12/7- 10/22-31, 11/01-04	14 34,57 9,7 9,14,44 7,9,37 10,4	Any bull Antlerless Any elk Antlerless Any elk Antlerless	Modern Firearm Elk Permit Hunts (EF) (EF or EM)	
	Elk Area 032 F (75), G (10), 330 C (10)	10/08-27(032);10/1-11	20, 11	Antlerless,Any elk,	Muzzleloader Elk Permit Hunts (EM)	
	328 C (35), 329C (12), 335C (35)	09/01-14	14	Any bull	Archery Elk Permit Hunts (EA)	
	249, 250, 334; 328, 329, 330, 335	09/8 - 09/21	14	Any elk; Spike or antlerless	Early Archery Elk Season (EA)	
	328, 335	11/20 - 12/08	18	Spike bull or antlerless	Late Archery Elk Season (EA)	
	250, 251, 335	10/04 - 10/10	7	Spike bull	Early Muzzleloader Elk Season (EM)	
	AHE Area 3911	8/01 - 2/28	212	Antlerless	AHE (EA, EM, EF)	
	AHE 3028 A (40), B (40)	10/4-10; 11/8-14	7 ea	Antlerless	AHE only A=EM, B=EF	
	249, 251, 328, 329, 335	10/25 - 11/02	9	Spike bull	Modern Firearm General Elk Season (EF)	
	328A(19), 329A(20), 335A (12); B (30) Area 2032 Malaga A (100), C (150) Area 2032 B(5), D(5), E (5), F(5) Area 2033 A (20), C(20), E(20) Area 2033 B (5), D (5), F (5) GMU 330 A (10), B (10)	10/20-11/2; 10/25-11/2 8/16-9/28, 11/3-1/31 9/6-,11/3-,12/13-,1/1- 08/16-,9/16-,11/30- 8/18-,9/21-, 12/15- 10/25-29; 10/30-11/2	14, 9 34,90 16,14,919 10,18,63 8, 9,4 5, 4	Any bull, Antlerless Antlerless Any elk Antlerless Any elk Antlerless	Modern Firearm Elk Permit Hunts (EF)	
328B (4), 329B (5), 335B (3) 330C (10); 335D (50)	10/4-10 10/1-10, 10/4-10	7 11, 7	Any Bull Antlerless	Muzzleloader Elk Permit Hunts (EM)		
328 C (35), 329C (12), 335C (35)	09/8-21	14	Any bull	Archery Elk Permit Hunts (EA)		
2003	249, 250, 334; 328, 329, 330, 335	09/8 - 09/21	14	Any elk; Spike Only	Early Archery Elk Season (EA)	
	328, 335	11/20 - 12/08	18	Spike Only	Late Archery Elk Season (EA)	
	250, Area 2051, 335	10/02 - 10/8	7	Spike bull	Early Muzzleloader Elk Season (EM)	
	AHE Area 3911	8/01 - 2/28	212	Antlerless	AHE (EA, EM, EF)	
	249, 251, 328, 329, 335	10/30 - 11/07	9	Spike bull	Modern Firearm General Elk Season (EF)	
	328A(19), 329A(18), 335A (12) Area 2032 Malaga A (100), C (150) Area 2032 B(10), D(10), E (15) Area 2033 A (20), B(20), D(30) Area 2033 C (5), E (10) 3028 (35); 330 A (5), B (5)	10/25-11/7 8/14-9/26, 11/8-2/28 9/6-, 11/8-, 12/20- 08/16-,9/15-,11/30- 9/22-30,12/15-2/28 10/9-; 10/30-; 11/4-	14 34,113 16,47,113 10,17,91 9, 91 7, 5, 4	Any bull Antlerless Any elk Antlerless Any elk Antlerless	Modern Firearm Elk Permit Hunts (EF)	
	328B(4), 329B(5), 335B(3); 330C(5)	10/1-10	11	Any Bull; Antlerless	Muzzleloader Elk Permit Hunts (EM)	
	328 C (30), 329C (41), 335C (31)	09/8-21	14	Any bull	Archery Elk Permit Hunts (EA)	
	2004	249, 250, 334; 328, 329, 330, 335	09/8 - 09/21	14	Any elk; Spike Only	Early Archery Elk Season (EA)
		328, 335	11/20 - 12/08	18	Spike Only	Late Archery Elk Season (EA)
250, Area 2051, 335		10/02 - 10/8	7	Spike bull	Early Muzzleloader Elk Season (EM)	
AHE Area 3911		8/01 - 2/28	212	Antlerless	AHE (EA, EM, EF)	
249, 251, 328, 329, 335		10/30 - 11/07	9	Spike bull	Modern Firearm General Elk Season (EF)	
328A(19), 329A(18), 335A (12) Area 2032 Malaga A (100), C (150) Area 2032 B(10), D(10), E (15) Area 2033 A (20), B(20), D(30) Area 2033 C (5), E (10) 3028 (35); 330 A (5), B (5)		10/25-11/7 8/14-9/26, 11/8-2/28 9/6-, 11/8-, 12/20- 08/16-,9/15-,11/30- 9/22-30,12/15-2/28 10/9-; 10/30-; 11/4-	14 34,113 16,47,113 10,17,91 9, 91 7, 5, 4	Any bull Antlerless Any elk Antlerless Any elk Antlerless	Modern Firearm Elk Permit Hunts (EF)	
328B(4), 329B(5), 335B(3); 330C(5)		10/1-10	11	Any Bull; Antlerless	Muzzleloader Elk Permit Hunts (EM)	
328 C (30), 329C (41), 335C (31)		09/8-21	14	Any bull	Archery Elk Permit Hunts (EA)	

APPENDIX B. Wildlife Damage Rules.

RCW 77.36.005

Findings.

The legislature finds that:

(1) As the number of people in the state grows and wildlife habitat is altered, people will encounter wildlife more frequently. As a result, conflicts between humans and wildlife will also increase. Wildlife is a public resource of significant value to the people of the state and the responsibility to minimize and resolve these conflicts is shared by all citizens of the state.

(2) In particular, the state recognizes the importance of commercial agricultural and horticultural crop production and the value of healthy deer and elk populations, which can damage such crops. The legislature further finds that damage prevention is key to maintaining healthy deer and elk populations, wildlife-related recreational opportunities, commercially productive agricultural and horticultural crops, and that the state, participants in wildlife recreation, and private landowners and tenants share the responsibility for damage prevention. Toward this end, the legislature encourages landowners and tenants to contribute through their land management practices to healthy wildlife populations and to provide access for related recreation. It is in the best interests of the state for the department of fish and wildlife to respond quickly to wildlife damage complaints and to work with these landowners and tenants to minimize and/or prevent damages and conflicts while maintaining deer and elk populations for enjoyment by all citizens of the state.

(3) A timely and simplified process for resolving claims for damages caused by deer and elk for commercial agricultural or horticultural products, and rangeland used for grazing or browsing of domestic livestock is beneficial to the claimant and the state.

[1996 c 54 § 1; 2001 c 274 § 1 expired June 30, 2004, pursuant to 2001 c § 5.]

NOTES:

Expiration date -- 2001 c 274 §§ 1-3: "The following expired June 30, 2004:

- (1) Section 1, chapter 274, Laws of 2001;
- (2) Section 2, chapter 274, Laws of 2001; and
- (3) Section 3, chapter 274, Laws of 2001." [2001 c 274 § 5.]

Effective date -- 2001 c 274: "This act is necessary for the immediate preservation of the public peace, health, or safety, or support of the state government and its existing public institutions, and takes effect July 1, 2001." [2001 c 274 § 6.]

RCW 77.36.010

Definitions.

Unless otherwise specified, the following definitions apply throughout this chapter.

(1) "Crop" means a commercially raised horticultural and/or agricultural product and includes growing or harvested product but does not include livestock. For the purposes of this chapter all parts of horticultural trees shall be considered a crop and shall be eligible for claims.

(2) "Emergency" means an unforeseen circumstance beyond the control of the landowner or tenant that presents a real and immediate threat to crops, domestic animals, or fowl.

(3) "Immediate family member" means spouse, brother, sister, grandparent, parent, child, or grandchild.

[1996 c 54 § 2; (2001 c 274 § 2 expired June 30, 2004, pursuant to 2001 c 274 § 5).]

NOTES:

Expiration date -- 2001 c 274 §§ 1-3: See note following RCW [77.36.005](#).

Effective date -- 2001 c 274: See note following RCW [77.36.005](#).

RCW 77.36.020

Game damage control -- Special hunt/remedial action.

The department shall work closely with landowners and tenants suffering game damage problems to control damage without killing the animals when practical, to increase the harvest of damage-causing animals in hunting seasons, and to kill the animals when no other practical means of damage control is feasible.

If the department receives recurring complaints regarding property being damaged as described in this section or RCW [77.36.030](#) from the owner or tenant of real property, or receives such complaints from several such owners or tenants in a locale, the commission shall consider conducting a special hunt or special hunts to reduce the potential for such damage or take remedial action to reduce the potential for such damage. The commission shall authorize either one or two antlerless permits per hunter for special hunts held in damage areas where qualified staff, or designee, have confirmed six incidents of drop damage by deer or elk.

As an alternative to hunting, the department shall work with affected entities to relocate deer and elk when needed to augment existing herds.

[2003 c 385 § 1; 1996 c 54 § 3.]

RCW 77.36.030

Trapping or killing wildlife causing damage -- Emergency situations.

(1) Subject to the following limitations and conditions, the owner, the owner's immediate family member, the owner's documented employee, or a tenant of real property may trap or kill on that property, without the licenses required under RCW [77.32.010](#) or authorization from the director under RCW [77.12.240](#), wild animals or wild birds that are damaging crops, domestic animals, or fowl:

(a) Threatened or endangered species shall not be hunted, trapped, or killed;

(b) Except in an emergency situation, deer, elk, and protected wildlife shall not be killed without a permit issued and conditioned by the director or the director's designee. In an emergency, the department may give verbal permission followed by written permission to trap or kill any deer, elk, or protected wildlife that is damaging crops, domestic animals, or fowl; and

(c) On privately owned cattle ranching lands, the land owner or lessee may declare an emergency only when the department has not responded within forty-eight hours after having been contacted by the land owner or lessee regarding damage caused by wild animals or wild birds. In such an emergency, the owner or lessee may trap or kill any deer, elk, or other protected wildlife that is causing the damage but deer and elk may only be killed if such lands were open to public hunting during the previous hunting season, or the closure to public hunting was coordinated with the department to protect property and livestock.

(2) Except for coyotes and Columbian ground squirrels, wildlife trapped or killed under this section remain the property of the state, and the person trapping or killing the wildlife shall notify the department immediately. The department shall dispose of wildlife so taken within three days of receiving such a notification and in a manner determined by the director to be in the best interest of the state.

[1996 c 54 § 4.]

RCW 77.36.040

Payment of claims for damages -- Procedure -- Limitations.

(1) Pursuant to this section, the director or the director's designee may distribute money appropriated to pay claims for damages to crops caused by wild deer or elk in an amount of up to ten thousand dollars per claim. Damages payable under this section are limited to the value of such commercially raised horticultural or agricultural crops, whether growing or harvested, and shall be paid only to the owner of the crop at the time of damage, without assignment. Damages shall not include damage to other real or personal property including other vegetation or animals, damages caused by animals other than wild deer or elk, lost profits, consequential damages, or any other damages whatsoever. These damages shall comprise the exclusive remedy for claims against the state for damages caused by wildlife.

(2) The director may adopt rules for the form of affidavits or proof to be provided in claims under this section. The director may adopt rules to specify the time and method of assessing damage. The burden of proving damages shall be on the claimant. Payment of claims shall remain subject to the other conditions and limits of this chapter.

(3) If funds are limited, payments of claims shall be prioritized in the order that the claims are received. No claim may be processed if:

(a) The claimant did not notify the department within ten days of discovery of the damage. If the claimant intends to take steps that prevent determination of damages, such as harvest of damaged crops, then the claimant shall notify the department as soon as reasonably possible after discovery so that the department has an opportunity to document the damage and take steps to prevent additional damage; or

(b) The claimant did not present a complete, written claim within sixty days after the damage, or the last day of damaging if the damage was of a continuing nature.

(4) The director or the director's designee may examine and assess the damage upon notice. The department and claimant may agree to an assessment of damages by a neutral person or persons knowledgeable in horticultural or agricultural practices. The department and claimant shall share equally in the costs of such third party examination and assessment of damage.

(5) There shall be no payment for damages if:

(a) The crops are on lands leased from any public agency;

(b) The landowner or claimant failed to use or maintain applicable damage prevention materials or methods furnished by the department, or failed to comply with a wildlife damage prevention agreement under RCW [77.12.260](#);

(c) The director has expended all funds appropriated for payment of such claims for the current fiscal year; or

(d) The damages are covered by insurance. The claimant shall notify the department at the time of claim of insurance coverage in the manner required by the director. Insurance coverage shall cover all damages prior to any payment under this chapter.

(6) When there is a determination of claim by the director or the director's designee pursuant to this section, the claimant has sixty days to accept the claim or it is deemed rejected.

[1996 c 54 § 5.]

RCW 77.36.050

Claimant refusal -- Excessive claims.

If the claimant does not accept the director's decision under RCW [77.36.040](#), or if the claim exceeds ten thousand dollars, then the claim may be filed with the office of risk management under RCW [4.92.040\(5\)](#). The office of risk management shall recommend to the legislature whether the claim should be paid. If the legislature approves the claim, the director shall pay it from moneys appropriated for that purpose. No funds shall be expended for damages under this chapter except as appropriated by the legislature.

[1996 c 54 § 6.]

RCW 77.36.060**Claim refused -- Posted property.**

The director may refuse to consider and pay claims of persons who have posted the property against hunting or who have not allowed public hunting during the season prior to the occurrence of the damages.

[1996 c 54 § 7.]

RCW 77.36.070**Limit on total claims from wildlife fund per fiscal year.**

The department may pay no more than one hundred twenty thousand dollars per fiscal year from the wildlife fund for claims under RCW [77.36.040](#) and for assessment costs and compromise of claims. Such money shall be used to pay animal damage claims only if the claim meets the conditions of RCW [77.36.040](#) and the damage occurred in a place where the opportunity to hunt was not restricted or prohibited by a county, municipality, or other public entity during the season prior to the occurrence of the damage.

[1996 c 54 § 8.]

RCW 77.36.080**Limit on total claims from general fund per fiscal year -- Emergency exceptions. (Expires June 30, 2004.)**

(1) The department may pay no more than thirty thousand dollars per fiscal year from the general fund for claims under RCW [77.36.040](#) and for assessment costs and compromise of claims unless the legislature declares an emergency. Such money shall be used to pay animal damage claims only if the claim meets the conditions of RCW [77.36.040](#) and the damage occurred in a place where the opportunity to hunt was restricted or prohibited by a county, municipality, or other public entity during the season prior to the occurrence of the damage.

(2) The legislature may declare an emergency, defined for the purposes of this section as any happening arising from weather, other natural conditions, or fire that causes unusually great damage by deer or elk to commercially raised agricultural or horticultural crops by deer and elk. In an emergency, the department may pay as much as may be subsequently appropriated, in addition to the funds authorized under subsection (1) of this section, for claims under RCW [77.36.040](#) and for assessment and compromise of claims. Such money shall be used to pay animal damage claims only if the claim meets the conditions of RCW [77.36.040](#) and the department has expended all funds authorized under RCW [77.36.070](#) or subsection (1) of this section.

[1996 c 54 § 9; (2001 c 274 § 3 expired June 30, 2004, pursuant to 2001 c 274 § 5).]

NOTES:

Expiration date -- 2001 c 274 §§ 1-3: See note following RCW [77.36.005](#).

Effective date -- 2001 c 274: See note following RCW [77.36.005](#).

APPENDIX C: September (pre-hunting) and February (post-hunting) composition counts for the Colockum elk herd (1988-2002)

September					February				
Year	Bulls: 100 cows	Adult bulls: 100 cows	Calves: 100 cows	Sample size	Bulls: 100 cows	Adult bulls: 100 cows	Calves: 100 cows	Sample size	
1987-88	29 ^a		66	674	14		39	1,847 ^a	
1988-89	30 ^a		65	556					
1989-90	37 ^a		51	570	3	2	33	1,328	
1990-91	19 ^a		43	429	4	4	38	795	
1991-92	18		51	438	2	0.1	26	1,887	
1992-93					2	0.3	42	2,197	
1994-95	23 ^a	4.7	30	197 ^b	4	3	34	1,656	
1995-96					10	4	30	2,261	
1996-97	24 ^a		39	237 ^b	6	5	30	2,220	
1997-98	25 ^a		58	417	5	2	30	3,809	
1998-99	18 ^a		37	372	8	6	27	1,600	
1999-00					7	5	21	2,348	
2000-01	14	7.5	24	1,521	8	5	21	3,661	
2001-02	20	7.1	37	1,391	18 ^c	14 ^c	30	3,418	
2002-03	15	7.1	25	629	11	8	17	3,358	
2003-04					11	8	33	3,218	
2004-05					4	2	25	3,523	
2005-06					8	5	39	3,263	
^a Surveys from the ground.									
^b Counts based on small samples may not be representative of the population.									
^c In 2002, bull:cow ratios may not have been representative of the population.									

APPENDIX D: Elk harvest and hunter trends for the Colockum elk herd (1985-2001)

Year	Antlered	Antlerless	Total	Hunters	Hunter Days
1960's AVG	544	332	876		
1970's AVG	617	464	1081		
1980	580	305	885		
1981	520	280	800		
1982	580	310	890		
1983	560	208	768		
1984	658	272	930	8,886	36,692
1985	743	231	974	12,266	52,134
1986	717	450	1,167	11,087	46,447
1987	567	581	1,148	10,509	54,761
1988	806	735	1,541	11,543	57,012
1989	983	537	1,520	12,884	61,299
1980's AVG	671	391	1,062	11,196	51,391
1990 ^a	621	681	1,302		
1991	611	657	1,268	13,811	61,598
1992	809	616	1,425	13,253	59,169
1993	561	445	1,006	13,815	62,561
1994	559	741	1,300	11,338	53,154
1995	472	663	1,135	11,371	52,409
1996	471	596	1,067	12,553	54,939
1997	343	268	611	8,388	40,327
1998	496	247	743	9,776	53,563
1999	393	235	628	9,428	65,341
1990's AVG	534	515	1022	10,373	50,306
2000	438	293	731	8,374	37,522
2001	433	398	831	7,660	36,317
2002	436	593	1029	9,436	49,334
2003	424	393	817	7,756	39,571
2004	445	221	666	7,847	38,257

^aHarvest estimated from report cards.

APPENDIX E
Photos



Photo 1: Teanaway Solar Reserve wildlife habitat



Photo 2: Teanaway Solar Reserve wildlife habitat

APPENDIX F

**Settlement Agreement with Washington
State Department of Fish and Wildlife**
(Pending final review by WDFW)

APPENDIX G

Correspondence from REC Solar, Inc.

February 16, 2010

Howard Trott
Director-Teanaway Solar Project

Hello Howard,

It has been brought to my attention that there are two concerns with the Solar Modules that we propose for the Teanaway Solar project. First, the flammability of the modules, and second, the presence of any hazardous materials that may contaminate local soil and water. I have addressed both of these concerns below, and also attached the specifications sheet for the modules proposed.

To address the flammability of the system, the photovoltaic modules, manufactured by REC Solar AS, which would be utilized on this project are constructed of glass, aluminum and silicon with PTE foil backsheet and EVA encapsulate. Also, all other materials used on the Solar arrays are steel, aluminum and copper. As the primary materials are non-flammable we do not anticipate that modules would be considered a fire hazard during a forest fire.

In regards to potential contamination, the modules are silicon based and do not contain hazardous materials such as cadmium which is used in some other types of solar modules. The modules do contain a small amount of lead solder which is fully encapsulated. Even in the event of damage to the modules, there is no potential for the lead to be released into the environment.

If you have any further questions, please do not hesitate to contact me.

Sincerely,

Chris Oestreich
Director of Engineering
REC Solar, Inc.
coestreich@recsolar.com
805-215-2345

HIGH PERFORMANCE SOLAR MODULES

REC AE-US

REC AE-Series modules are the perfect choice for building solar systems that combine long lasting product quality with reliable power output. REC combines high quality design and manufacturing standards to produce high-performance solar modules with uncompromising quality.



US - MADE
SILICON



ROBUST AND
DURABLE DESIGN



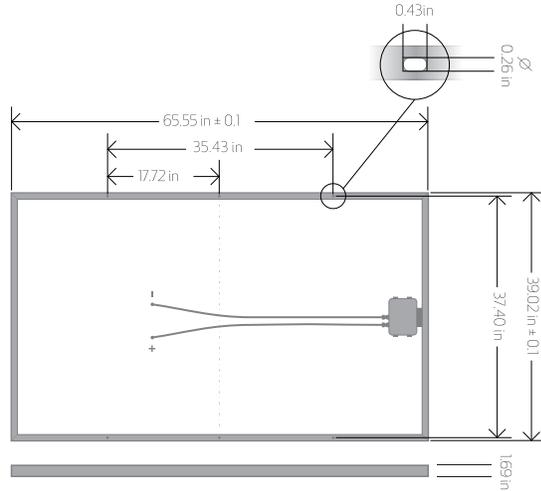
ENERGY PAYBACK
TIME OF ONE YEAR



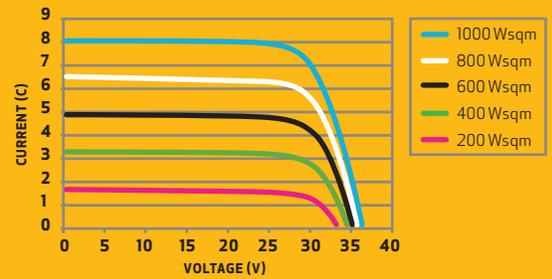
OPTIMIZED ALSO FOR
CLOUDY WEATHER



REC AE-US



IV CHARACTERISTICS 215W MODULE



13.9 EFFICIENCY
63 MONTHS WORKMANSHIP WARRANTY
25 YEAR POWER OUTPUT WARRANTY

ELECTRICAL DATA @ STC

	REC205 AE-US	REC210 AE-US	REC215 AE-US	REC220 AE-US	REC225 AE-US	REC230 AE-US
Peak Power Watts - P_{MAX} (Wp)	205	210	215	220	225	230
Power Output Tolerance - P_{MAX} (%)	±3	±3	±3	±3	±3	±3
Maximum Power Voltage - V_{MPP} (V)	27.2	27.6	28.0	28.4	28.8	29.1
Maximum Power Current - I_{MPP} (A)	7.6	7.6	7.7	7.8	7.8	7.9
Open Circuit Voltage - V_{OC} (V)	36.0	36.1	36.3	36.4	36.6	36.8
Short Circuit Current - I_{SC} (A)	8.3	8.3	8.3	8.4	8.4	8.4
Module Efficiency (%)	12.4	12.7	13.0	13.3	13.6	13.9

Values at Standard Test Conditions STC (Air Mass AM1.5, Irradiance 1000 W/m², Cell temperature 25 °C)

TEMPERATURE RATINGS (230W RATED MODULE)

Nominal Operating Cell Temperature (NOCT)	48.6°C (±2°C)
Temperature Coefficient of P_{MPP}	-0.497%/°C
Temperature Coefficient of V_{OC}	-0.370%/°C
Temperature Coefficient of I_{SC}	0.109%/°C

CERTIFICATION



Certification/Standards
 Certified according to UL1703 - 3rd edition

CEC/CSI listed

MECHANICAL DATA

Dimensions	65.55" x 39.02" x 1.69"
Area	17.76 ft ²
Weight	48.50 lbs

GENERAL DATA

Cell Type	156 x 156 mm multi-crystalline cells 60 cells in series
Glass	High-transparency solar glass with antireflection surface treatment by Sunarc Technology
Back sheet	PTE foil
Frame	Anodized aluminium
Connectors	2 x 61 in (1.55m) solar cables with MC4 connectors

WARRANTY

10 years limited warranty of 90% power output
 25 years limited warranty of 80% power output
 63 months limited product warranty

MAXIMUM RATINGS

Operational Temperature	-40 ... +176°F [-40 ... +80°C]
Maximum System Voltage	600V
Maximum Load	112 lbs/ft ² (5400 Pa)
Wind Speed	122 mph (safety factor 3, 197 km/h)
Max Series Fuse Rating	15A
Max Reverse Current	15A

Note! Specifications subject to change without notice.

REC is the leading vertically integrated player in the solar energy industry. REC Silicon and REC Wafer are among the world's largest producers of polysilicon and wafers for solar applications. REC Solar is a rapidly growing manufacturer of solar cells and modules, and are also engaging in project development activities in selected segments of the PV market. REC had revenues of NOK 8 191 million and an operating profit of NOK 2 529 million in 2008. Close to 3 000 employees work in REC's worldwide organization.

For further information, contact your local distributor or visit our web site: www.recgroup.com



REC Solar AS
 Kjørboveien 29
 1329 Sandvika
 Norway

www.recgroup.com/usa

ATTACHMENT I
Transportation Road Plan

Report

Teanaway Solar Reserve Transportation Road Plan Kittitas County, Washington

Prepared for
Teanaway Solar Reserve, LLC

February 2010

Prepared by
CH2MHILL



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Appendix

A Figures

Figures (Provided in Appendix A)

- 1 Vicinity Map
- 2 Site Access Map
- 3 Proposed Site Layout
- 4 Preliminary Road Section (Provided by Teanaway Solar Reserve)

1.0 Existing Conditions

1.1 Roadway Network

Transporter routes are assumed to carry the majority of construction-related vehicles, including solar component delivery vehicles, water trucks, and the majority of workforce traffic. Figure 1, Vicinity Map (provided in Appendix A) shows the major state highways serving the project. Figure 2, Site Access Map, shows the proposed access route from the major highway to the project site via local and county roadways.

Site access for construction-related vehicles will access the project site primarily from Interstate 90 (I-90) eastbound to Highway 970 northbound at Exit 85. From Highway 970 northbound, the access route would continue to Red Bridge Road (also known as Masterson Road), which is a local County roadway. From Red Bridge Road, project traffic will likely take Wiehl Road northbound for approximately 0.2 mile to Loping Lane, where traffic would turn left and continue westbound on Loping Lane to the project site as shown in Figure 2. Wiehl Road is a county road that is privately maintained. Loping Lane is a private road.

From Loping Lane, project traffic may use existing private roads to access the actual project site, or they may use new proposed maintenance roads constructed as part of this project. These project site roadways are shown in Figure 3, Proposed Site Layout.

Use of these roads would depend on weather conditions and load and size restrictions. Table 1 describes the roads that would directly access the project corridor or provide a critical regional transportation link to the project corridor.

TABLE 1
Key Roads Providing Access to the Project Site

Facility	Description
I-90	I-90 within the vicinity of the project is classified as a rural interstate roadway with rolling terrain, according to the Washington State Department of Transportation (WSDOT) road classification system. This roadway has two lanes in each direction, and has a posted speed limit of 70 miles per hour (mph) outside city limits. I-90 is anticipated to be the major haul route from Seattle, Washington.
Highway 970	Highway 970 begins in Cle Elum, Washington, where the speed limit is posted at 55 mph inside city limits. It continues eastbound and then northbound as a two-lane road with a posted speed limit of 60 mph. This facility is classified as a rural principal arterial with level terrain, according to the WSDOT road classification system. This rural principal arterial would provide the main access between the Interstate and local county roadways serving the project area.
Red Bridge Road	Red Bridge Road (also known as Masterson Road) is a paved two-lane road with a posted speed limit of 25 mph. It is classified by Kittitas County as a rural local-access road. This roadway, south of the intersection with Wiehl Road, will serve as the main connection between the state highway facility and private access roads. Construction-related traffic, especially truck traffic, will not be permitted to access the site by using Red Bridge Road north of the intersection with Wiehl Road.
Wiehl Road	Wiehl Road is an unpaved two-lane privately maintained roadway without a posted speed limit. It is within the public right-of-way, but is not maintained by Kittitas County. This rural privately maintained roadway likely experiences very little daily traffic, and likely will be able to provide access to the project site without impacting existing traffic operations.

TABLE 1
Key Roads Providing Access to the Project Site

Facility	Description
Loping Lane	Loping Lane is an unpaved two-lane private road without a posted speed limit. It is a private roadway, and is not maintained by Kittitas County. This rural private roadway likely experiences very little daily traffic, and likely will be able to provide access to the project site without impacting existing traffic operations.

1.2 Traffic Volumes

To evaluate the possible impacts resulting from traffic associated with the construction and operation of the proposed solar facility, the analysts obtained traffic volumes for state highways that are part of the expected construction transportation route. The study team consulted WSDOT and Kittitas County for traffic volumes and roadway characteristics.

Table 2 shows the average daily traffic (ADT) volumes between 2005 and 2008, the roadway functional classifications, the jurisdiction, and estimated truck percentages on state-maintained roadways in the study area. These volumes are based on available traffic data in an Annual Traffic Report published by the WSDOT. The 2008 WSDOT *Annual Traffic Report* provides annual traffic volumes for at least the last 4 years.

Traffic data along Red Bridge Road was provided by Kittitas County. No traffic data are available for Wiehl Road or Loping Lane because they are privately maintained, and are not monitored or maintained by the County.

All other applicable roadways within the project area are also likely to be privately owned local facilities serving rural traffic only. These roads typically do not have posted speed limits, and ADT volumes are likely not available for these locations.

TABLE 2
Average Daily Traffic (ADT) Volumes, Roadway Functional Classifications, and Estimated Percentage of Trucks

Roadway	State/ Jurisdiction	Functional Classification	2005 ADT	2006 ADT	2007 ADT	2008 ADT	Estimated Truck %
I-90 (MP 82.70) ^a	WSDOT	Rural Interstate	27,000	27,000	28,000	27,000	23
I-90 (MP 84.61) ^a	WSDOT	Rural Interstate	24,000	25,000	27,000	25,000	N/A
I-90 (MP 86.18) ^a	WSDOT	Rural Interstate	24,000	25,000	26,000	24,000	N/A
Highway 970 (MP 2.69 west of SR 10)	WSDOT	Rural Principal Arterial	5,600	5,800	5,800	5,400	N/A
Highway 970 (MP 2.69 east of SR 10)	WSDOT	Rural Principal Arterial	4,700	4,900	4,800	4,500	N/A
Red Bridge Road (MP 0.25) ^b	Kittitas County	Rural Local Access	260	230	250	200	N/A
Wiehl Road	Private	N/A	N/A	N/A	N/A	N/A	N/A
Loping Lane	Private	N/A	N/A	N/A	N/A	N/A	N/A

^a WSDOT, *Annual Traffic Report*, 2008.

^b Personal communication with Christina Wollman, Kittitas County, 2009.

N/A = Information not available

1.3 Roadway Restrictions and Limitations

The state highway system (I-90, Highway 970) is constructed to safely accommodate trucks with the designed load-bearing standards. These roadways are able to accommodate vehicles at the legal load limit, thereby reducing the potential for significant traffic safety and maintenance impacts.

There is, however, one permanent load restriction on I-90 between Seattle and the project site. This restriction prohibits loads taller than 16 feet-2 inches from entering the snow shed near Hyak (MP 54-62 on westbound I-90). This restriction is not anticipated to affect truck- and construction-related-traffic since any project related trucks would be empty (no loads) heading westbound. Construction vehicles are expected to be legal size and legal weight for Washington highways, therefore, no special permitting for transport of materials and equipment should be necessary. There are no permanent restrictions on Highway 970 in the vicinity of the project site.

Kittitas County Code 10.28 “Seasonal Weight Restrictions” specifies load and weight restrictions on Kittitas County roads during load sensitive periods. These include any weather conditions that could affect traffic on county roads, such as ice, snow, fog, etc. It also authorizes the director of public works to issue emergency permits for the operation of vehicles exceeding the allowable gross load.

It is not anticipated that seasonal traffic will have any effect on public use of the roadways utilized during construction because of the rural location of the project site. However, if seasonal traffic or other special events possibly may affect traffic, the issue will be addressed as necessary.

1.4 Existing Roadway Level of Service

To analyze traffic conditions, average daily traffic data from WSDOT were used to determine a level of service (LOS) for each of the state roadway segments on the proposed transporter route. LOS is a qualitative measure describing operational conditions in a traffic stream, and motorists' or passengers' perceptions of those conditions. There are six LOS classifications, each given a letter designation from A to F. LOS A represents the best operating conditions and LOS F represents the worst. An estimate of 10 percent of the ADT volume is used to determine the peak hour volumes for state highways.

Table 3 presents the existing LOS for the proposed transporter roads. LOS is based on the methodology in the most current Highway Capacity Manual (HCM) (Transportation Research Board, 2000). The ADT represents the estimated 2008 daily volumes in both directions of travel.

TABLE 3
 Existing Level of Service on Proposed Transporter Roads

Roadway	Functional Classification	Number of Lanes	2008 ADT	2008 Peak Hour Volume	2008 Peak Hour LOS
I-90 (MP 84.61)	Rural Interstate	Rural Interstate	25,000	2,500	B
I-90 (MP 86.18)	Rural Interstate	Rural Interstate	24,000	2,400	B
Highway 970 (MP 2.69 west of SR 10)	Rural Principal Arterial	Rural Principal Arterial	5,400	540	C
Highway 970 (MP 2.69 east of SR 10)	Rural Principal Arterial	Rural Principal Arterial	4,500	450	C

Source: WSDOT, *Annual Traffic Report*, 2008.

The LOS ratings for the current state roadways surrounding the proposed project site are LOS C or better. This LOS represents generally smooth traffic operating conditions with occasional delays. With LOS C, individual users feel generally unrestricted by the presence of others in the traffic stream.

1.5 Safety

At the intersection of Highway 970 and Red Bridge Road, eastbound traffic is in a vertical curve. Approaching this intersection, vehicles may have difficulties seeing oncoming or turning traffic from Red Bridge Road due to a slight crest in the road. The posted speed limit is 60 mph, but vehicles often travel at higher speeds. There is no significant crash history at this existing location, but WSDOT has indicated that an eastbound left turn lane could be beneficial. This separate turn lane would allow vehicles to slow down while waiting for a gap in westbound traffic without impeding through traffic. (Source: Personal communication with Rick Holmstrom/WSDOT, January 21, 2010)

1.6 Public Transportation

The project site is not currently served by public transit. The nearest public transportation system is in Ellensburg, Washington. Central Transit is a general public transportation system that operates a fixed route serving mainly Central Washington University. It

includes bus stops, operates on a schedule, and does not require advance reservations. It is operated by HopeSource. (Source: *Kittitas County Long Range Transportation Plan*, 2008)

1.7 Air, Rail, Waterborne Traffic

There are no regional or municipal airports in the vicinity of the project site. The nearest airport is Kittitas County Airport (Bowers Field), approximately 1.5 miles north of the City of Ellensburg. The Kittitas County Airport (Bowers Field) does not have scheduled air service, and none of the equipment or materials necessary for project operations or construction will be transported by air.

Burlington Northern operates an active rail main line between Auburn and the Tri-Cities over Stampede Pass, passing through Ellensburg. Approximately 4 to 10 trains traverse the route daily. No project related equipment or materials will be transported by rail to the project site.

The Ports of Pasco, Benton, and Kennewick operate on the Columbia River over 100 miles southeast of the project site. Grain is the major commodity using barge transportation on this stretch of the river. It is not anticipated that any of the equipment or materials necessary for operations or construction will be transported by barge or ship.

2.0 Impacts during Construction

2.1 Truck Traffic Volumes

Transport of major equipment and materials to the site for construction would likely span seven to nine months for each of two or three construction seasons (over 3 consecutive years). During construction, a number of trucks will be accessing the site on the proposed transporter route. Trucks will be carrying equipment and components for the construction and operation of the proposed solar facility that cannot be produced onsite. Trucks will also be needed to provide operation services such as delivering water to the site for fugitive dust control during road construction or for grading improvements. Trucks are not expected to exceed the legal load limits for the roads along the transporter route. If a load in excess of load limits is expected, the appropriate permits will be obtained and fees paid.

All solar panels necessary for the reserve will be trucked to the site. It is estimated that the project will require up to 450 trucks to bring in the solar panels. An estimated 800 trucks would be necessary to deliver structural supports and other materials for the solar module foundations. Concrete will be necessary for up to 80 inverter stations. Concrete will also be necessary for control buildings and maintenance building onsite, as well as support structure foundations. Assuming transport trucks have a capacity of 10 cubic yards of concrete, approximately 175 truckloads of concrete could be expected through the construction period.

Gravel and water for the project will be sourced in the Cle Elum area to the extent possible. Gravel will be used mainly for surfacing of the maintenance roads and access roads. Assuming Wiehl Road and Loping Lane will be improved with gravel, approximately 3,600 cubic yards of the material (360 trucks) would be necessary. Approximately

18,650 cubic yards (1,865 trucks) would be necessary for new or improved maintenance roads onsite. A total of approximately 2,225 trucks could be necessary for import of gravel.

Water will be used for fugitive dust control. Quantities for water required for onsite activities are being determined.

Prior to the transport of solar materials and equipment, the site will require clearing to address the potential for damage from blown down trees. To clear the site for installing the project, trees will be harvested within the project area on an as-needed basis. Construction equipment such as tractors, backhoes, loaders, dozers, and graders will also be needed to clear brush and vegetation from the site as needed, and to grade roads and foundation locations. Assuming cleared or excavated material will be hauled off-site, approximately 950 trucks could be necessary for removal of this material.

TABLE 4
 Approximate Construction Truck Quantities

Item	Quantity	Unit	Number of Trucks ^a
Solar Panels	450	Shipping Container	450
Solar Panel Structural Supports/Mounting	N/A	N/A	800
Concrete	1,750	Cubic Yard	175
Gravel	22,250	Cubic Yard	2,225
Water	TBD	TBD	TBD
Clearing/Grading	9,500	Cubic Yard	950

^a Number of trucks expected over the course of construction (two or three seasons)
 Note: Quantities for water, and clearing and grading are still being determined.

Approximately 7- to 9-month construction seasons are expected for 2 or 3 consecutive years. A total of approximately 4,600 trucks would be expected over the course of construction. This estimate does not include trucks for water.

To conservatively estimate truck traffic impacts, these trips could be assumed to arrive during two construction seasons of 7 months each. Assuming 20 workdays per construction month, and truck deliveries occur between 7 a.m. and 7 p.m. on weekdays only, this would produce approximately 17 daily trucks. This will equate to a maximum of 34 trips per day (17 trucks with one inbound trip and one outbound trip) added to background traffic patterns during the peak of construction.

However, this estimate is conservative because actual truck deliveries would likely be spread over three construction seasons, and not all types of construction activities could occur at the same time. A more reasonable estimate of average daily truck traffic to the site is calculated by spreading the total truck traffic out over three construction seasons of approximately 9 months each. Using the same assumptions as above (20 workdays per construction month), the project is expected to generate approximately 9 trucks per day, or 18 truck trips per day.

2.2 Workforce Traffic Volumes

Construction worker traffic would also be expected during the construction seasons. The expected workforce could peak at 450 workers, while the average workforce would be approximately 225 workers. Carpooling will be encouraged, and high-occupancy bus trips to the project site will be emphasized. Vanpools or busses from local hotels will likely be provided to workers to minimize vehicular traffic on Red Bridge Road, Wiehl Road, and Loping Lane. Approximately 50 workers can be transported by each bus.

Local workers will most likely originate in the nearby City of Ellensburg to the east, which is approximately 30 miles from the proposed project site. Workers could also originate from the west in Cle Elum (approximately 7 miles from the site). Workers needed for specialized construction (e.g., electrical, solar testing) may originate from areas outside Kittitas County.

Under peak workforce conditions, assuming 30 percent of construction workers carpool to the site each day with one other person and the remaining 70 percent use project-provided bus transportation, approximately 75 construction worker vehicles could be expected to enter the project site in the morning and leave the site during the evening peak hour. These 75 construction worker vehicles would consist of 68 personal vehicles and seven busses. If the entire peak workforce is transported to the project site via bus, nine total workforce vehicles would be expected.

Under average workforce conditions approximately 38 construction worker vehicles could be expected to enter and exit the project site each day.

2.2.1 Construction Traffic Summary

Assuming construction occurs during a two year construction window, approximately 17 trucks (34 daily trips) and 75 worker vehicles (150 daily trips) could be added to background traffic patterns if 70 percent of the workforce is bussed to the site. If 100 percent of the workforce is bussed to the site, worker vehicles could be reduced to 9 busses (18 daily trips).

During construction with an average workforce, 17 trucks (34 daily trips) and 38 worker vehicles (76 daily trips) could be expected (if 70 percent of the workforce is bussed to the site). If the entire average workforce is bussed to the site, worker vehicles could be reduced to 5 daily busses (or 10 daily trips).

If construction occurs under a more reasonable three year construction window, truck traffic would likely be reduced from 17 trucks to approximately 9 trucks entering and exiting the project site per day (18 daily trips).

2.3 Total Traffic Volumes

As previously established, I-90 carried an ADT volume of approximately 25,000 vehicles in 2008 within the project travel area. Assuming similar volumes during the year of construction, the project would likely cause an increase in traffic of approximately 34 daily truck trips (17 vehicles expected to enter the site and leave the site at the end of the day) and up to 150 daily worker trips (up to 75 vehicles entering the site in the morning and leaving the site at the end of the day). This increase represents an increase of approximately

1 percent on I-90, and is expected to be inconsequential. Construction of the facility is not expected to cause any traffic congestion or delay impacts to the state roadway system.

Average daily traffic volumes on Highway 970 would likely increase by approximately 5 percent with construction trips. This is not expected to affect driving conditions or cause backups and delays because there would still be ample capacity on Highway 970, and an additional daily 184 construction-related trips are not expected to affect driving conditions or cause backups and delays.

On the county and private roadways (on Red Bridge Road, Wiehl Road, and Loping Lane), the daily traffic volumes will likely triple. Although these roads would experience a temporary increase in traffic volumes during construction, because of the rural nature of the area, construction will not result in traffic volumes that exceed the capacity of the roadway facilities. The roadway facilities currently support few trips and have ample capacity. Therefore, even with traffic increases, construction is not anticipated to cause adverse impacts to current levels of service.

2.4 Proposed Roadway Improvements

Existing public and private roads will be used as much as possible, except that construction-related traffic will not be permitted to use Red Bridge Road north of the intersection of Wiehl Road. Because project-generated and local traffic volumes are fairly low, improvements to existing paved roads or streets accessing the project are not anticipated. Highway 970 and Red Bridge Road (between Highway 970 and Wiehl Road) are not expected to require improvements prior to construction.

Unimproved, unpaved roadways to the project site will also be used. These roadways include Wiehl Road (public road, privately maintained) and Loping Lane (private road). These roads will require improvements prior to construction. Improvements such as gravel resurfacing, grading, or widening could be necessary to accommodate transport of large or heavy equipment and/or materials to the site during construction. These private roadways would be improved to Kittitas County Road Standards, and likely be at least 24 feet wide at completion per the Local Access Rural Design Standards for low-volume, low-speed roads.

A portion of Wiehl Road between Red Bridge Road and Loping Lane is very steep, and would likely need to be improved to allow for acceptable roadway grades. This road would be constructed to County standards with drainage ditches and shoulder widths prior to project construction. The County road standards suggest asphalt concrete pavement for roads with grades exceeding 10 percent. Because this portion of Wiehl Road is fairly steep, paving would likely be recommended.

Culverts or drainage ditches could be constructed along the roadway to drain any potential runoff into a detention pond or catchment area away from the roadway, where it would be slowly released back into the ground. The design of these culverts or catchment areas would be developed during the engineering stage of the project and would follow requirements as specified in the Washington State Ecology Manual for Eastern Washington (see Attachment F, *Hydrology Plan*, for more information).

An alternative to paving is using layers of crushed stone or gravel to level and stabilize the roadway. The gravel layer would likely need to be between 8 and 21 inches deep,

depending on the topography of the existing road. The size of the gravel and the density of the layers would need to be determined during the engineering stage of the project. Although gravel roads would allow some drainage to occur from the roadway surface, drainage ditches or culverts would likely still be necessary to prevent water from collecting on the shoulders.

Any improvements to privately maintained County roadways will be coordinated with the Kittitas County Public Works Department to ensure compliance with County requirements.

From Loping Lane, new or existing maintenance roads would be used to access the solar arrays as shown in Figure 3, Proposed Site Layout. These private roads would have gravel surfaces and be at least 20 feet wide to allow for traffic in both directions.

Vehicle turnouts on Loping Lane will be constructed at various intersections with access and maintenance roads to help facilitate turning movements to and from the project site. These vehicle turnouts would provide adequate space for large construction vehicles to make safe turning movements into and out of maintenance roads.

The total number of new maintenance roads will be kept to a minimum to avoid disrupting existing land use. Haul routes and roadway improvements will be constructed with the smallest possible footprint.

3.0 Impacts during Operation

3.1 Traffic Volumes

Traffic impacts associated with the completed project are not anticipated. Once the project has been completed, there will be virtually no daily traffic for operations and maintenance. Staff technicians will perform system monitoring. Once onsite, staff will make frequent trips between the facility and the operations and maintenance building by way of passenger pickup truck or off-road vehicle.

Larger delivery trucks occasionally may be required if major equipment is in need of replacement such as structural elements, inverters, or large quantities of solar panels.

On typical days, fewer than five vehicles could be expected to access the site. Given the low traffic volumes within the project area, these minor added trips would not cause traffic impacts during project operations. TSR has committed to maintenance and operation of Wiehl Road and Loping Lane during all seasons, which includes winter plowing of these roads.

3.2 Emergency Vehicle Access

The gate system controlling access to the project site will be coordinated with applicable private property owners so they can maintain access. Access gate control will also be coordinated with local agencies, such as fire, medical, and emergency services. These services will be able to gain access to the project site via these gates. Access roads at these gates will be at least 16 feet wide to accommodate emergency or rescue vehicles.

TSR will also provide local emergency agencies with detailed maps of the access road to the site and the maintenance roads within the site.

3.3 Traffic Management

In general, adverse construction and operational impacts to traffic safety or travel times from the project are not anticipated. While construction-related traffic may cause short-term traffic delays (delivery vehicles turning onto or off of Highway 970), the delays will be temporary and could be managed with the following general measures:

- Providing proper road signage and warnings of “Equipment on Road,” “Truck Access,” or “Road Crossings”.
- Provide road signs directing traffic to the project-site.
- Provide drivers with maps to the project site and instructions not to use Red Bridge Road north of Wiehl Road.
- Construction workers will be bused to reduce traffic volume.
- Employing flagpersons as necessary to direct traffic if equipment is exiting or entering public roads to minimize risk of accidents.

The construction workforce will most likely travel during the morning and afternoon peaks of a typical workday. Although local traffic volumes on Kittitas County roadways near the project site are estimated to be very low, by bussing workers fewer vehicles can be anticipated on the roadway during this time, thus reducing the effect of construction on typical commuters.

Because project transportation impacts are limited and temporary in nature, specific measures to reduce traffic impacts to local residents at specific locations during the construction process, such as signaling are not warranted.

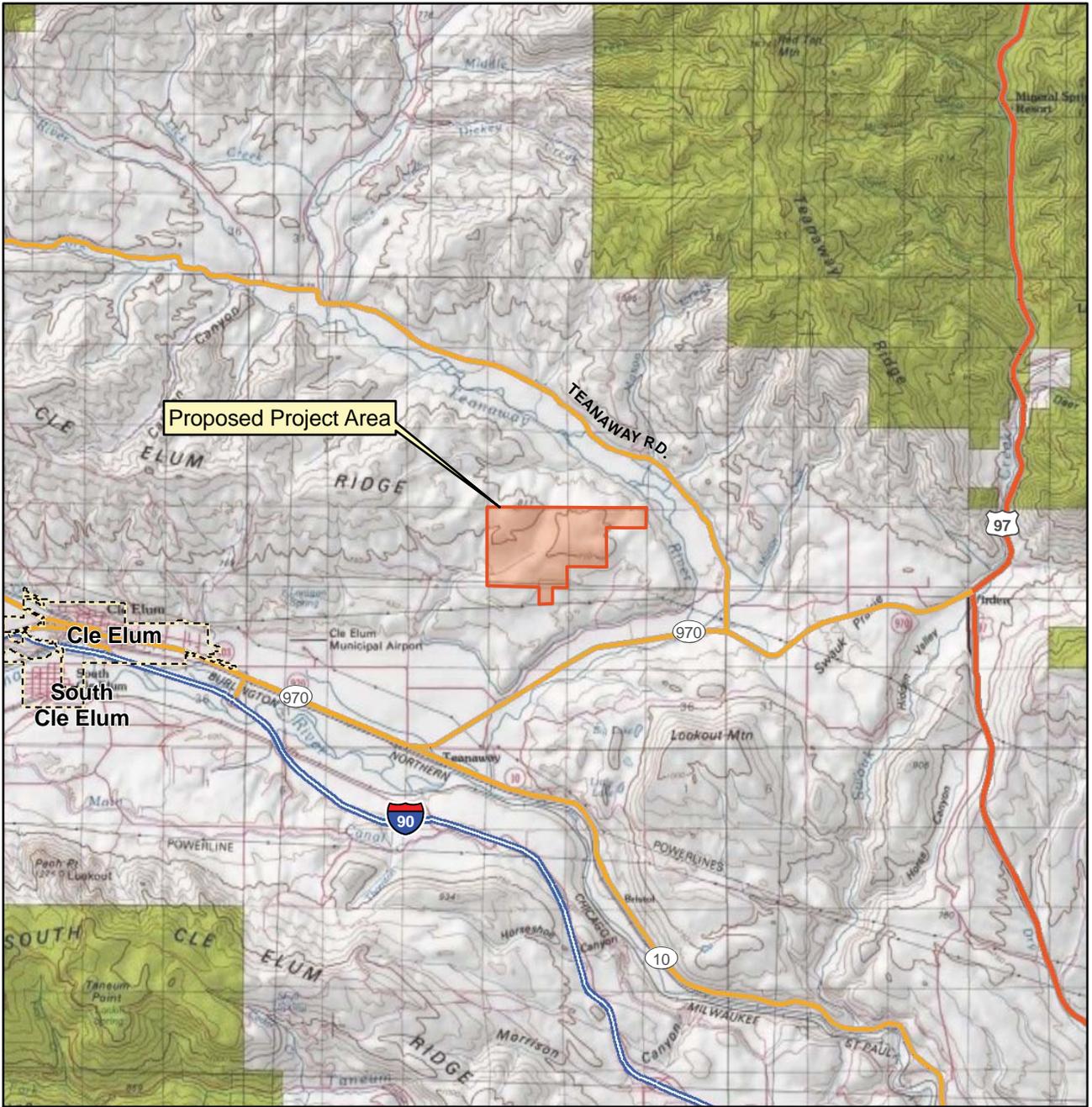
3.4 Decommissioning

Traffic impacts during decommissioning are expected to be similar to those described for construction. If some of the access roads constructed or improved as part of the project remain in place, there would be fewer trips associated with workforce, materials, and equipment during decommissioning, and there would likely be fewer traffic impacts than expected during construction. Truck trips are anticipated to occur between 7 a.m. and 7 p.m. on weekdays. Workforce trips during decommissioning are expected to increase compared to workforce trips during project operation, but no significant unavoidable adverse impacts from decommissioning or restoration of the proposed project are expected.

Mitigation at the time of decommissioning would be implemented and would likely be similar to that recommended for construction.

APPENDIX A

Figures



VICINITY MAP

LEGEND

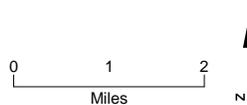
-  Proposed Project Area
-  City Boundary
-  Interstate
-  Highway
-  Major Road

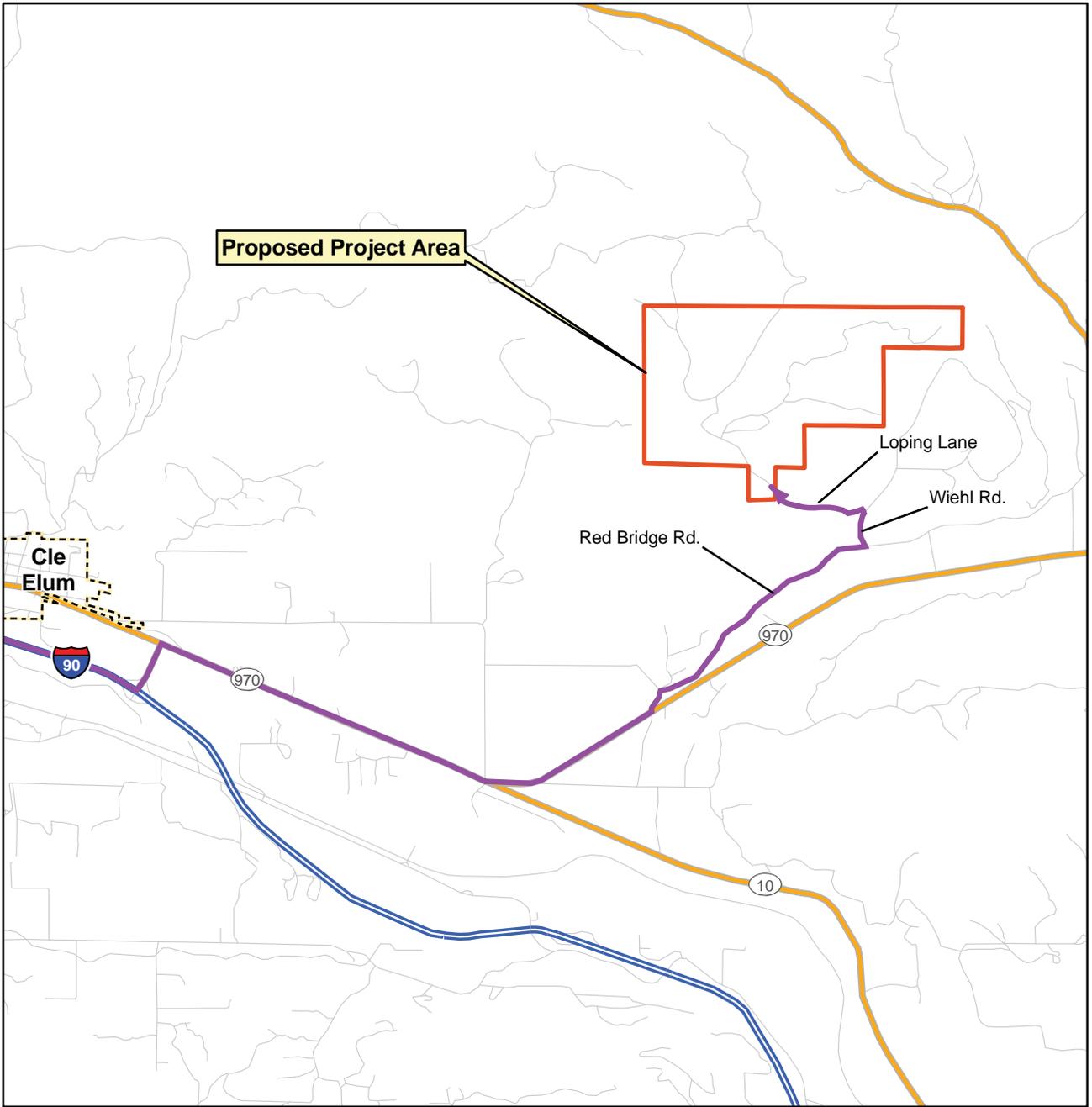
Note:
1. USGS 100K Quadrangle: Wenatchee.



FIGURE 1
Vicinity Map

Transportation Road Plan
Teanaway Solar Reserve
Kittitas County, Washington





VICINITY MAP

LEGEND

-  Proposed Project Area
-  Site Access Route
-  City Boundary
-  Interstate
-  Highway
-  Major Road
-  Minor Road

Note:

1. Street Data: 2002 ESRI StreetMap USA.

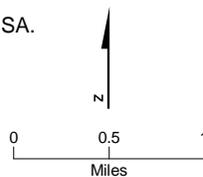
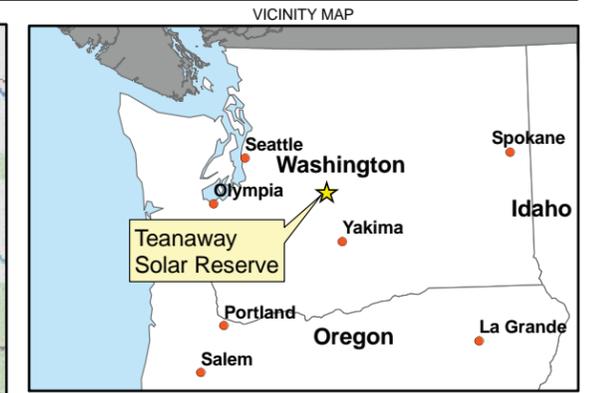
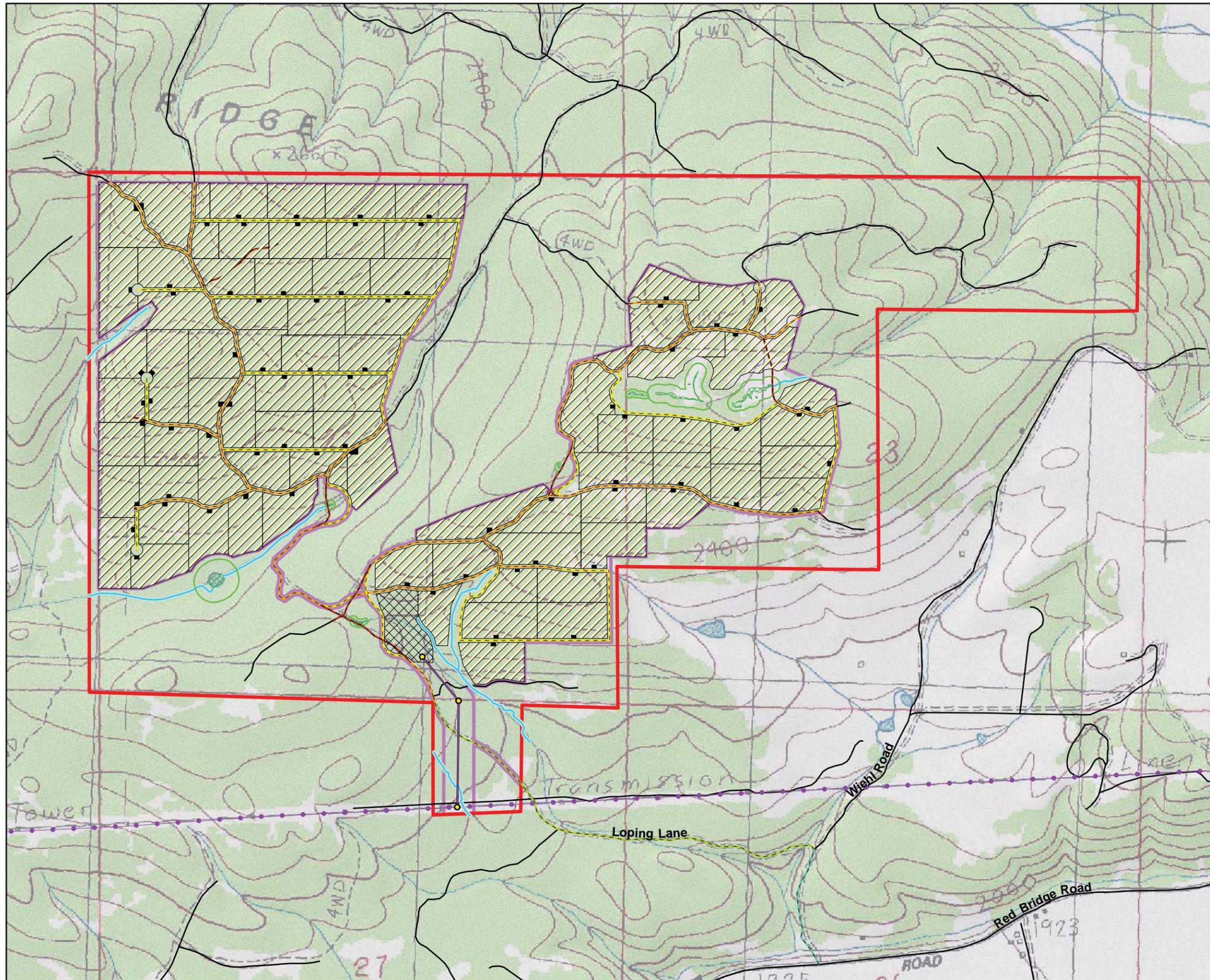


FIGURE 2
Site Access Map
 Transportation Road Plan
 Teanaway Solar Reserve
 Kittitas County, Washington



- LEGEND**
- Proposed Project Features**
- Proposed Project Area (982 Acres)
 - Proposed Project Site (477 acres)
 - Proposed PV Array Block
 - Proposed Field Inverter and Field Transformer
 - Proposed Substation/O&M Facility
 - Proposed Transmission Line
 - Proposed Transmission Structure
 - Proposed Maintenance Road
 - Proposed Improved Maintenance Road
 - Existing Maintenance Road (Planned Decommissioning)
 - Proposed Improved County Access Road
 - Proposed Improved Private Access Road
- Existing Features**
- Existing BPA Transmission Line and ROW
 - Existing Road
 - Stream
 - Stream Buffer
 - Wetland
 - Wetland Buffer

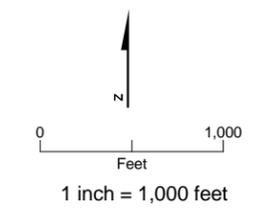
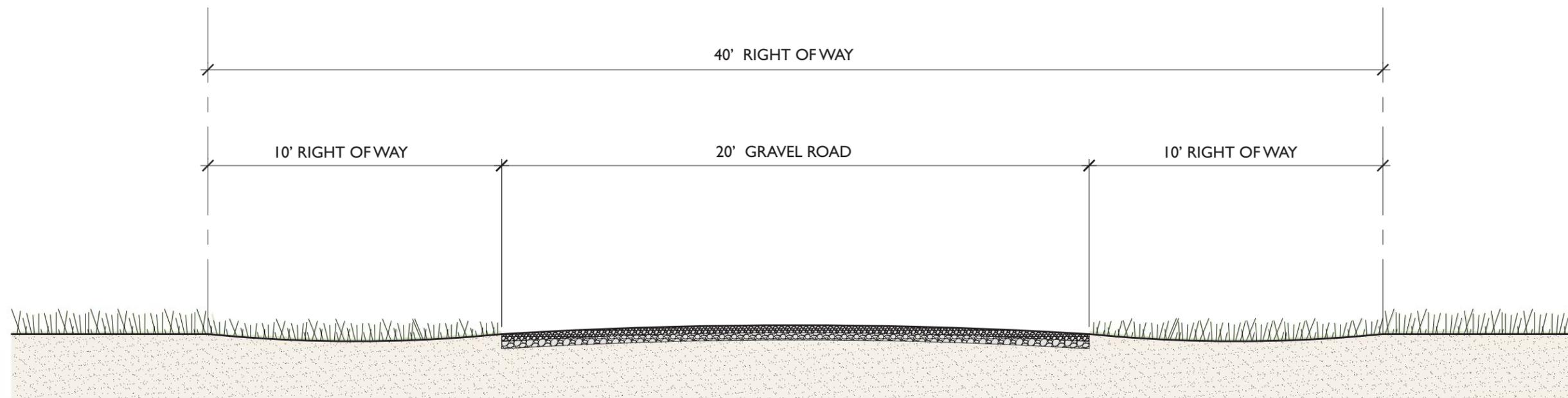


FIGURE 3
Proposed Site Layout
 Transportation Road Plan
 Teanaway Solar Reserve
 Kittitas County, Washington



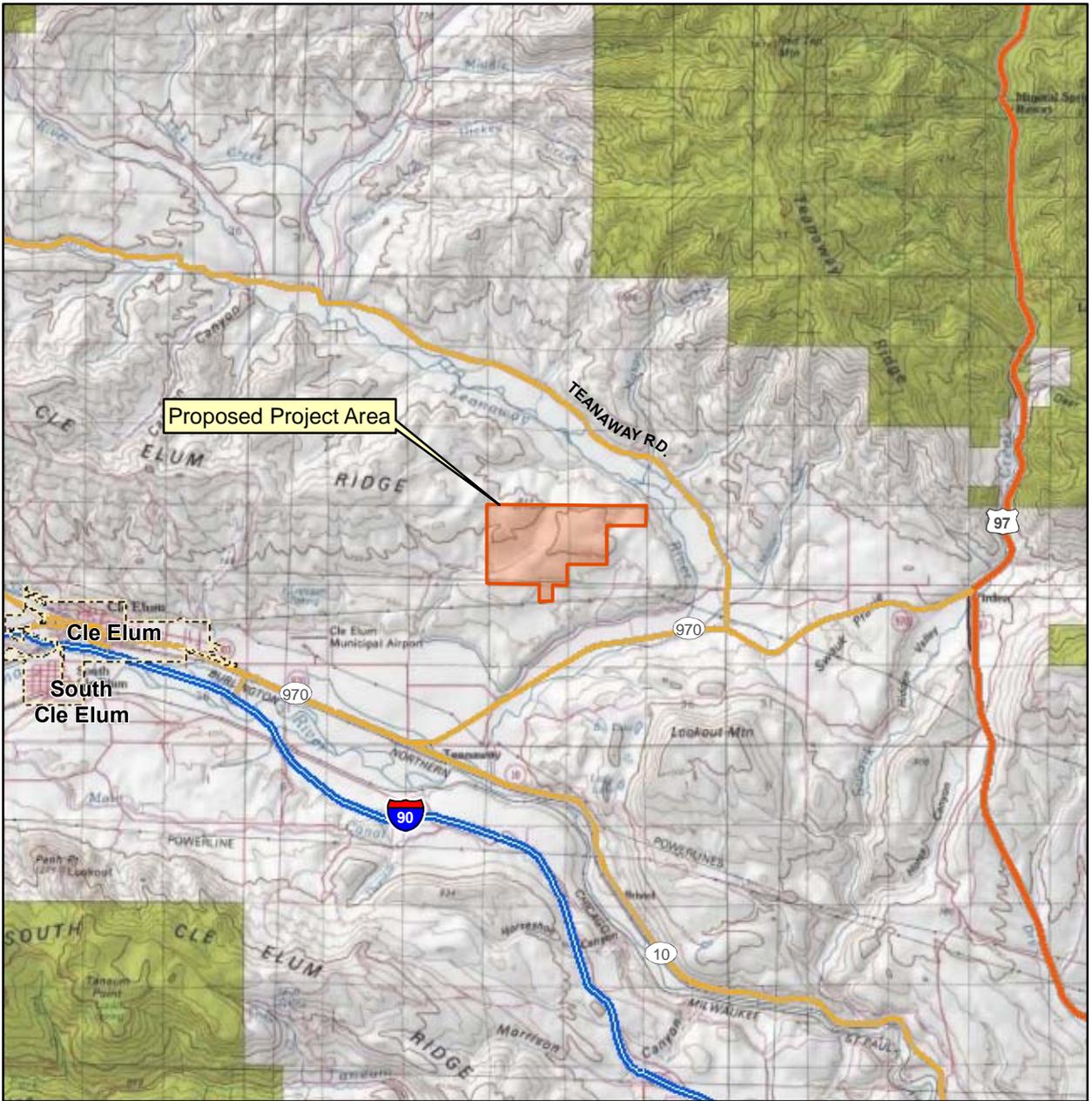
TYPICAL ROAD SECTION

scale: 1/4" = 1'-0"

FIGURE 4
 Preliminary Road Section
 Teanaway Solar Reserve
 Kittitas County, Washington

ATTACHMENT J

Figures Referenced in the Text



VICINITY MAP

LEGEND

-  Proposed Project Area
-  City Boundary
-  Interstate
-  Highway
-  Major Road

Note:

1. USGS 100K Quadrangle: Wenatchee.

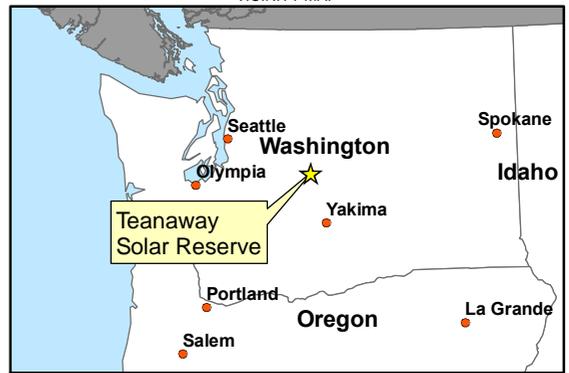
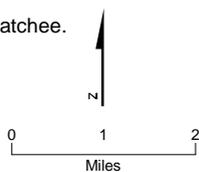
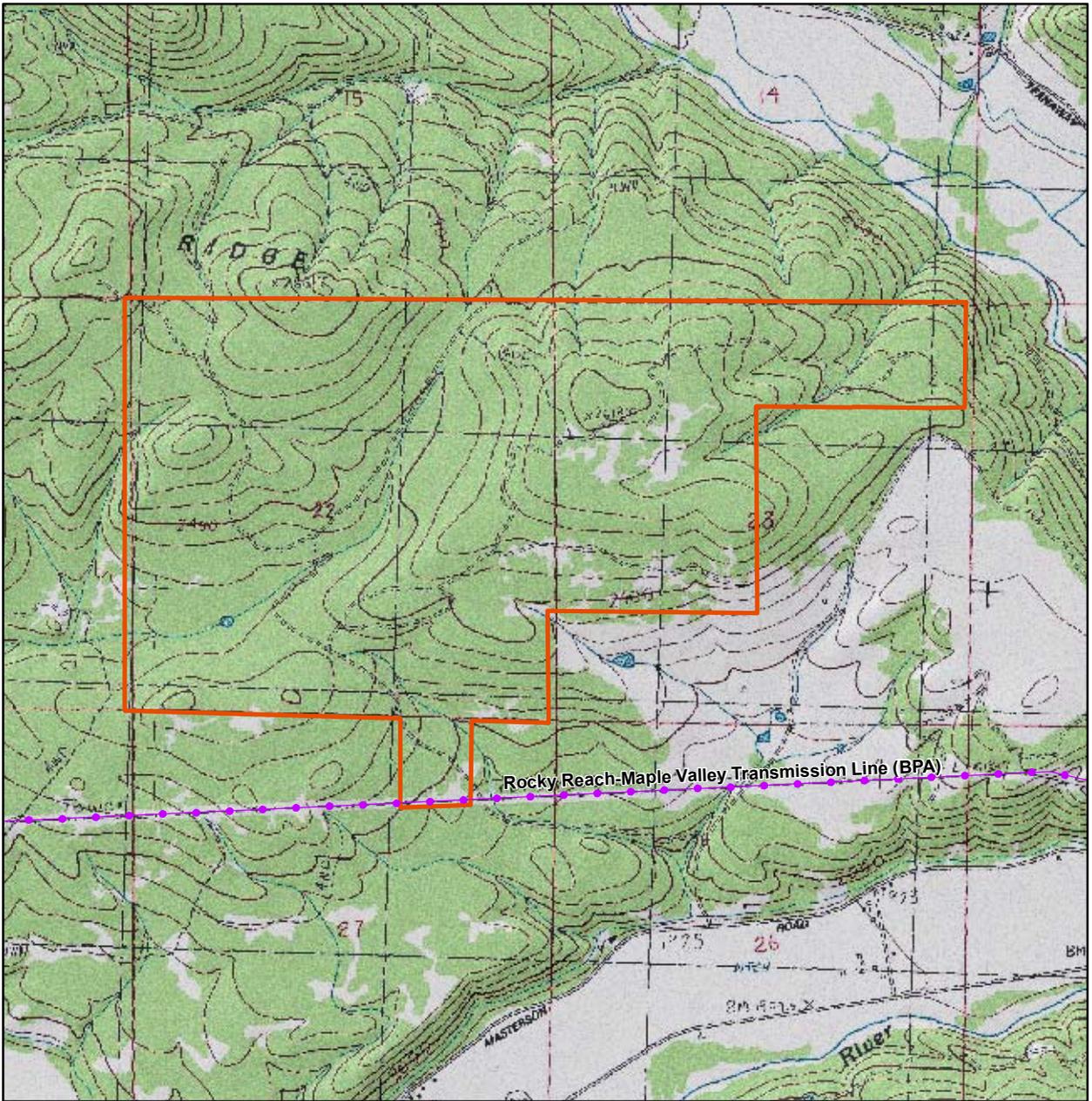


FIGURE 1
Vicinity Map

Teanaway Solar Reserve
Kittitas County, Washington



VICINITY MAP

LEGEND

- Existing BPA Transmission Line
- ▭ Proposed Project Area

Note:
1. USGS 24K Quadrangle: Teanaway.

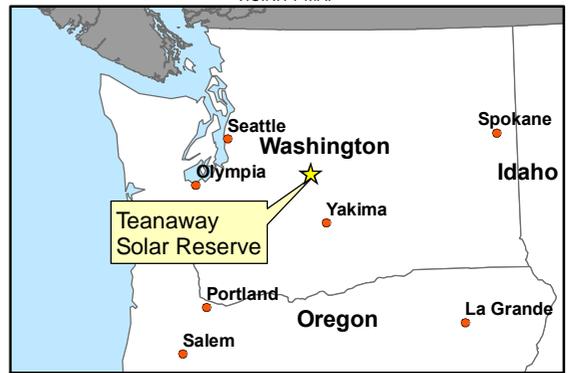
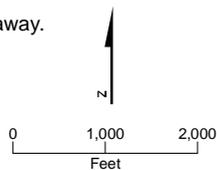
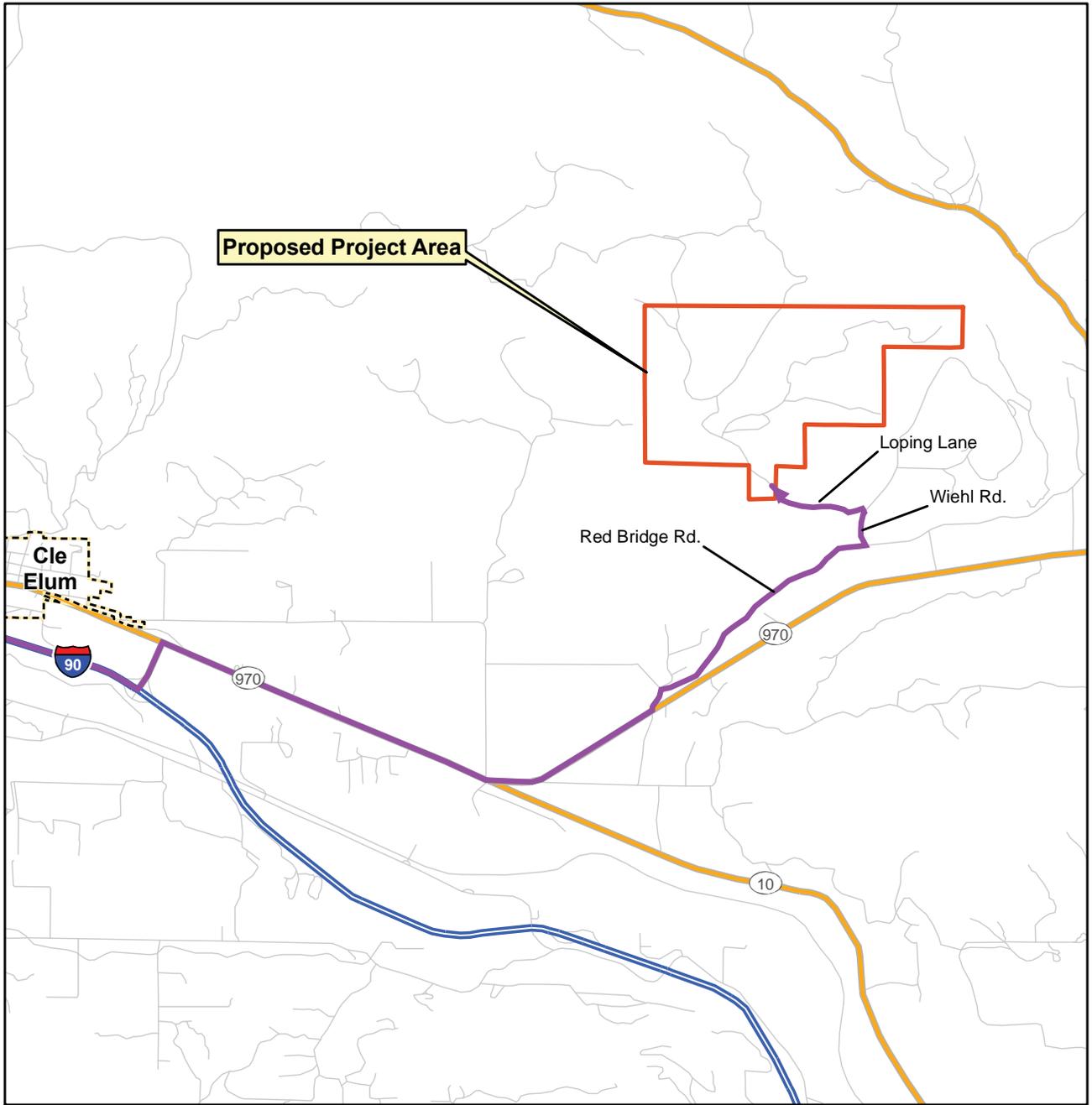


FIGURE 2
U.S. Geological Survey Topographic Map
Teanaway Solar Reserve
Kittitas County, Washington



VICINITY MAP

LEGEND

-  Proposed Project Area
-  Site Access Route
-  City Boundary
-  Interstate
-  Highway
-  Major Road
-  Minor Road

Note:

1. Street Data: 2002 ESRI StreetMap USA.

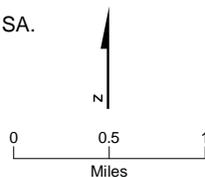
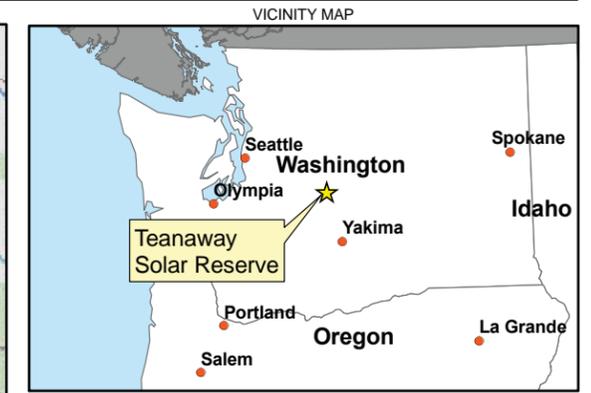
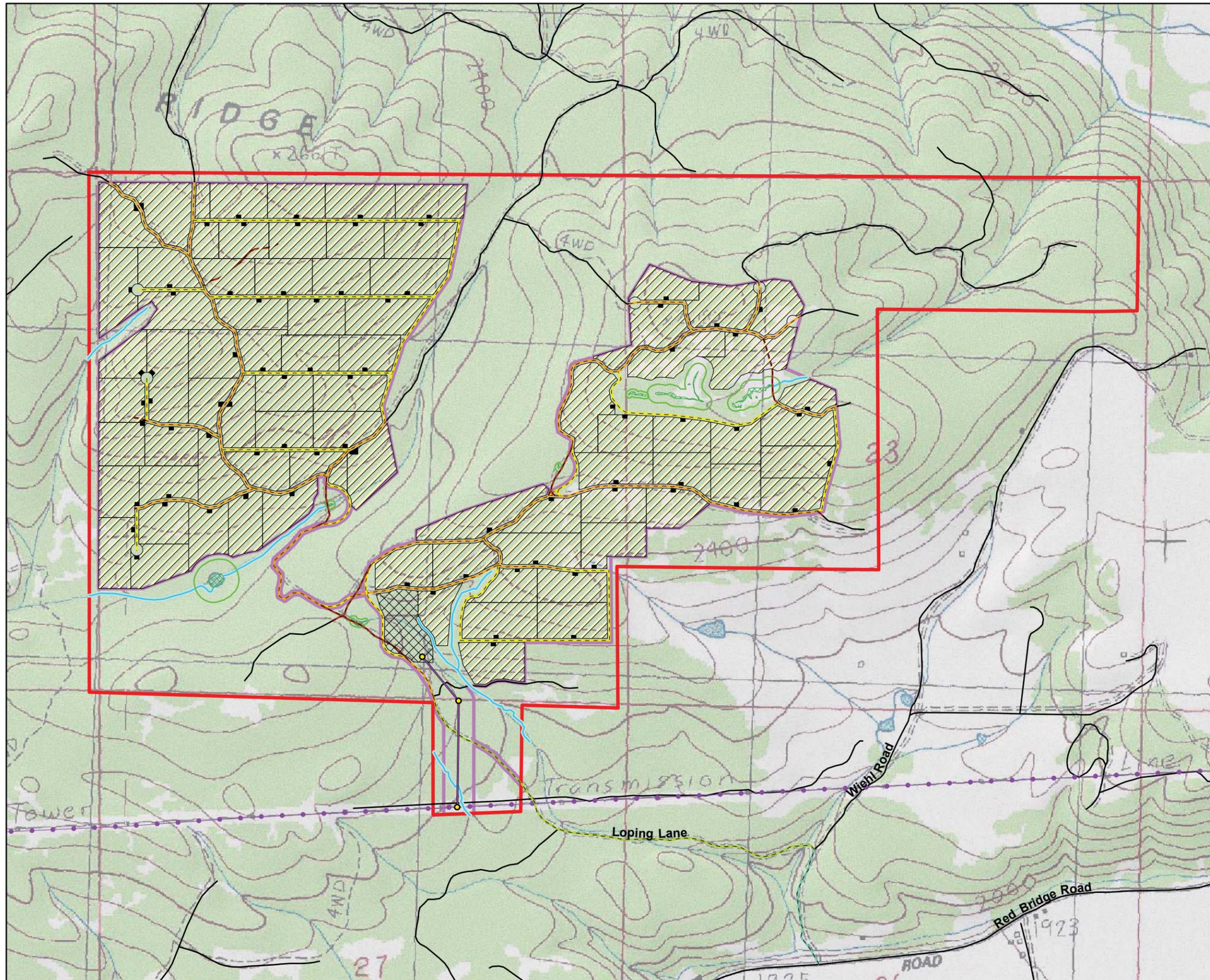


FIGURE 3
Site Access Map
 Teanaway Solar Reserve
 Kittitas County, Washington



- LEGEND**
- Proposed Project Features**
- Proposed Project Area (982 Acres)
 - Proposed Project Site (477 acres)
 - Proposed PV Array Block
 - Proposed Field Inverter and Field Transformer
 - Proposed Substation/O&M Facility
 - Proposed Transmission Line¹
 - Proposed Transmission Structure
 - Proposed Maintenance Road
 - Proposed Improved Maintenance Road
 - Existing Maintenance Road (Planned Decommissioning)
 - Proposed Improved County Access Road
 - Proposed Improved Private Access Road
- Existing Features**
- Existing BPA Transmission Line and ROW
 - Existing Road
 - Stream
 - Stream Buffer
 - Wetland
 - Wetland Buffer

Note:
 1. TSR has delineated a 300' area within which the BPA transmission line could be sited. Of this 300' area, a maximum of 200' will be cleared for the placement of the BPA transmission line. Final design and placement to be determined by BPA.

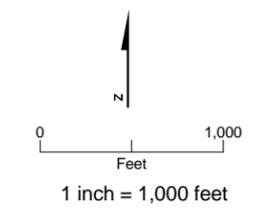


FIGURE 4
Proposed Site Layout
 Teanaway Solar Reserve
 Kittitas County, Washington

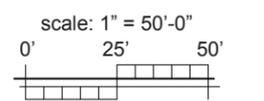
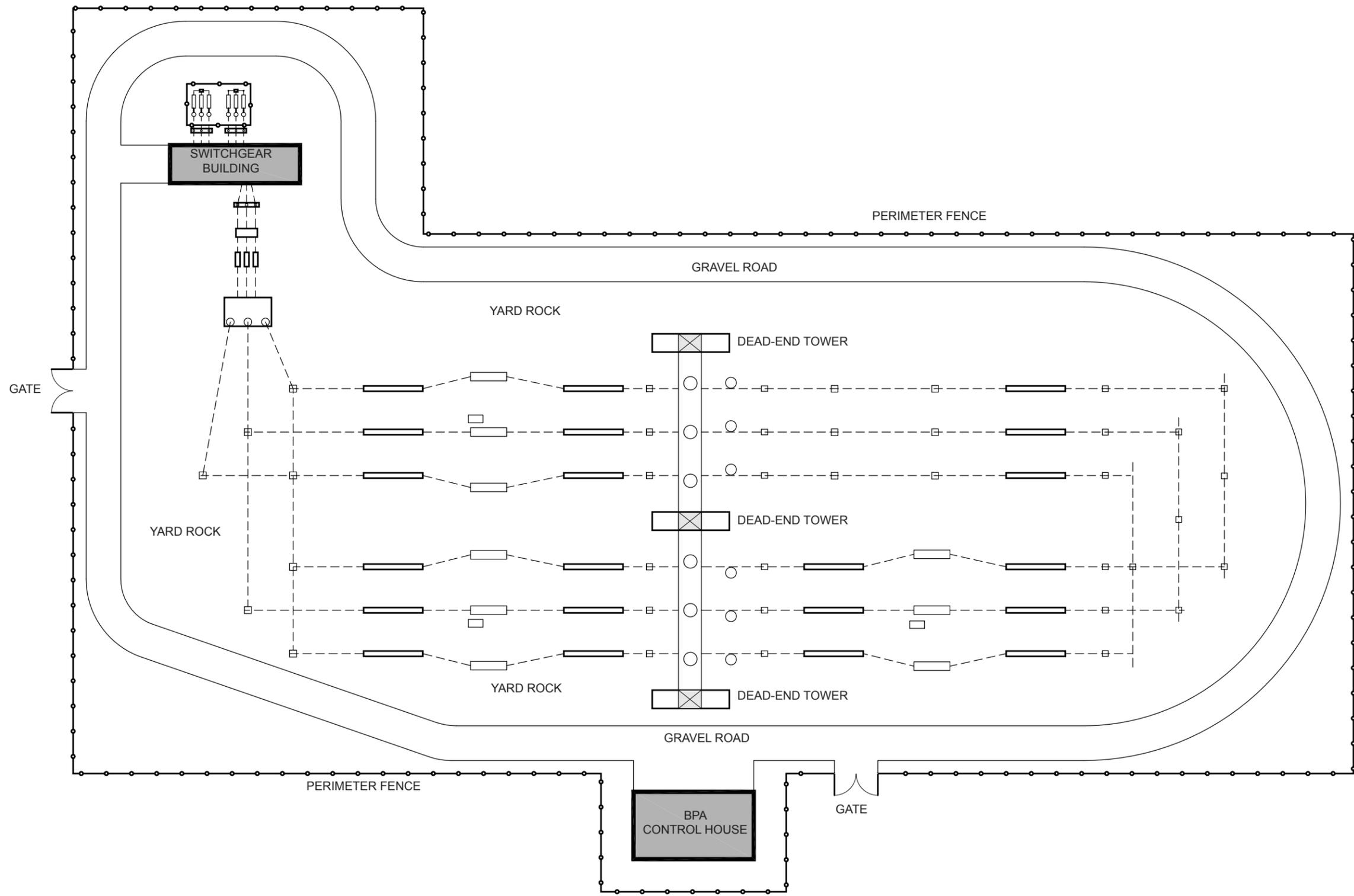
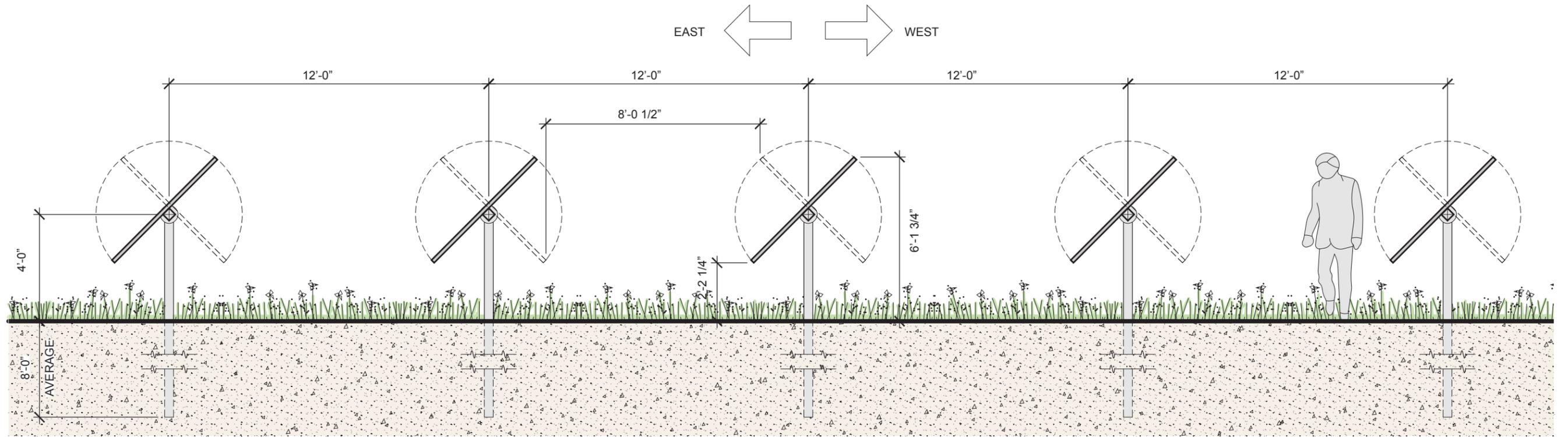
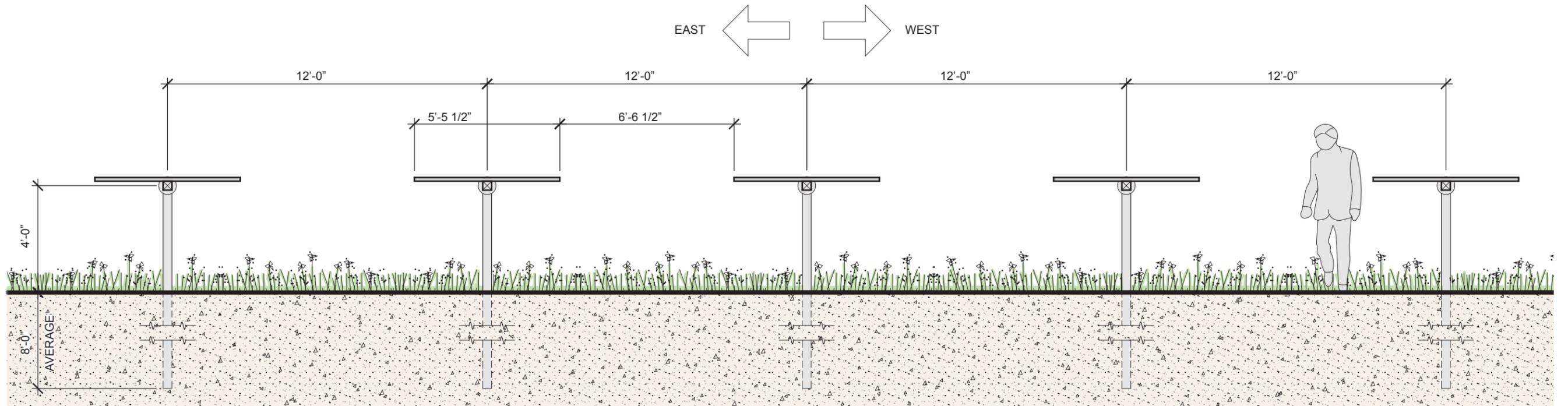


FIGURE 4a
 Substation Plan
 Teanaway Solar Reserve
 Kittitas County, Washington



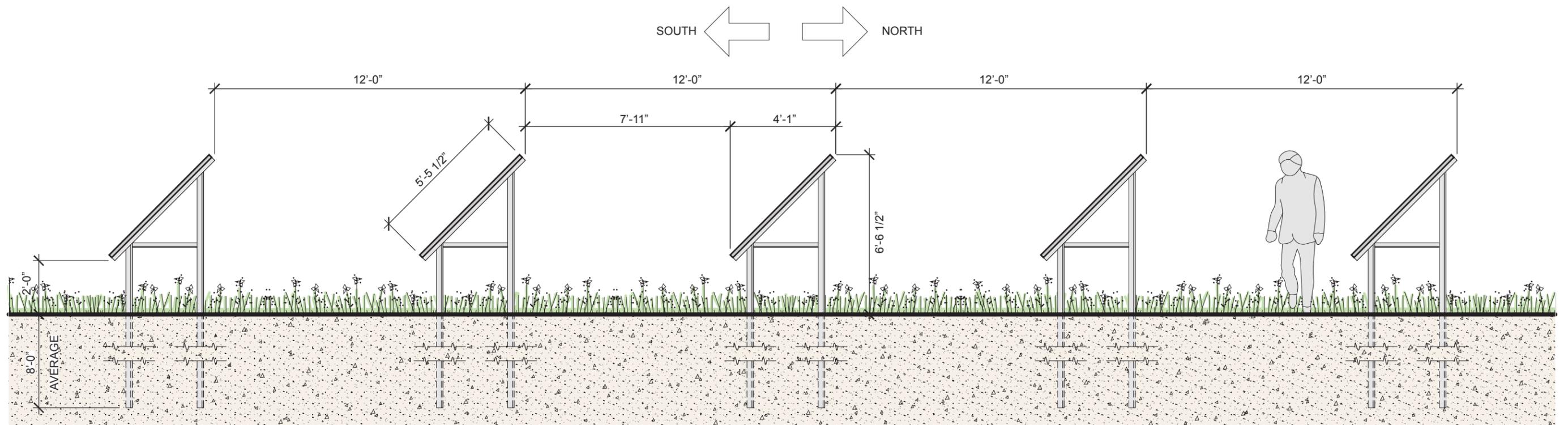
12' PANEL ROW SPACING solar panels in maximum tilt position



12' PANEL ROW SPACING solar panels in flat position
scale: 1/4" = 1'-0"



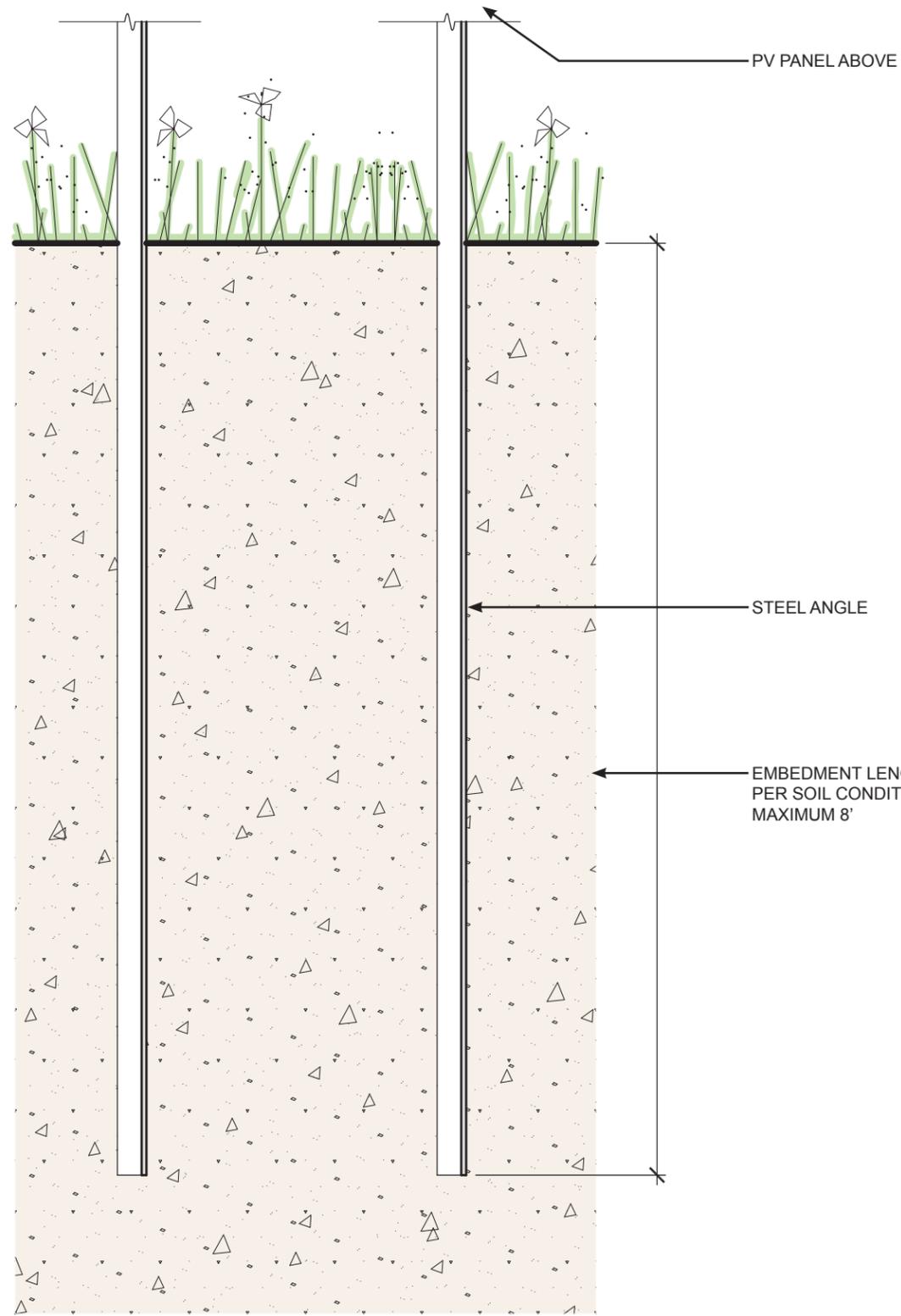
FIGURE 4b
PV Panel Sections
Teaway Solar Reserve
Kittitas County, Washington



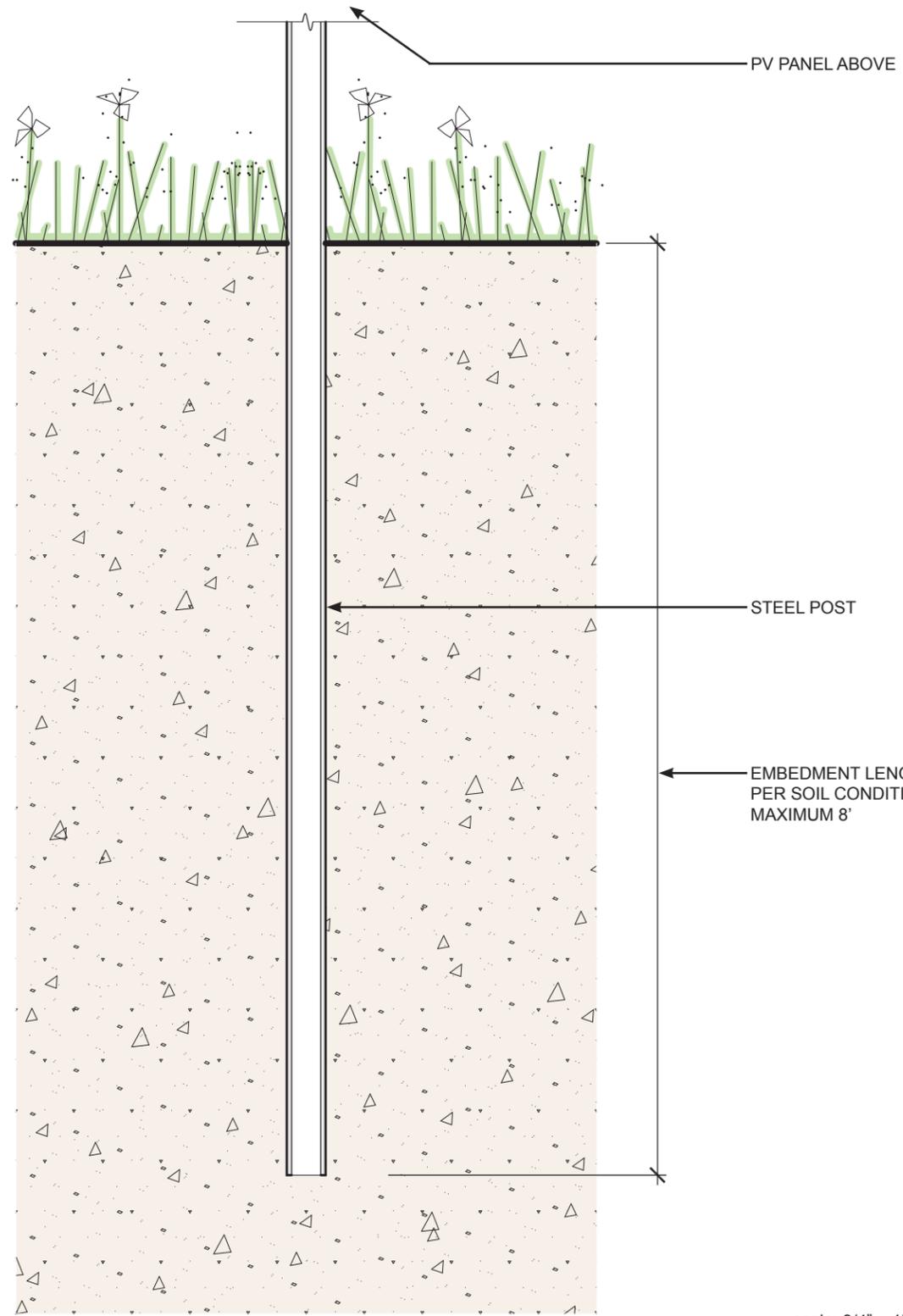
12' PANEL ROW SPACING solar panels in flat position
scale: 1/4" = 1'-0"



FIGURE 4c
PV Panel Sections
 Teanaway Solar Reserve
 Kittitas County, Washington



PANEL INSTALLATION fixed tilt



PANEL INSTALLATION single axis

* NOTE: NO CONCRETE WILL BE USED IN THE INSTALLATION OF PV PANEL FOOTINGS.

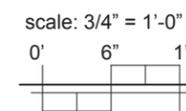


FIGURE 4d
Panel Installation Sections
 Teanaway Solar Reserve
 Kittitas County, Washington

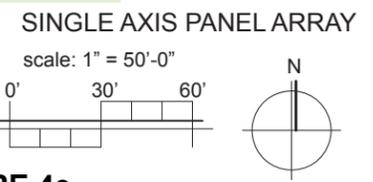


FIGURE 4e
 Enlarged One Megawatt Field
 Teanaway Solar Reserve
 Kittitas County, Washington

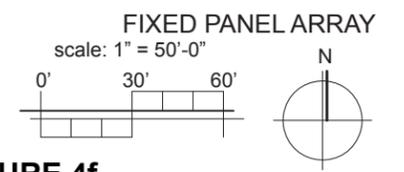


FIGURE 4f
 Enlarged One Megawatt Field
 Teanaway Solar Reserve
 Kittitas County, Washington

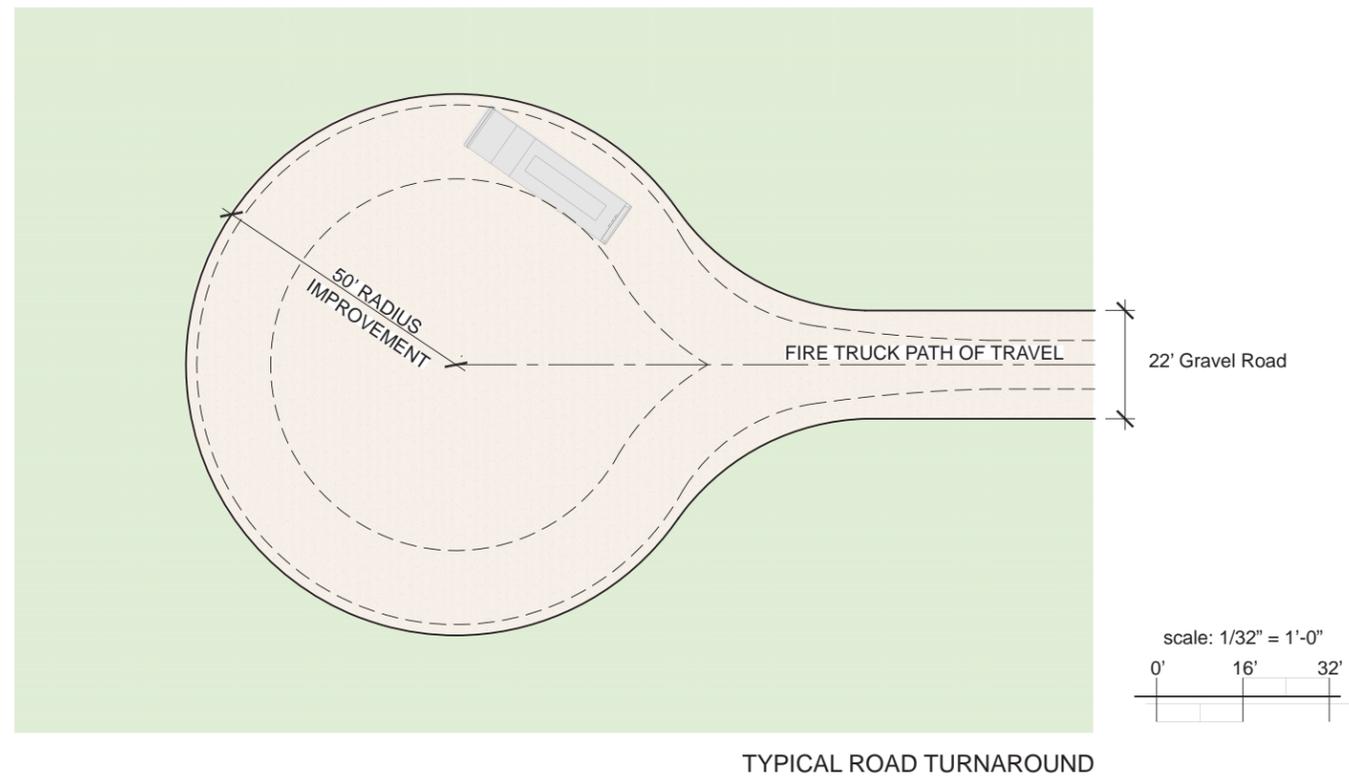
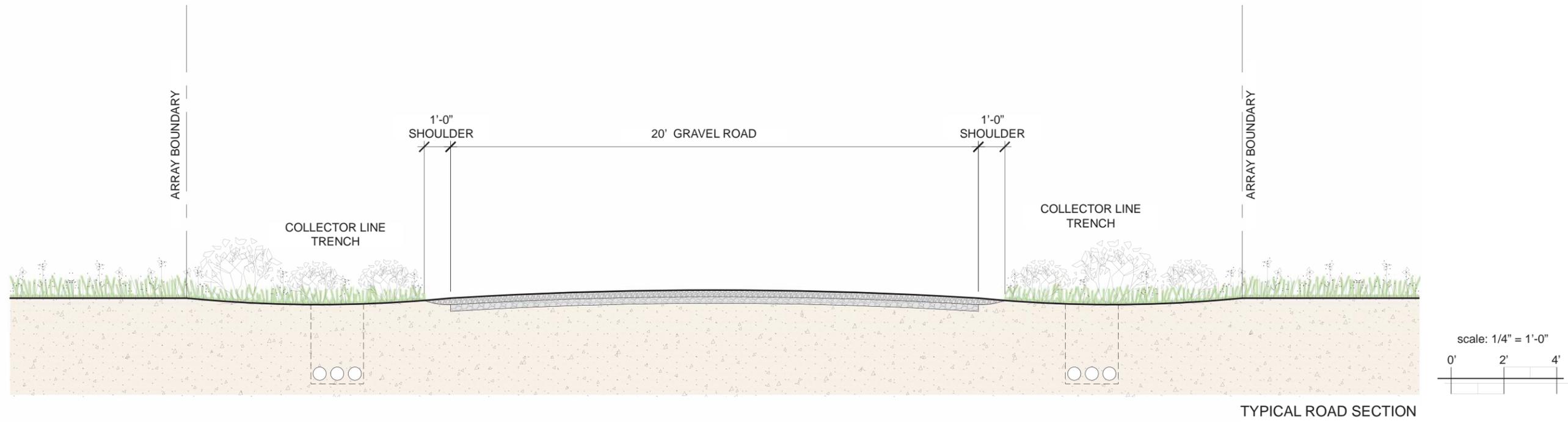
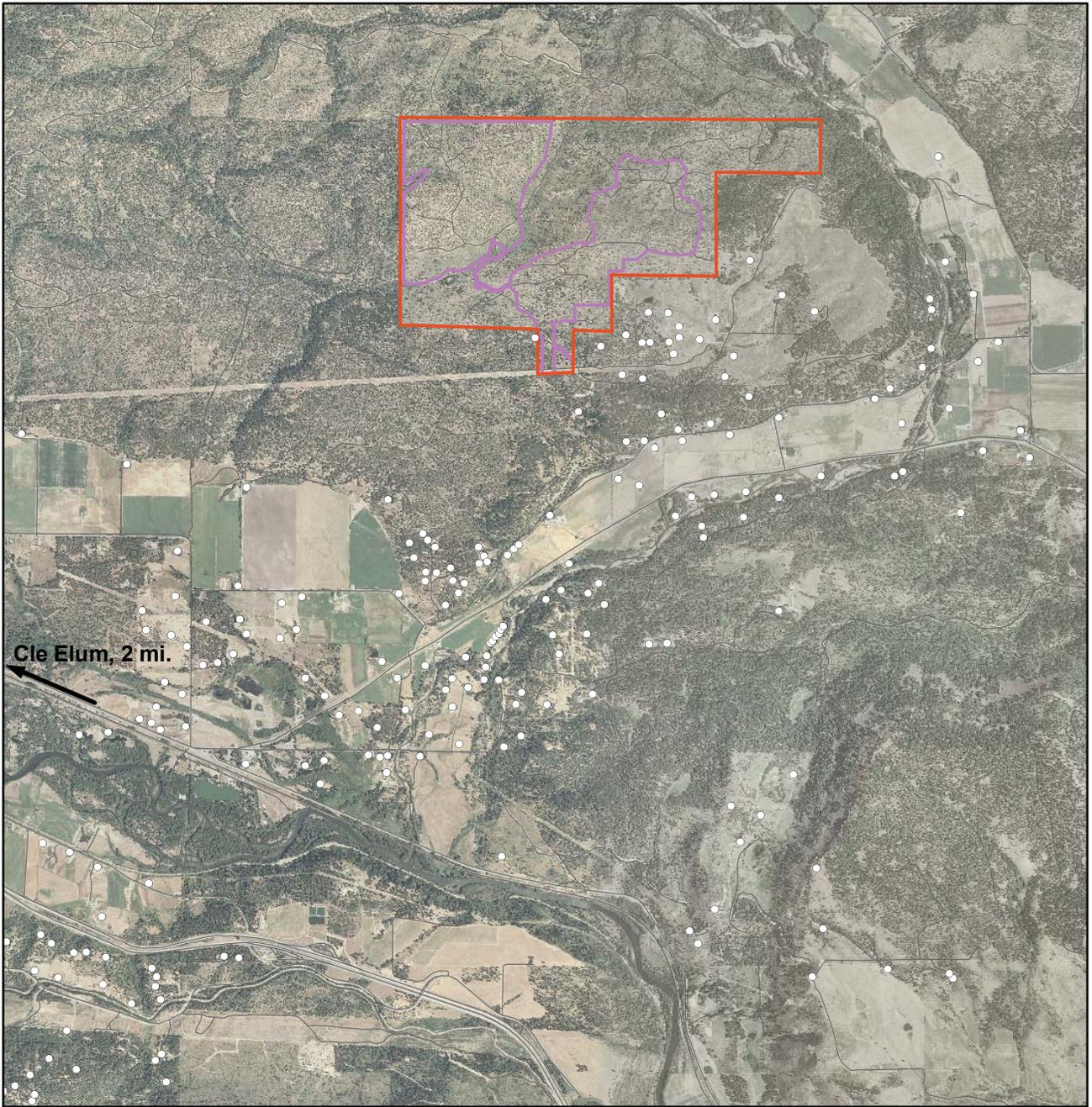


FIGURE 4g
Road Section Turnaround
 Teanaway Solar Reserve
 Kittitas County, Washington



VICINITY MAP

LEGEND

- Identified Structure
- Existing Road
- Proposed Project Area (982 Acres)
- Proposed Project Site (477 acres)

Notes:

1. Aerial Imagery: 2006 1m NAIP.
2. Structures identified from aerial, not ground verified.

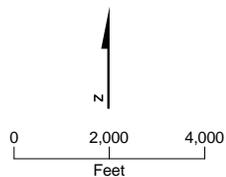
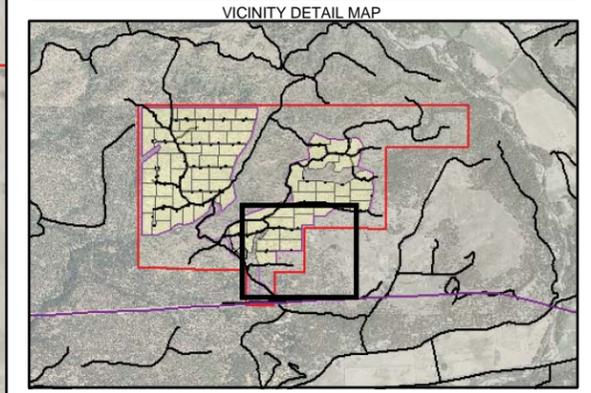
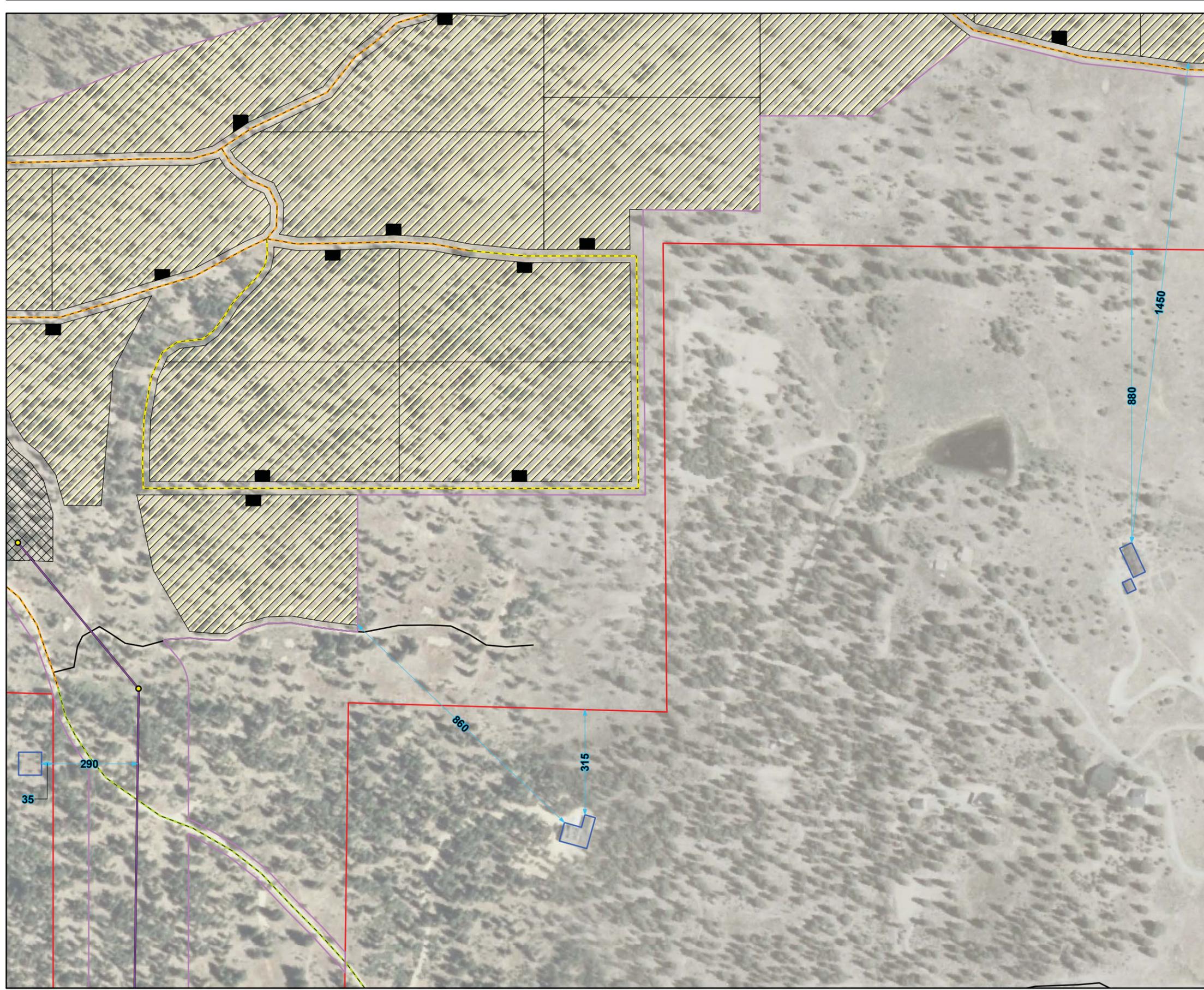


FIGURE 5
Identified Structure Map
 Teanaway Solar Reserve
 Kittitas County, Washington



- LEGEND**
- Distance in Feet Between Structure and Lease/Facility
 - Selected Residential Structure
 - Proposed Project Area (982 Acres)
 - Proposed Project Site (477 acres)
 - Proposed PV Array Block
 - Proposed Field Inverter and Field Transformer
 - Proposed Substation/O&M Facility
 - Proposed Transmission Line¹
 - Proposed Transmission Structure
 - Proposed Maintenance Road
 - Proposed Improved Maintenance Road
 - Proposed Improved Private Access Road
 - Existing Road

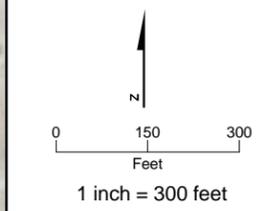
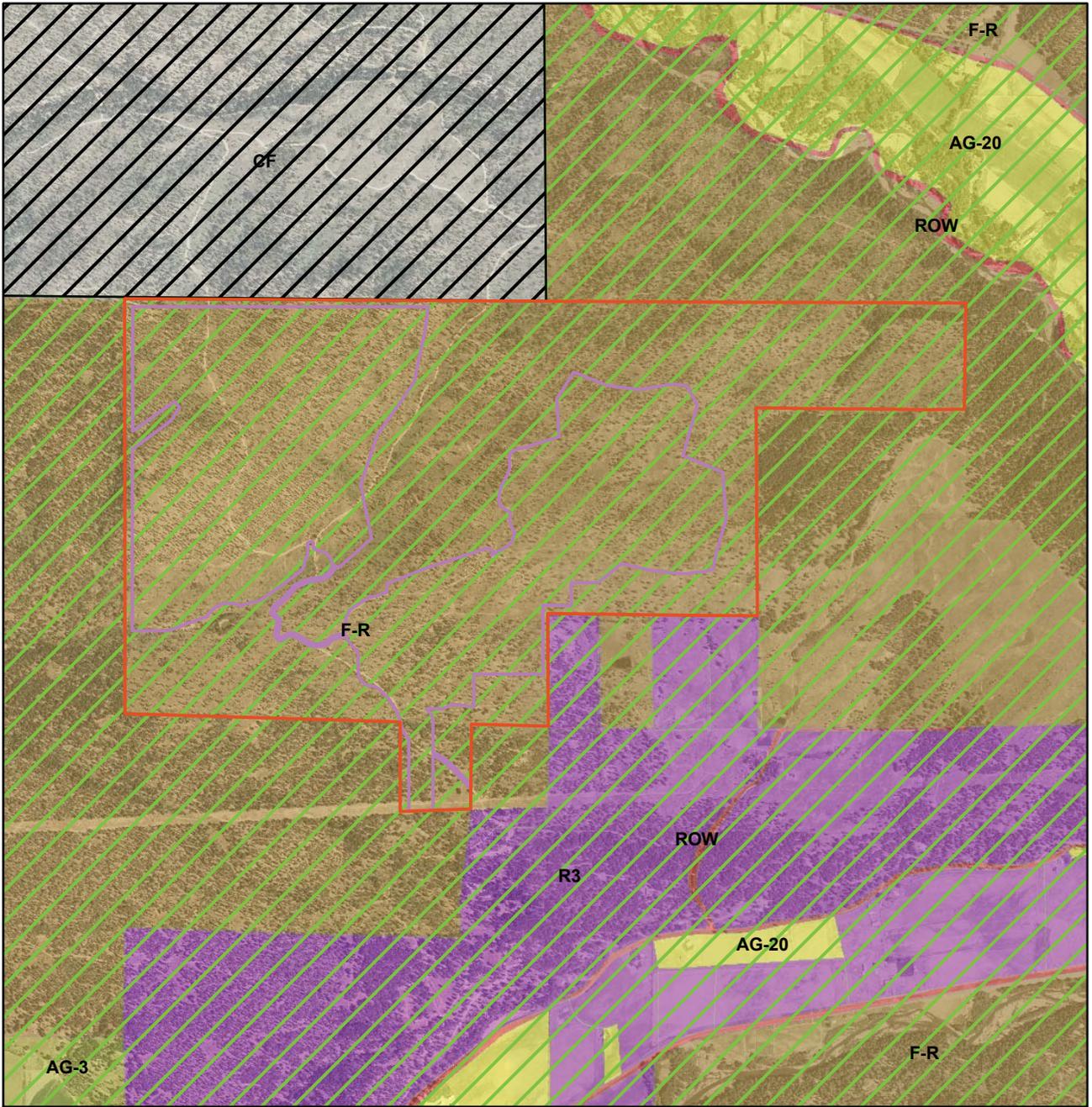


FIGURE 5a
Proximity to Closest Residences
 Teanaway Solar Reserve
 Kittitas County, Washington



VICINITY MAP

LEGEND

-  Proposed Project Area (982 Acres)
-  Proposed Project Site (477 acres)

Zoning

-  AG-20, Agricultural 20
-  AG-3, Agricultural 3
-  CF, Commercial Forest
-  F-R, Forest & Range
-  R3, Rural 3
-  ROW, Right-of-Way

Land Use

-  COMMERCIAL FOREST
-  RURAL

Note:

1. Aerial Imagery: 2006 1m NAIP.

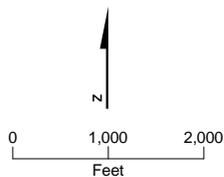
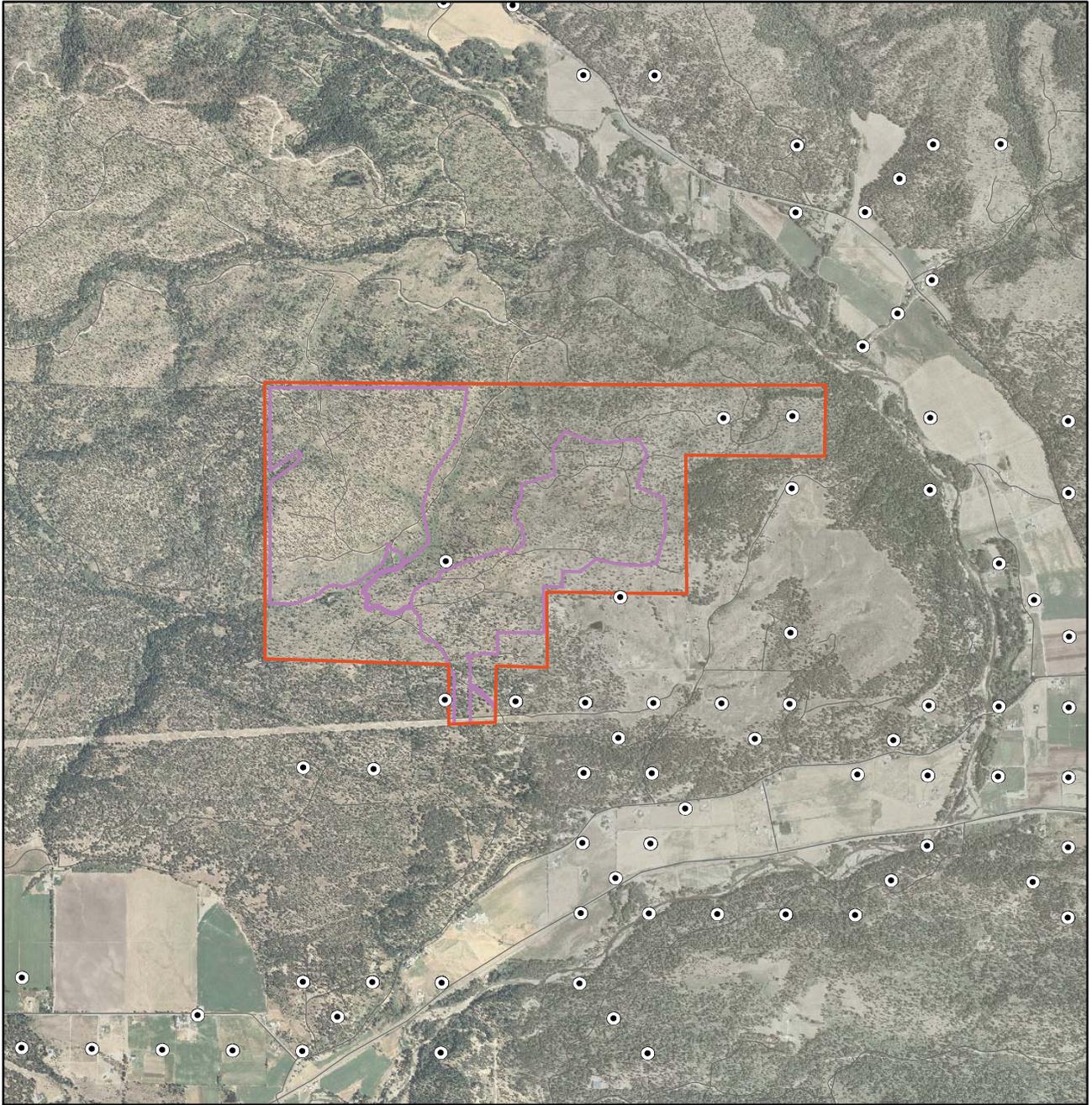


FIGURE 6
Land Use/Zoning Map
 Teanaway Solar Reserve
 Kittitas County, Washington



VICINITY MAP

LEGEND

- Well Location
- Existing Road
- Proposed Project Area (982 Acres)
- Proposed Project Site (477 acres)

Notes:

1. Well Log Data: Washington State Department of Ecology Water Resources Program.
2. Aerial Imagery: 2006 1m NAIP.

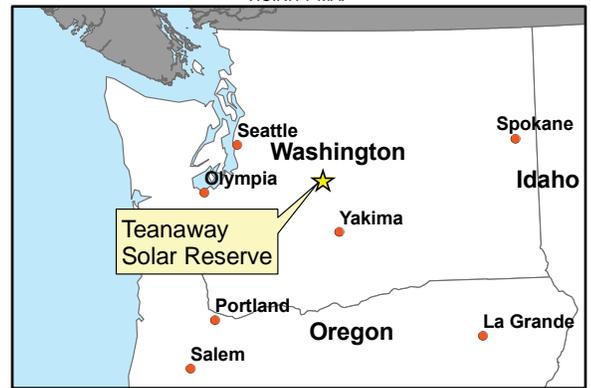
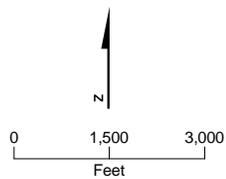
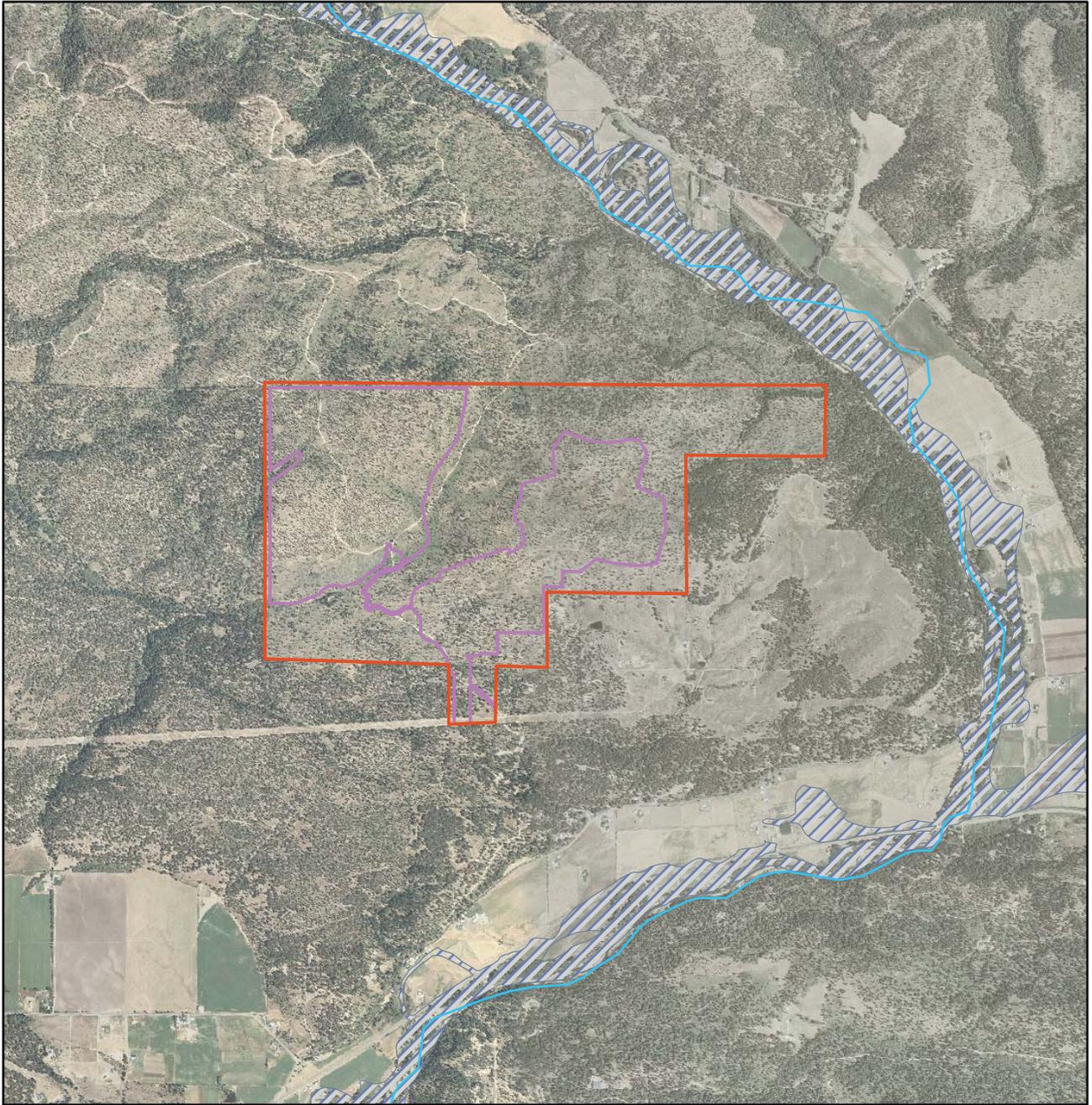


FIGURE 7
Designated Critical Areas:
Aquifer Recharge Areas
 Teanaway Solar Reserve
 Kittitas County, Washington



VICINITY MAP

LEGEND

-  Shoreline Management Act Stream (450 feet from proposed project area)
-  FEMA 100-year Flood Zone
-  Proposed Project Area (982 Acres)
-  Proposed Project Site (477 acres)

Notes:

1. Flood Data: Federal Emergency Management Agency Flood Insurance Rate Map.
2. Stream Data: Washington Department of Ecology.
3. Aerial Imagery: 2006 1m NAIP.

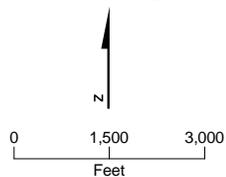
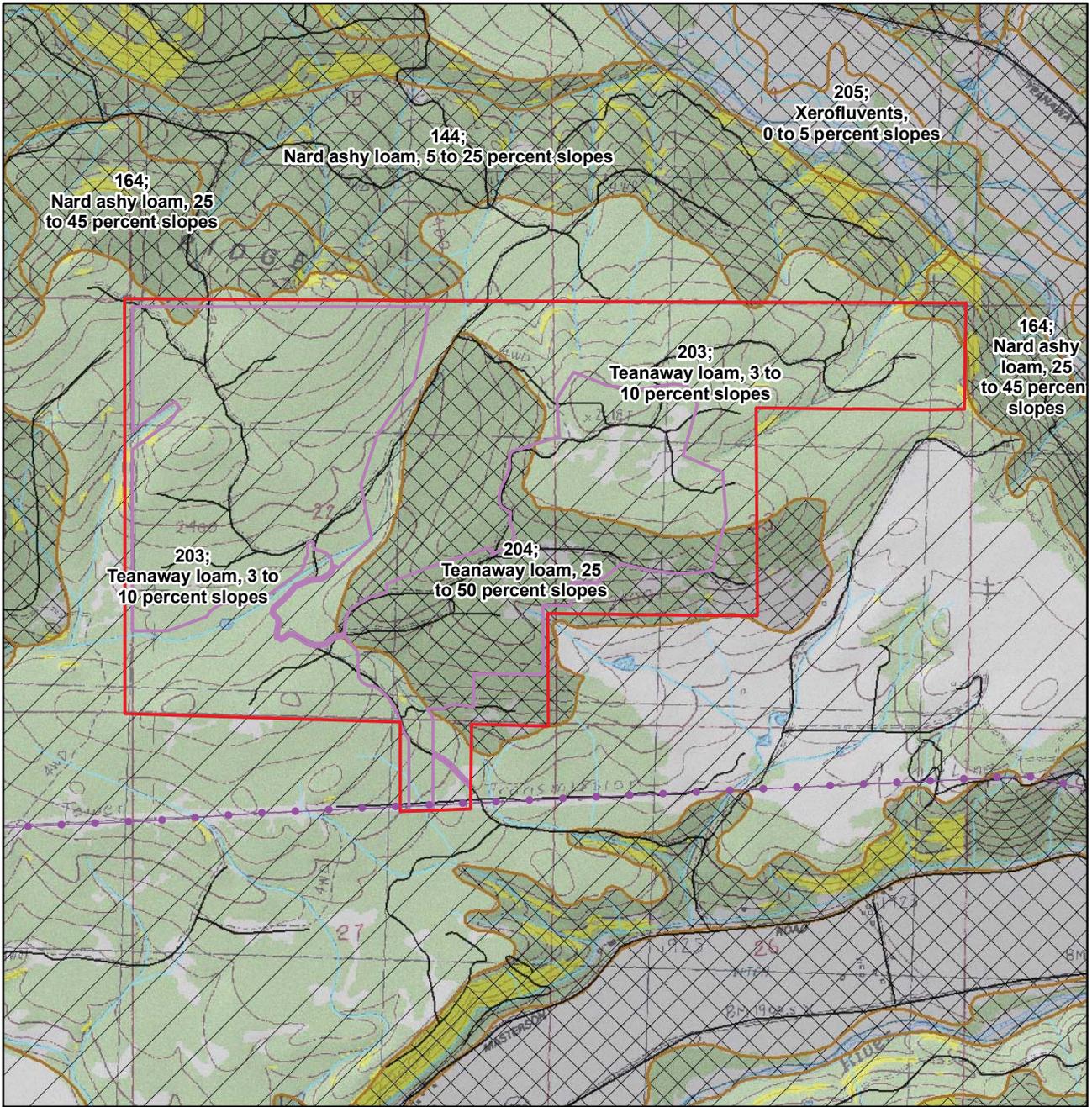


FIGURE 8
Designated Critical Areas: FEMA Federal Insurance Rate Map for Kittitas County
 Teanaway Solar Reserve
 Kittitas County, Washington



VICINITY MAP

LEGEND

- | | | | |
|--|-----------------------------------|--|--------------------------|
| | Proposed Project Area (982 Acres) | | Soil Unit Boundary |
| | Proposed Project Site (477 acres) | | Slope |
| | Existing Road | | 0 - 33% (not symbolized) |
| | Existing BPA | | 33%+ |
| | Transmission Line | | Soil Limitations - |
| | Stream | | Local Roads and Streets |
| | Waterbody | | Somewhat limited |
| | | | Very limited |

Notes:

1. USGS 24K Quadrangle: Teanaway.
2. Soils Data: Soil Survey Geographic (SSURGO) Database.

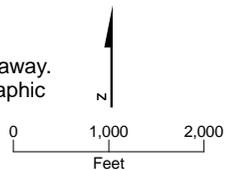


FIGURE 9
Designated Critical Areas: Erosion-Prone Soils and Geologic Hazards

Teanaway Solar Reserve
 Kittitas County, Washington

ATTACHMENT K

Photographs of Solar Equipment

ATTACHMENT K

Photo Plates

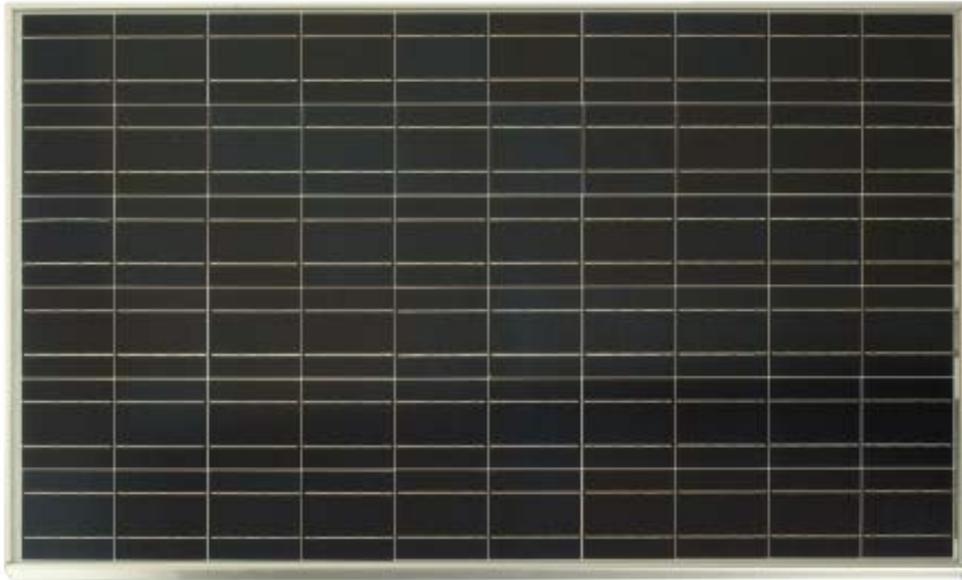


Photo Plate 1: Representative Solar Module (Source: Sharp Electronics Corporation)



Photo Plate 2: Single-Axis Tracking System by RayTracker (Source: Array Technologies)



Photo Plate 3: Proposed Fixed Tilt Mounting Structure (Source: Dreamstime.com, used with permission)



PowerGate® Plus 1 MW

PVS – 1000 (MVT)

Unparalleled Performance

With their advanced system intelligence, next-generation Edge™ MPPT technology, and industrial-grade engineering, PowerGate Plus inverters maximize system uptime and power production, even in cloudy conditions.

Power Efficiency (Inverter Only)

Power Level	Output Power	Efficiency
10%	100 kW	96.2%
20%	200 kW	97.4%
30%	300 kW	97.6%
50%	500 kW	97.8%
75%	750 kW	97.7%
100%	1000 kW	97.5%

Measured at 420V

Edge MPPT

Provides rapid and accurate control that boosts PV plant kilowatt yield

Provides a wide range of operation across all photovoltaic cell technologies

Printed Circuit Board Durability

Wide thermal operating range: -40° C (-40° F) to 85° C (185° F)

Conformal coated to withstand extreme humidity and air-pollution levels

Proven Reliability

Rugged and reliable, PowerGate Plus PV inverters are engineered from the ground up to meet the demands of large-scale installations.

Low Maintenance

Modular components make service efficient

Dual cooling fans

Safety

UBC Seismic Zone 4 compliant

Built-in DC and AC disconnect switches

Integrated DC two-pole disconnect switch isolates the inverter (with the exception of the GFDI circuit) from the photovoltaic power system to allow inspection and maintenance

Protective covers over exposed power connections

PV Inverters | PowerGate® Plus 1 MW



PowerGate Plus 1 MW Specifications		UL/CSA	CE
Input Parameters			
Maximum Array Input Voltage	900 VDC	•	•
	Floating	•	•
Input Voltage Range (MPPT; Full Power)	420–815 VDC	•	•
Maximum Input Current	2,442 ADC	•	•
Output Parameters			
Nominal Output Voltage to Transformer	265 VAC	•	•
Output Frequency Range	59.3–60.5 Hz	•	
	49.3–50.5 Hz		•
AC Voltage Range (Standard)	-12%/+10%	•	•
Nominal Output Frequency	60 Hz	•	
	50 Hz		•
Number of Phases	3	•	•
Maximum Output Current per Phase	2,178 A	•	•
CEC Weighted Efficiency (Inverter/System)	97.5%/96% ¹	•	•
Maximum Continuous Output Power	1000 kW (1000 kVA)	•	•
Power Factor at Full Load	>0.99	•	•
Harmonic Distortion	<3% THD	•	•

- Standard
- Optional

¹ System efficiency is calculated as combination of measured inverter efficiency and typical transformer efficiency.

Photo Plate 4: Specifications for a Typical Inverter (Source: Satcon Technology Corporation, 2010)

COMPONENTS

For the ultimate in value and reliability, the Central Moloney Components Operation produces the majority of the components used on Central Moloney's three-phase padmounted transformers. For over 30 years, Central Moloney Components has been a leader in the design and manufacture of transformer components. You can be assured that the primary and secondary bushings, primary switch, dual voltage switch, tap changer, current limiting fuse holders, drip shields, etc. will have the Central Moloney logo of quality on them.



PRODUCT FEATURES

Three-Phase Padmounted Transformers

Central Moloney, Inc. produces three-phase padmounted distribution transformers, oil filled, 45 kVA and above, up to 34.5 kV voltage class. Our three-phase padmounted distribution transformers are designed and manufactured in compliance with all applicable ANSI and RUS industry standards for installation on three-phase underground systems.



Recessed handle closed.



Recessed handle open.



3-point latching mechanism.



Handhole with tamper-proof cover.

STANDARD FEATURES & ACCESSORIES

- Cabinet secured to tank with 300 series stainless studs
- Removable doors and sill
- Three point door-latching mechanism with penta head bolt
- Steel barrier separating high and low voltage compartments
- Access to high voltage compartment via penta head bolt(s)
- Tank equipped with four (4) lifting lugs
- Jacking provisions
- Tank and cabinet painted Munsell 7GY3.29/1.5 Green
- Zinc epoxy primer
- High voltage bushings are externally clamped universal wells
- Low voltage bushings are externally clamped with ANSI spades
- Removable neutral ground strap on low voltage neutral bushing
- One-inch oil fill plug
- Drain valve with sampling device
- 25°C liquid level plug
- Automatic pressure relief valve
- Externally operated HO Disconnect (WYE-WYE)
- Accessory parking stands (Dead-Front Only)
- Door stop rods
- Tank grounding provisions (1 in HV, 1 in LV)

OPTIONAL ACCESSORIES

- Draw-out expulsion fuses with isolation links or internal expulsion fuses
- Non-metallic drip shield
- Draw-out full range current limiting fuse
- Internal partial range current limiting fuse with internal or draw-out expulsion fuses
- Draw-out, non-loadbreak current limiting fuses, with interlocking loadbreak switch
- Loadbreak or non-loadbreak high voltage bushing inserts
- Integral high voltage bushings
- Low voltage bushing connectors or non-standard ANSI spades
- Dual voltage switch
- Delta-WYE switch
- Tap changer switch
- Loadbreak sectionalizing switch
- Pressure/vacuum gauge
- Temperature gauge
- Liquid level gauge
- Handhole(s) with tamper-resistant cover
- Additional support for low voltage spades

Check with a factory sales representative for availability of other optional accessories not listed.

TESTING

Our three-phase transformers undergo rigorous testing outlined by IEEE/ANSI Standards.

These tests include:

- Impulse
- Hipot
- No-Load Loss (Core Loss)
- Load Loss (Copper Loss) & Impedance
- Phase Relation
- Induce
- Ratio
- Other tests as required by customer or specification.

QUALITY ASSURANCE

Central Moloney's quality management system has earned ISO-9001 certification. ISO certification at Central Moloney provides the basis for control and continuous improvement. We believe that making quality products requires the full understanding and commitment of each employee. Employees are made aware of the company objectives and quality policy by training, quality assurance procedures and quality audits.

Photo Plate 5:A Typical Transformer Cabinet (Source: Central Maloney, Inc.)



Photo Plate 6: Example of Cabling Being Installed in Trenches for Interconnection to Grid



Photo Plate 7: Example of Cabling Being Installed in Trenches for Interconnection to Grid

ATTACHMENT L

Potential Visual Impact Assessment

Report

**Teanaway Solar Reserve
Potential Visual Impact
Assessment
Kittitas County, Washington**

Prepared for
Teanaway Solar Reserve, LLC

February 2010

Prepared by
CH2MHILL



**Printed on
Recycled and
Recyclable
Paper**

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3.0 Project Viewpoints and Simulations	2

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- B Photos and Simulations

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- 2 Zone of Potential Visual Influence - All Areas Map
- 3 Zone of Potential Visual Influence - Area A Map
- 4 Zone of Potential Visual Influence - Area B Map
- 5 Zone of Potential Visual Influence - Area C Map
- 6 Zone of Potential Visual Influence - Area D Map
- 7 Proposed PV Array Blocks and Zone of Potential Visual Influence in Vicinity of Project Site Map
- 8 Existing 500 kV Transmission Line Zone of Potential Visual Influence in Vicinity of Project Site Map
- 9 Proposed Transmission Line Zone of Potential Visual Influence in Vicinity of Project Site Map
- 10 Project Substation Zone of Potential Visual Influence in Vicinity of Project Site Map

1.0 Introduction

The purpose of this updated technical report is threefold: (1) provide updated background documentation for the conclusions presented in the Aesthetics section of the Expanded SEPA Checklist Supplement, (2) assist Kittitas County in evaluating the potential visual impacts associated with the proposed project, and (3) respond to the letter from Kittitas County to CH2M HILL dated December 4, 2009 regarding the Teanaway Solar Reserve Conditional Use Permit (CU-09-00005) and Development Agreement.

2.0 Methodology

The first step in evaluating the potential visual impacts associated with the proposed project was to determine areas from which the project could potentially be visible. To achieve this goal, a geographic information system (GIS)-based visibility assessment, called a Zone of Visual Influence (ZVI) analysis, was conducted. The layout of the project that provided the basis for the August 2009 ZVI analysis was updated to reflect the layout as of January 2010. Environmental Systems Research Institute (ESRI) ArcGIS software was used for the analysis. The ZVI data were overlaid on a map of the general proposed project area in order to graphically depict areas from which the project would be potentially visible. Figure 1 in Appendix A illustrates an updated conceptual layout of the project. Figure 2 in Appendix A illustrates the potential collective visibility of solar panels in all four areas of the project site. Four maps (see Appendix A, Figures 3 to 6) were developed to show the potential visibility of solar panels in each one of the four areas.

To respond to the letter from Kittitas County dated December 4, 2009, requesting additional analysis within 1 mile of the project, “close up” ZVI maps were developed to indicate the potential visibility of the project components. The potential visibility of solar collectors to areas within 2 miles of the potential project site was developed (see Appendix A, Figure 7). Additional ZVI maps were also developed to illustrate the potential view of the part of the existing BPA transmission line near the project site (see Appendix A, Figure 8) and the project transmission line (see Appendix A, Figure 9). For readers who are familiar with the project area, the BPA transmission line ZVI map is useful in terms of seeing how the “potential” visibility depicted in a ZVI map relates to what is actually seen. The last additional ZVI map that was developed was for the project substation (see Appendix A, Figure 10). The software that was used to produce the ZVI measured 10-meter digital elevation models that were derived from multiple sources. These sources consisted of 7.5’ (1:24,000) U.S. Geological Survey (USGS) topographic quadrangle maps, elevation manuscripts, and aerial photographs. The elevation models represent ground elevations.

The ZVI model calculated lines of sight between points that represent solar panels 10 feet above the adjacent terrain and ground areas from which they would be potentially visible. The ZVI model that was developed for the substation calculated lines of sight between points that were 120 feet above adjacent terrain to depict the tallest structure at the substation, the A-frame dead-end structure that connects the substation with its transmission line (none of the other components in the substation is taller than 30 feet). The ZVI model that was developed for the existing BPA transmission line near the project site

and the proposed project transmission line tower (one) and poles (two) used points that were 150 feet above adjacent terrain.

It is important to realize that the models do not take into account the presence of trees, buildings, or other features, so in many areas where project visibility is indicated, views will actually be screened by trees, other vegetation, or other structures. The ZVI models “overstate” the potential visibility of the project because the presence of trees, other vegetation, and other structures within the potential “seen” areas that would block or screen views are not taken into account when demarking areas from which evaluated projects would potentially be visible. In addition, ZVI models are line-of-sight models that do not account for attenuating factors such as distance, haze, humidity, background landscape, or weather, which would make the project invisible or barely visible from certain locations under many atmospheric or weather conditions.

3.0 Project Viewpoints and Simulations

To respond to the December 4, 2009 letter from Kittitas County requesting additional analysis within 1 mile of the project area and to get a better idea of how visible the project would be, six new viewpoints (or locations) were added to the original four (see Appendix A, Figure 2). The 10 viewpoints represent locations from around the project area at varying distances. Photographs were taken from each location to depict existing views. Conceptual depictions or simulations of how the project would appear from eight of the locations were developed.

Viewpoints were also used to depict existing visual conditions in the general project area and how they might change if the project were constructed. Viewpoints 1 and 2 were chosen to represent views of the project from areas south of Interstate 90 (I-90). Viewpoint 1 is located alongside Watson Cutoff Road just below the intersection with Upper Peoh Point Road. It is approximately 4 miles southwest of the project. Viewpoint 2 is approximately 3.5 miles to the southwest of the project and is located on Watson Cutoff Road at a lower elevation than Viewpoint 1 and is approximately 0.2 mile south of I-90. Both of these viewpoints were identified in the ZVI maps to be within the “seen” area of the project. Figure 1a of Appendix B depicts the existing view towards the project from Viewpoint 1, and Figure 1b is a conceptual depiction of what the view might look like with the project in place. Figures 2a and 2b of Appendix B illustrate similar views and conceptual depictions from Viewpoint 2. The project would be noticeable to viewers from these areas. It would appear as a series of low-lying dark objects located along the forested ridge that includes the project site. The project would be noticeable as a non-timber land use, but would likely be difficult for most viewers to identify what it is at this distance. Due to the low-lying nature of the solar collectors, the project would not block or obscure views of the mountains behind the project site.

Viewpoints 3 and 4 are situated on Lookout Mountain south and southeast, respectively, of the project site. Despite much of the northwest side of Lookout Mountain being identified as an area from which the project would be potentially visible, it was difficult to find publically accessible locations on the northwest facing slopes of Lookout Mountain from which the project site can be seen. Based on several site visits and discussions with neighbors in the area on July 26, 2009, many, if not most, of the residences on the slopes of Lookout

Mountain have views toward the project site that are obscured or at least partially screened by trees. Two areas were found that did have views of the project area.

Viewpoint 3 is located on private property in a pasture above the main part of the ranch. It represents a very unobstructed and wide-open view of the project. Viewpoint 4 is located near the intersection of Ridgewater Drive and Lambert Road on public property. Both of these locations are approximately 1.5 miles from the closest edge of the project. These viewpoints were chosen to depict some of the closest elevated residential areas that could have views of the project. Figure 3a in Appendix B depicts the existing view from Viewpoint 3 looking toward the project area. Figure 3b is a conceptual depiction of what the view might look like if the project were constructed. Figures 4a and 4b in Appendix B illustrate similar views and conceptual depictions from Viewpoint 4.

The view from Viewpoint 3 would change considerably with the project (although views farther down the slope near the ranch house would change less due to a lower viewing angle and some vegetation that would somewhat screen views). Views from Viewpoint 4 would also change with the project but would not be as noticeable from Viewpoint 3 and would be of short durations as people drive on Ridgewater Drive.

Most residences on the north side of Highway 970 are closer to the project site than the residences on the northwest face of Lookout Mountain. However, none are higher in elevation than the project site and do not look down upon, or parallel to, it, so the project would not be as visible as it would from parts of Lookout Mountain. Four new viewpoints (5, 6, 7, and 10) within 1 mile of the project site were selected based upon the request from Kittitas County for closer viewpoints. Viewpoint 5 (see Figures 5a and 5b in Appendix B) is located at the intersection of Wiehl Road and a private drive and represents views that people driving by the area on a public road, or people driving to nearby residences, would have looking toward the project. Viewpoint 6 (see Figures 6a and 6b of Appendix B) is from a residence approximately 800 feet southeast of the nearest project panels. Viewpoint 7 (see Figures 7a and 7b in Appendix B) is from a nearby residence that is also located approximately 800 feet away from the closest project panels. Viewpoint 10 (see Figures 10a and 10b in Appendix B) is from the location where Loping Lane crosses the existing Bonneville Power Administration (BPA) transmission line. This view is seen by people accessing private properties and residences via Loping Lane.

Viewpoints 8 and 9 were selected to illustrate views toward the project from two nearby public roads that are located in valleys below the project area. Viewpoint 8 (see Figure 8 in Appendix B) is located on Highway 970 approximately 0.5 mile south of the highways crossing of the Teanaway River. As seen in Figure 8, the sides of the upland area upon which the project would be built can be clearly seen, but the top cannot be. Viewpoint 9 is taken from Teanaway Road where the BPA transmission line crosses the road (see Figure 9 of Appendix B). Although project components would not be seen in this area, the location of this viewpoint is useful for depicting the BPA transmission line corridor in an area where it is very visible and viewing the north slope of the upland area on which the project would be constructed.

As the conceptual depictions of the project from Viewpoints 5, 6, 7, and 10 illustrate, close-up views of the proposed facility would be largely screened by topography and vegetation. The removal of trees on the horizon would be noticed from Viewpoint 5, but project

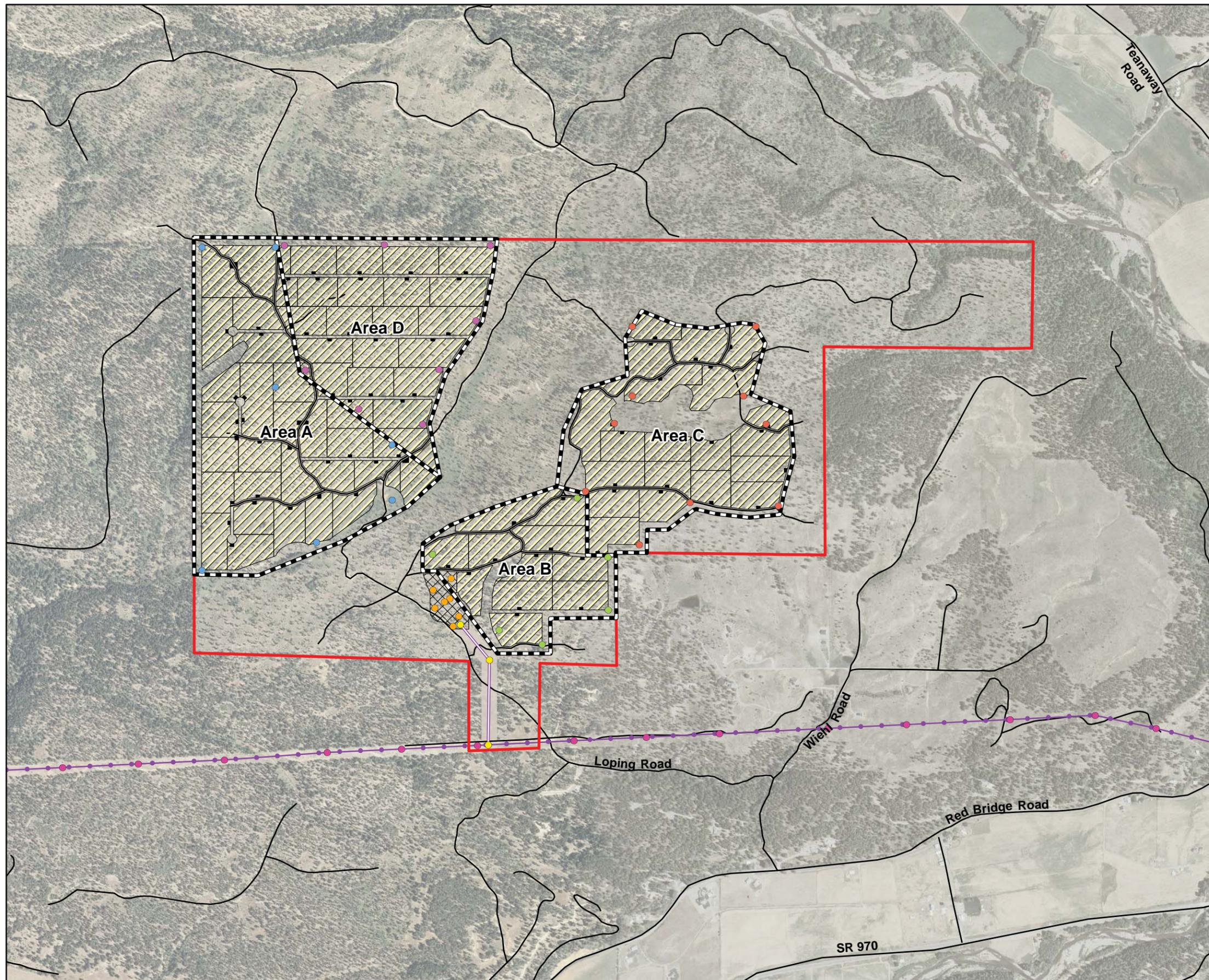
equipment would not be. The removal of trees would not greatly diminish the visual quality of the view from this location. The removal of trees will also be noticed from Viewpoint 6, and for several years after construction some panels will be seen. They would be located on a ridge and seen as a uniform horizontal shape that would differ from the irregular shape of the existing tree line. Trees planted near the perimeter of the facility, if desired, would help restore the irregular tree line and block views of parts of the panels within 3 to 10 years and would reduce the visibility of the project. The trees between Viewpoint 7 and the project would screen most views of the project from this location. The project would require the removal of some trees, which could be somewhat noticed between the trunks of closer trees that would remain. However, the removal of some trees would not greatly change the view from this location. Tree planted near the perimeter of the facility and/or on the property of the residence if desired, would screen the parts of it that might be seen from this location. People driving past Viewpoint 10 would see the project conductors (wires) connecting with the new structure that would be constructed as part of the project in the BPA right-of-way. Drivers might also notice where the 200-foot cleared right-of-way of the project would intersect at a right angle with the cleared 200-foot right-of-way of the BPA transmission line.

The visibility of the project transmission line would likely be similar to that of the adjacent BPA transmission line as indicated in Figures 8 and 9 of Appendix A. The project transmission line would connect with the existing BPA transmission line from the north and its cleared right-of-way would be visible from some areas depicted in Figure 9 of Appendix A. The one lattice structure (where it would tie into the BPA transmission line) and two pole structures would be potentially visible from essentially the same areas that the nearby BPA structures are. The transmission line would be visible from some areas near it, such as along the parts of the existing BPA transmission line right-of-way, as illustrated in Figure 10b of Appendix B. It would likely not be seen from most of the residences east of the project area (near Viewpoints 5, 6, and 7) due to topography and vegetation. The actual location of the transmission line will be likely be decided by the BPA, but the centerline and the 200-foot of cleared right-of-way will be at least 100 feet east of the nearest residence to the west of it and over 1,000 feet from the nearest residence to the east.

As indicated in Figures 10a and 10b of Appendix B, the substation would be less visible than the transmission line. The tallest structure (the 120-foot high "A-Frame") would potentially be seen from the residential area east of the project site. However, as with the project transmission line, topography and the presence of trees would likely screen most views of it from this area.

APPENDIX A
Figures

Appendix A Zone of Visual Influence Maps		
Zone of Visual Influence Figure Descriptions		
Figure Number	Title	Description/Notes
1.	Project Areas and Points Used for Zone of Potential Influence Analysis Map	Depicts project layout and the four areas (A, B, D and D) that were used to assess potential visibility.
2.	Zone of Potential Visual Influence – All Areas Map	Depicts areas within 8 miles from which the four areas (A to D) of the Project site that would contain PV array blocks would potentially be visible.
3.	Zone of Potential Visual Influence – Area A Map	Depicts areas within 8 miles from which the Area A of the Project site would potentially be visible.
4.	Zone of Potential Visual Influence – Area B Map	Depicts areas within 8 miles from which the Area B of the Project site would potentially be visible.
5.	Zone of Potential Visual Influence – Area C Map	Depicts areas within 8 miles from which the Area C of the Project site would potentially be visible.
6.	Zone of Potential Visual Influence – Area D Map	Depicts areas within 8 miles from which the Area D of the Project site would potentially be visible.
7.	Proposed PV Array Blocks and Zone of Potential Visual Influence in Vicinity of Project Site Map	This figure is a detailed (within 2-miles) image of the potential visibility for all four areas at the site that would contain PV array blocks.
8.	Existing 500 kV Transmission Line Zone of Potential Visual Influence in Vicinity of Project Site Map	This figure depicts the potential visibility of existing towers in the BPA right-of-way south of the project site. It provides a “reality” check in that many areas that are “potentially visible” in terms of ZVI analyzes, are in reality, not visible due to vegetation, topography, etc. As people who are familiar with the project area are aware, the existing BPA transmission line structures are not as visible as depicted in this figure. It can be very reasonably assumed that many of the areas in all of these figures would not in reality be visible.
9.	Proposed Transmission Line Zone of Potential Visual Influence in Vicinity of Project Site Map	This figure is a detailed (within 2-miles) image of the potential visibility of the three 150-foot high proposed transmission line structures.
10.	Project Substation Zone of Potential Visual Influence in Vicinity of Project Site Map	This figure is a detailed (within 2-miles) image of the potential visibility of the proposed project substation.



- LEGEND**
- Analysis Points**
- Area A
 - Area B
 - Area C
 - Area D
 - Substation
 - Transmission Structure
 - Existing 345 kV Transmission Structure
 - ☒ Areas Containing Solar Facilities
 - ☒ Proposed Project Area
- Proposed Project Features**
- ▨ Proposed PV Array Block
 - Proposed Field Inverter and Field Transformer
 - ⊠ Proposed Substation/O&M Facility
 - Proposed Transmission Line
- Existing Features**
- Existing 345 kV Transmission Line
 - Existing Road

Note:
1. Aerial Imagery: 2006 1m NAIP.

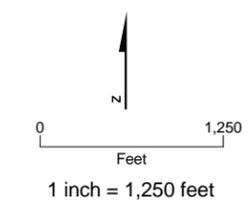
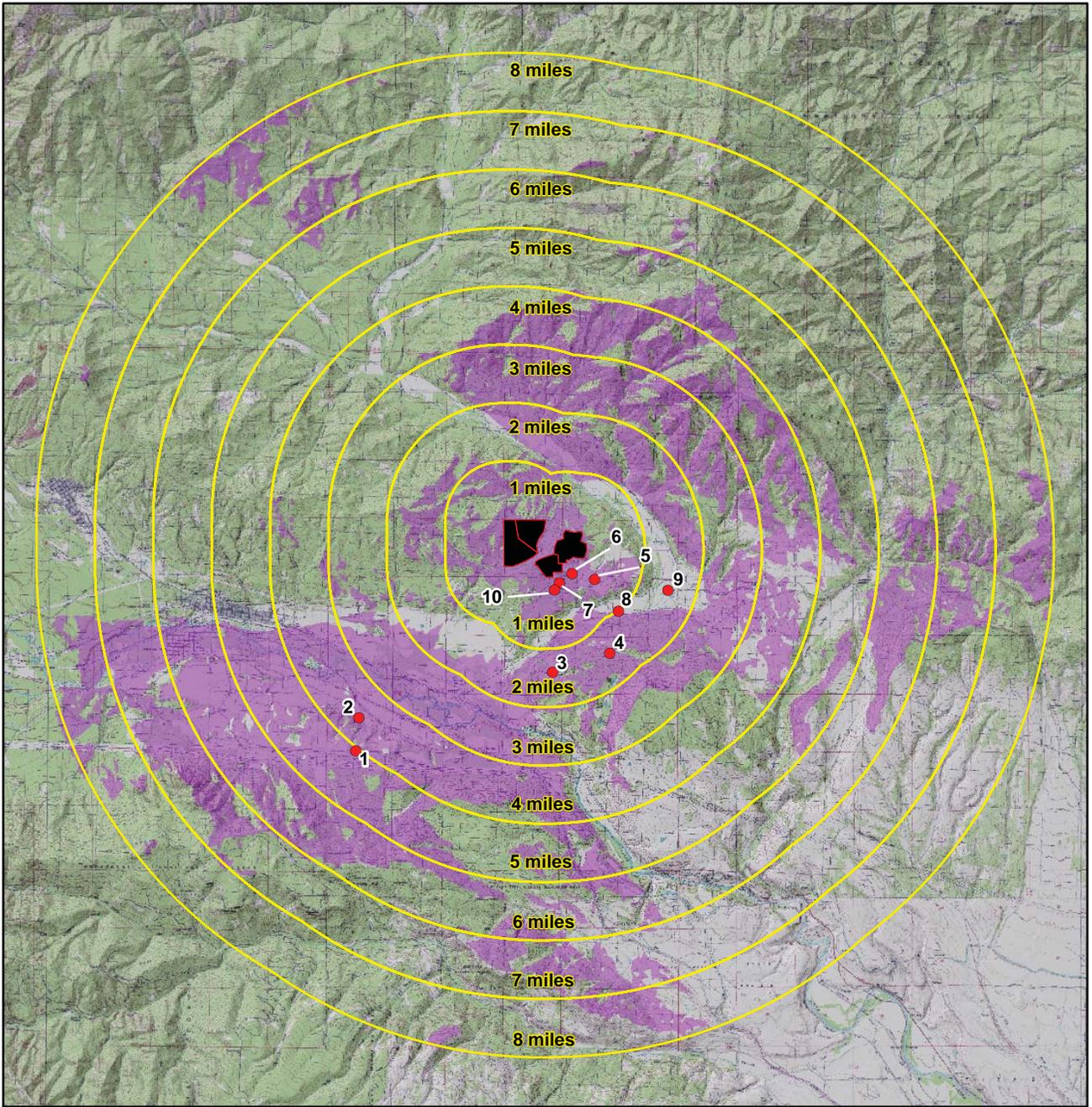


FIGURE 1
Project Areas and Points Used for Zone of Potential Visual Influence Analyses
Teanaway Solar Reserve
Kittitas County, Washington



VICINITY MAP

LEGEND

- Viewpoint
- ⊕ Areas Considered in Analysis
- Areas Containing Solar Facilities
- Distance from Project Site
- ☞ Zone of Potential Visual Influence*

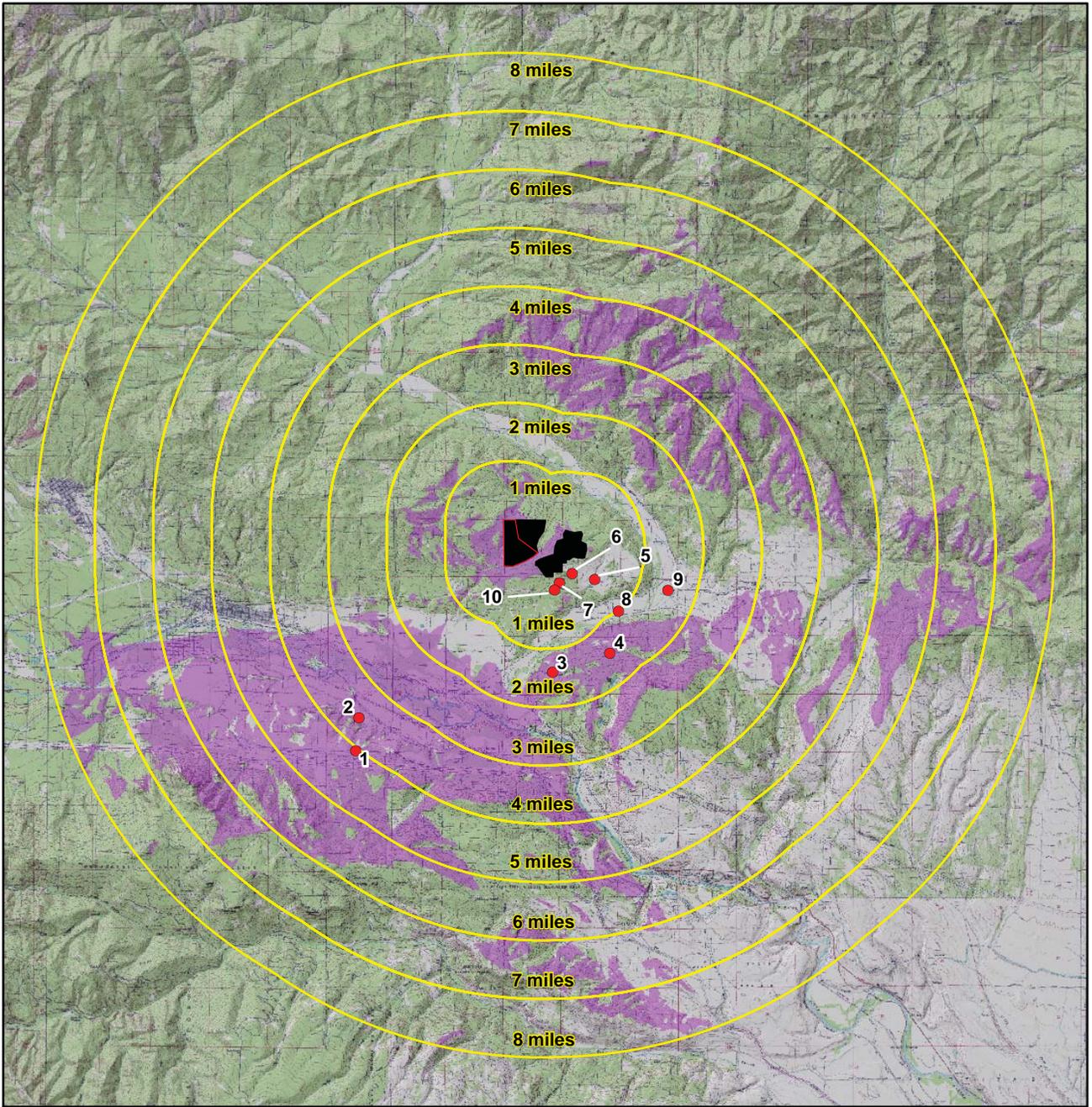
*Please note that the zone of potential visual influence depicted in this figure is very conservative in that it "overstates" the project's potential visibility. The Geographic Information System (GIS) model used to develop the figure does not take into account objects such as trees, buildings, and small topographic features that may block or screen views of the project. Factors that influence visibility such as haze, lighting conditions, weather, and viewing distance (the project would likely be difficult to see from beyond approximately 3.5 to 4 miles) are also not considered.



FIGURE 2
Zone of Potential Visual Influence-All Areas

Teanaway Solar Reserve
 Kittitas County, Washington





VICINITY MAP

LEGEND

- Viewpoint
- ⊕ Area Considered in Analysis
- ⬛ Areas Containing Solar Facilities
- Distance from Project Site
- ⊕ Zone of Potential Visual Influence*

*Please note that the zone of potential visual influence depicted in this figure is very conservative in that it "overstates" the project's potential visibility. The Geographic Information System (GIS) model used to develop the figure does not take into account objects such as trees, buildings, and small topographic features that may block or screen views of the project. Factors that influence visibility such as haze, lighting conditions, weather, and viewing distance (the project would likely be difficult to see from beyond approximately 3.5 to 4 miles) are also not considered.

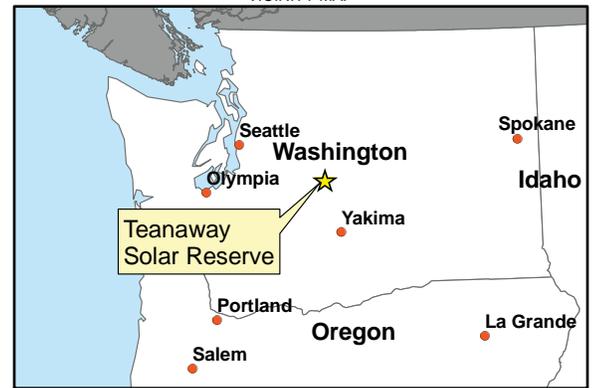
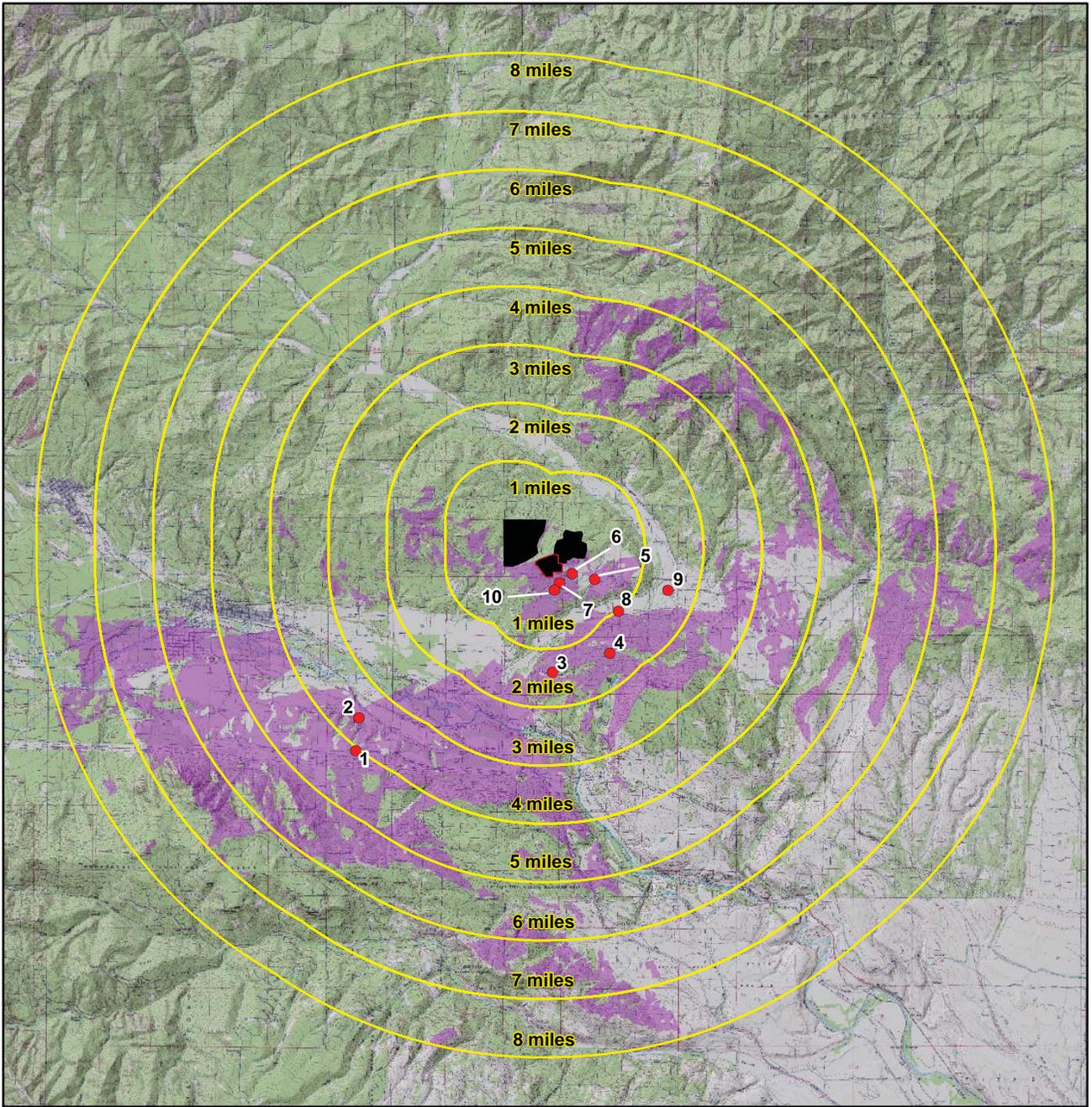


FIGURE 3
Zone of Potential Visual Influence-Area A
 Teanaway Solar Reserve
 Kittitas County, Washington





VICINITY MAP

LEGEND

- Viewpoint
- ⊕ Area Considered in Analysis
- ⊞ Areas Containing Solar Facilities
- Distance from Project Site
- ⊞ Zone of Potential Visual Influence*

*Please note that the zone of potential visual influence depicted in this figure is very conservative in that it "overstates" the project's potential visibility. The Geographic Information System (GIS) model used to develop the figure does not take into account objects such as trees, buildings, and small topographic features that may block or screen views of the project. Factors that influence visibility such as haze, lighting conditions, weather, and viewing distance (the project would likely be difficult to see from beyond approximately 3.5 to 4 miles) are also not considered.

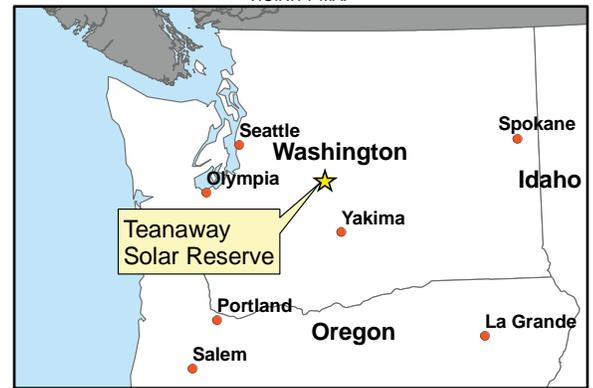
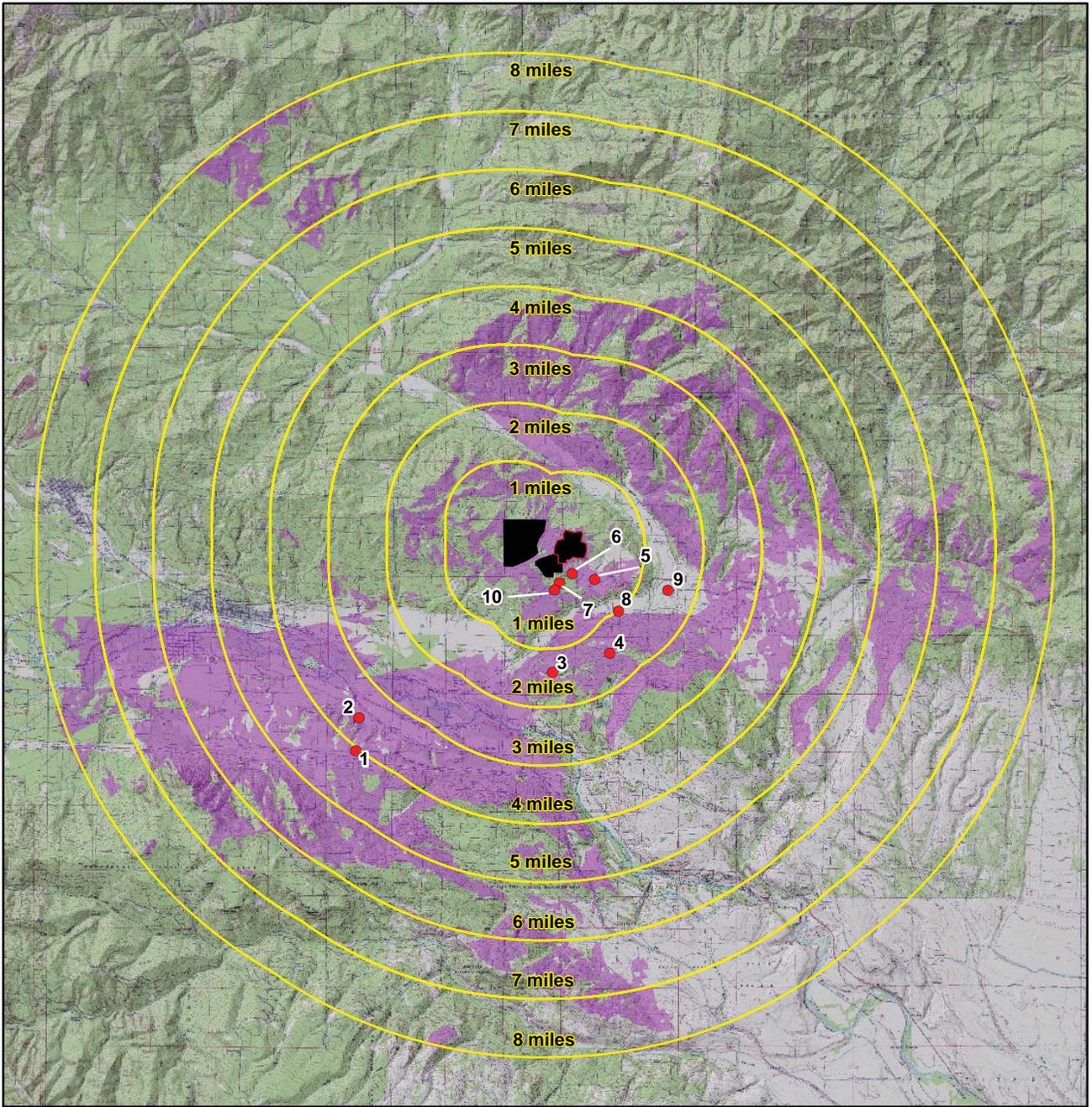


FIGURE 4
Zone of Potential Visual Influence-Area B
 Teanaway Solar Reserve
 Kittitas County, Washington





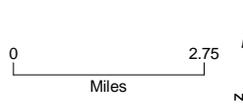
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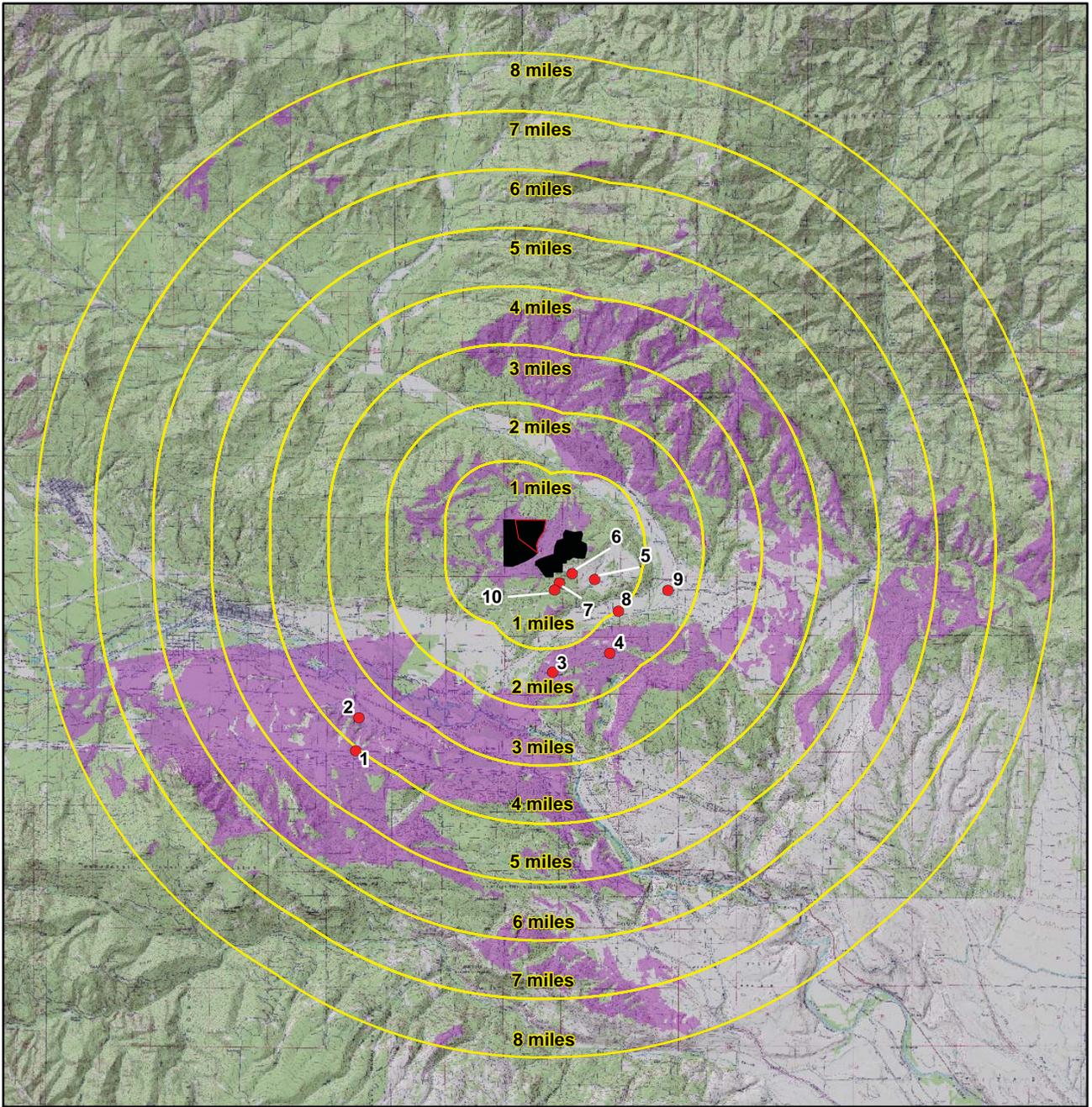
- Viewpoint
- ⊕ Area Considered in Analysis
- Areas Containing Solar Facilities
- Distance from Project Site
- ☞ Zone of Potential Visual Influence*

*Please note that the zone of potential visual influence depicted in this figure is very conservative in that it "overstates" the project's potential visibility. The Geographic Information System (GIS) model used to develop the figure does not take into account objects such as trees, buildings, and small topographic features that may block or screen views of the project. Factors that influence visibility such as haze, lighting conditions, weather, and viewing distance (the project would likely be difficult to see from beyond approximately 3.5 to 4 miles) are also not considered.



FIGURE 5
Zone of Potential Visual Influence-Area C
 Teanaway Solar Reserve
 Kittitas County, Washington





VICINITY MAP

LEGEND

- Viewpoint
- ⊕ Area Considered in Analysis
- Areas Containing Solar Facilities
- Distance from Project Site
- ☞ Zone of Potential Visual Influence*

*Please note that the zone of potential visual influence depicted in this figure is very conservative in that it "overstates" the project's potential visibility. The Geographic Information System (GIS) model used to develop the figure does not take into account objects such as trees, buildings, and small topographic features that may block or screen views of the project. Factors that influence visibility such as haze, lighting conditions, weather, and viewing distance (the project would likely be difficult to see from beyond approximately 3.5 to 4 miles) are also not considered.

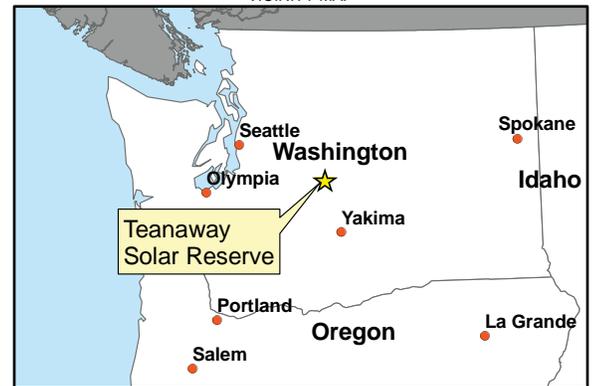
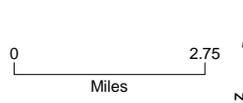
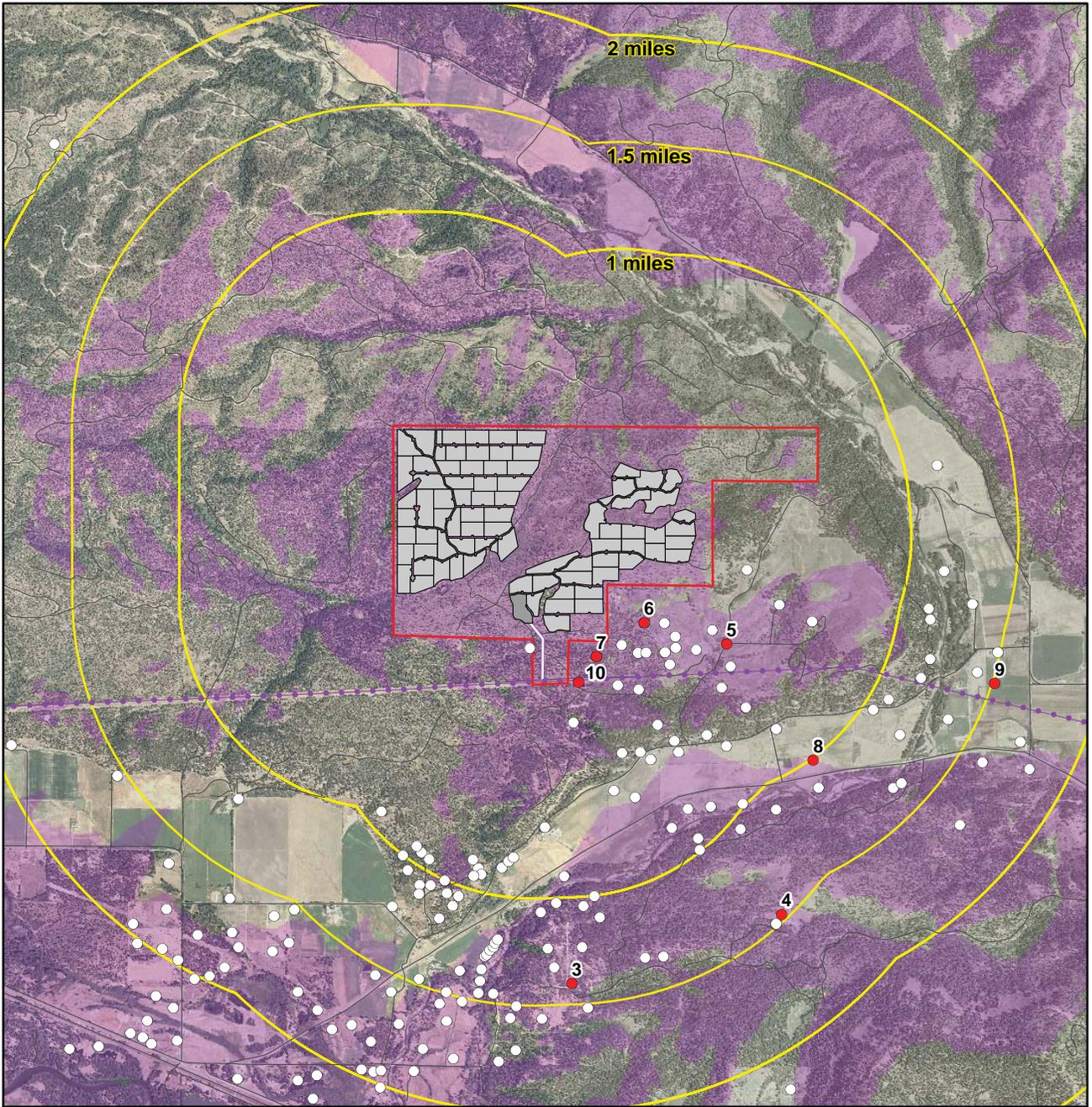


FIGURE 6
Zone of Potential Visual Influence-Area D
 Teanaway Solar Reserve
 Kittitas County, Washington





VICINITY MAP

LEGEND

- Viewpoint
- ☒ Proposed Project Area
- Distance from Project Site
- ☞ Zone of Potential Visual Influence*
- Proposed PV Array Block
- Proposed Substation/O&M Facility
- Proposed Transmission Line
- Existing 345 kV Transmission Line
- Identified Structure**
- Existing Road

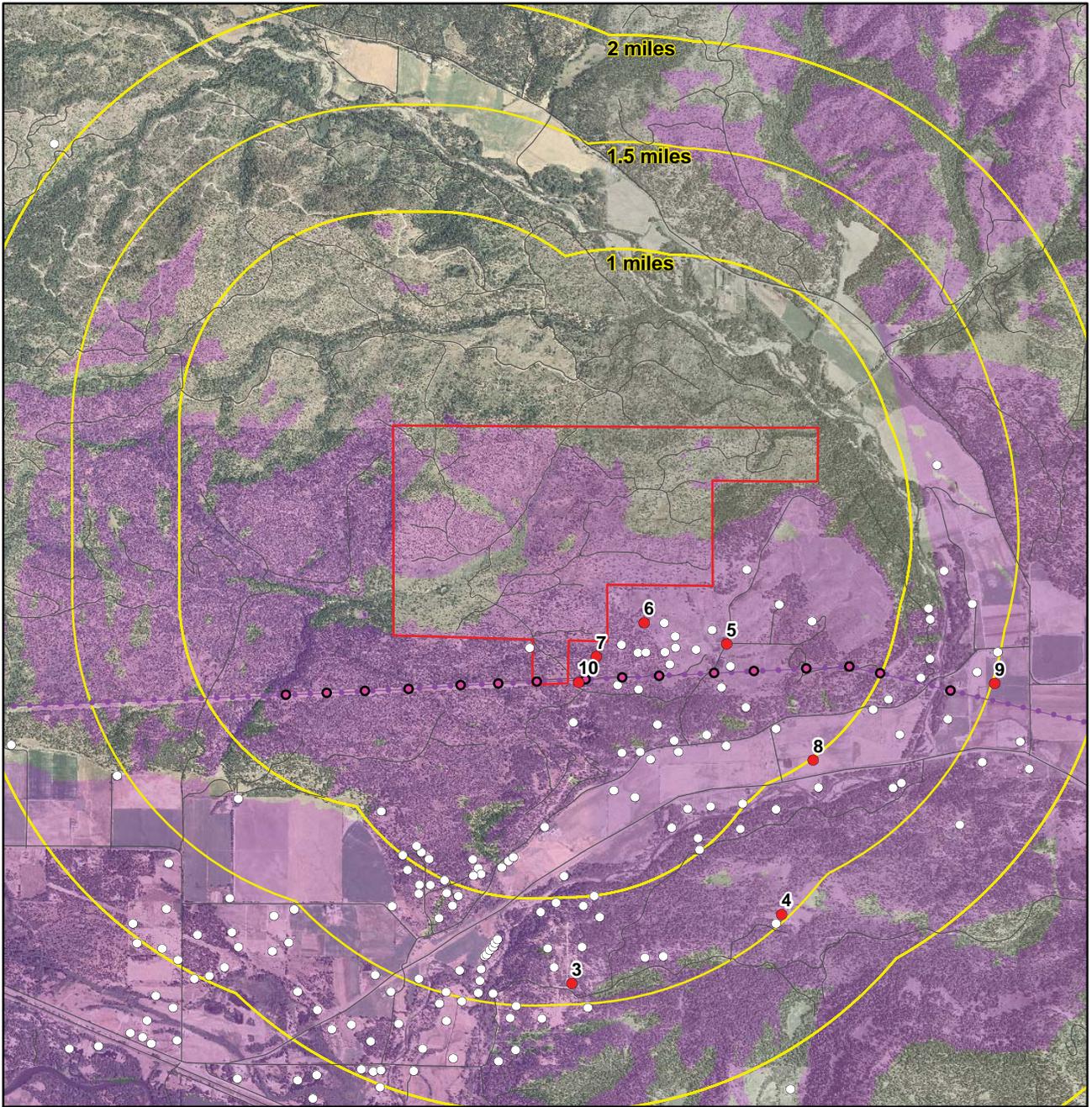
*Please note that the zone of potential visual influence depicted in this figure is very conservative in that it "overstates" the project's potential visibility. The Geographic Information System (GIS) model used to develop the figure does not take into account objects such as trees, buildings, and small topographic features that may block or screen views of the project. Factors that influence visibility such as haze, lighting conditions, weather, and viewing distance (the project would likely be difficult to see from beyond approximately 3.5 to 4 miles) are also not considered.

**Structures identified from aerial, not ground verified.



FIGURE 7
Proposed PV Array Blocks and Zone of Potential Visual Influence in Vicinity of Project Site

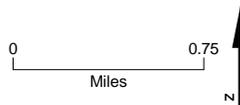
Teanaway Solar Reserve
 Kittitas County, Washington



VICINITY MAP

LEGEND

- Proposed Project Area
- Distance from Project Site
- Zone of Potential Visual Influence*
- Existing 345 kV Transmission Line Structure
- Existing 345 kV Transmission Line
- Identified Structure**
- Existing Road

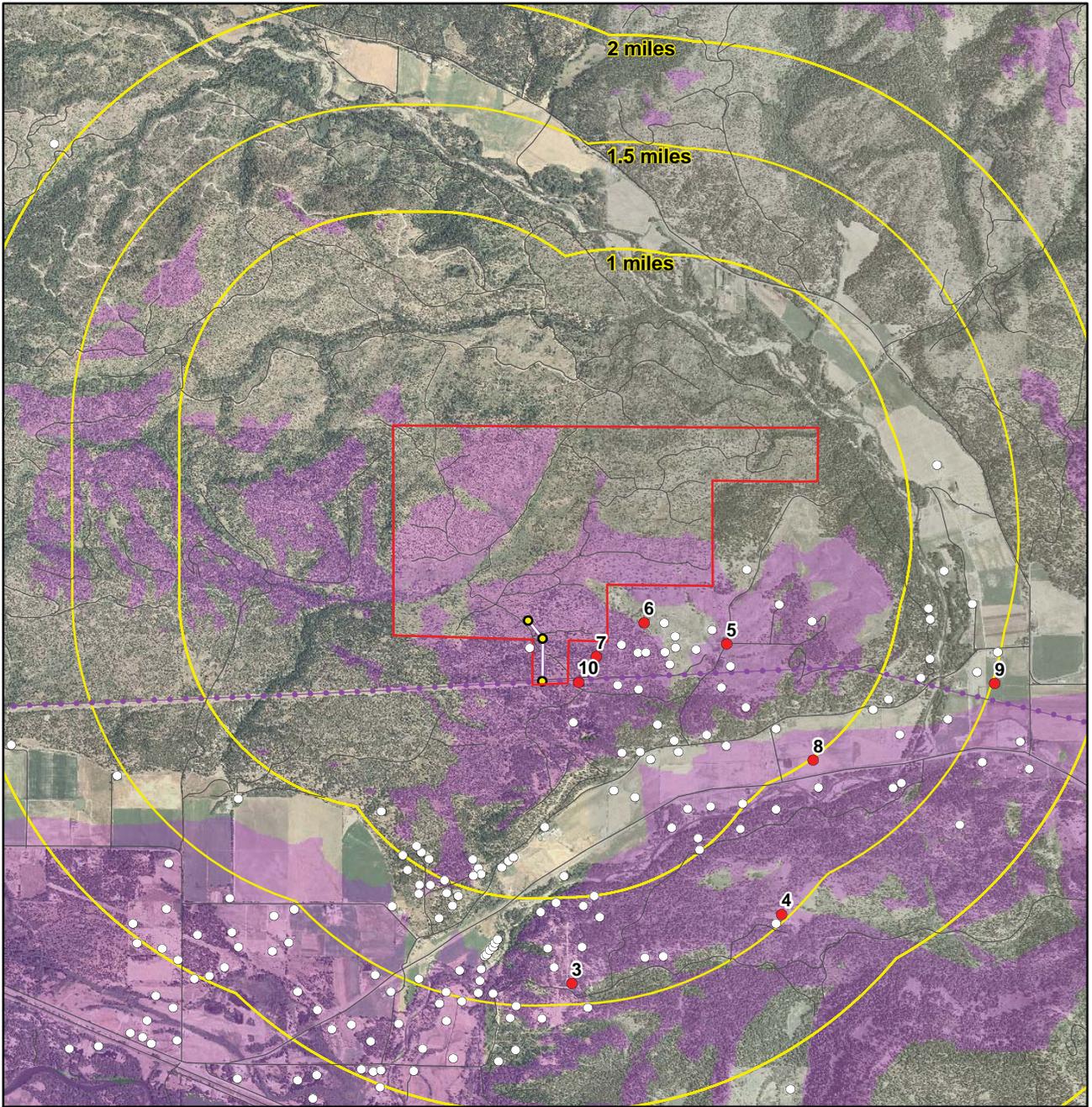


*Please note that the zone of potential visual influence depicted in this figure is very conservative in that it "overstates" the project's potential visibility. The Geographic Information System (GIS) model used to develop the figure does not take into account objects such as trees, buildings, and small topographic features that may block or screen views of the project. Factors that influence visibility such as haze, lighting conditions, weather, and viewing distance (the project would likely be difficult to see from beyond approximately 3.5 to 4 miles) are also not considered.

**Structures identified from aerial, not ground verified.

FIGURE 8
Existing 345 kV Transmission Line
Zone of Potential Visual Influence
in Vicinity of Project Site

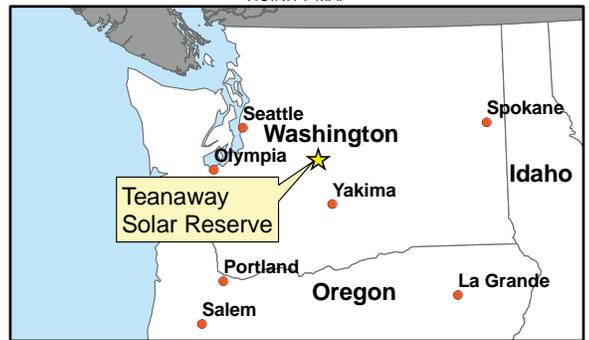
Teanaway Solar Reserve
 Kittitas County, Washington



VICINITY MAP

LEGEND

- Viewpoint
- Proposed Project Area
- Distance from Project Site
- Zone of Potential Visual Influence*
- Proposed Transmission Structure
- Proposed Transmission Line
- - - Existing 345 kV Transmission Line
- Identified Structure**
- Existing Road

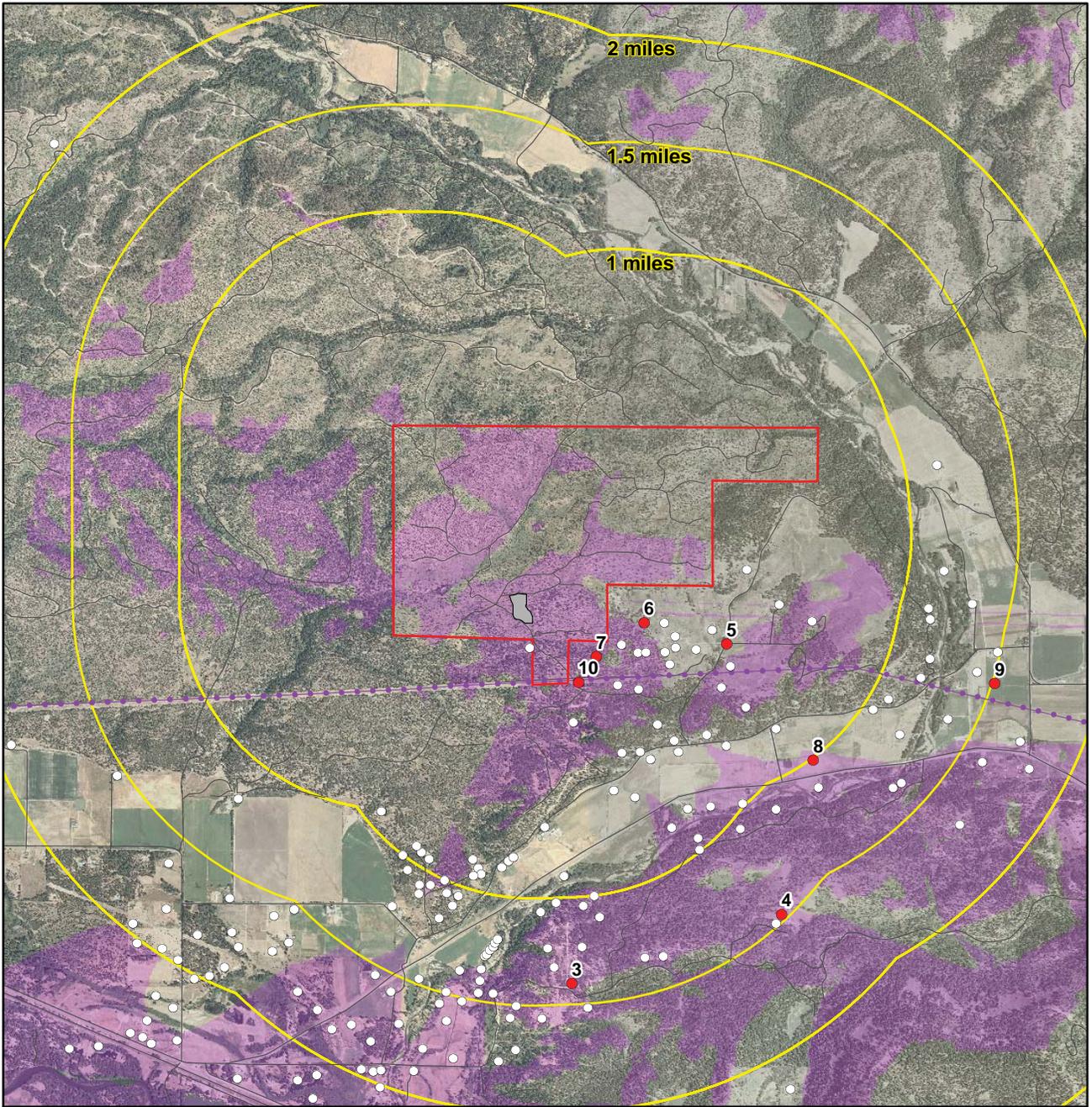


*Please note that the zone of potential visual influence depicted in this figure is very conservative in that it "overstates" the project's potential visibility. The Geographic Information System (GIS) model used to develop the figure does not take into account objects such as trees, buildings, and small topographic features that may block or screen views of the project. Factors that influence visibility such as haze, lighting conditions, weather, and viewing distance (the project would likely be difficult to see from beyond approximately 3.5 to 4 miles) are also not considered.

**Structures identified from aerial, not ground verified.

FIGURE 9
Proposed Transmission Line
Zone of Potential Visual Influence
in Vicinity of Project Site

Teanaway Solar Reserve
 Kittitas County, Washington



VICINITY MAP

LEGEND

- Viewpoint
- + Proposed Project Area
- Distance from Project Site
- Proposed Substation/O&M Facility
- Zone of Potential Visual Influence*
- Existing 345 kV Transmission Line
- Identified Structure**
- Existing Road



*Please note that the zone of potential visual influence depicted in this figure is very conservative in that it "overstates" the project's potential visibility. The Geographic Information System (GIS) model used to develop the figure does not take into account objects such as trees, buildings, and small topographic features that may block or screen views of the project. Factors that influence visibility such as haze, lighting conditions, weather, and viewing distance (the project would likely be difficult to see from beyond approximately 3.5 to 4 miles) are also not considered.

**Structures identified from aerial, not ground verified.

FIGURE 10
Project Substation Zone of Potential Visual Influence in Vicinity of Project Site
 Teanaway Solar Reserve
 Kittitas County, Washington

APPENDIX B

Photos and Simulations

Appendix B Existing Condition Photographs and Visual Simulations

Figure Number	Title	Description/Notes
1a and b.	Viewpoint 1: Watson Cutoff Road (upper)	Viewpoint 1 is located along side Watson Cutoff Road just below the intersection with Upper Peoh Point Road. It is approximately 4 miles southwest of the closest edge of the study area. Figure 1a depicts the existing view and Figure 1b is a conceptual illustration of the proposed project.
2a and b	Viewpoint 2: Watson Cutoff Road (lower)	Viewpoint 2 is located on Watson Cutoff Road at a lower elevation than Location 3 and is approximately 0.2 miles from I-90. It is approximately 3.5 miles southwest of the closest edge of the study area. Figure 2a depicts the existing view and Figure 2b is a conceptual illustration of the proposed project.
3a and b	Viewpoint 3: Residences ¼ mile west of Lambert Road	Viewpoint 3 is located on residential property on the eastern slope of Lookout Mountain approximately 1.5 miles east of the study area. The location of the viewpoint is in a field above the residence. Figure 3a depicts the existing view and Figure 3b is a conceptual illustration of the proposed project.
4a and b	Viewpoint 4: Ridgewater Drive	Viewpoint 4 is situated on Ridgewater Drive on the eastern slope of Lookout Mountain approximately 1.5 miles east of the study area. The location one of the few public areas on the east slope of Lookout Mountain from which the study area can be viewed. Figure 4a depicts the existing view and Figure 4b is a conceptual illustration of the proposed project.
5a and b	Viewpoint 5: Residential Area Near Wiehl Road	Viewpoint 5 is taken from the intersection of Wiehl Road and a private drive looking towards the study area which is approximately 3,100 feet to the northwest. Figure 5a depicts the existing view and Figure 5b is a conceptual illustration of the proposed project (note the removal of trees along the ridgeline).
6a and b	Viewpoint 6: Residence	Viewpoint 6 is taken from a residence approximately 800 feet east and southeast of the nearest PV array block. Figure 6a depicts the existing view and Figure 6b is a conceptual illustration of the proposed project (note the removal of trees along the ridgeline and visible panels. Planting new trees in cooperation with the resident will screen views of the array block within 5 to 10 years.
7a and b	Viewpoint 7: Residence	Viewpoint 7 is taken from a residence approximately 800 feet south of the nearest PV array block. Figure 17a depicts the existing view which is largely composed of nearby coniferous trees and Figure 16b is a conceptual illustration of the proposed project (note some trees in the background would be removed).
8	Viewpoint 8: SR 970	Existing condition photograph from SR 970 looking north to northwest at the southern edge of the "plateau" the project would be built on.
9.	Viewpoint 9: Teanaway Road	Existing condition photograph of BPA transmission line right-of-way from Teanaway Road in the Teanaway River valley.
10a and b	Viewpoint 10: Loping Road where it crosses over BPA transmission line corridor	Existing condition photograph and simulation of the proposed transmission line tying into the existing BPA 500 kV transmission line from the intersection of its right-of-way and Loping Road (which is used to access several homes southeast of the project site).



Figure 1a: Existing view of Viewpoint 1, Watson Cutoff Road (Upper)



Figure 1b: Conceptual illustration of Viewpoint 1, Watson Cutoff Road (Upper)



Figure 2a: Existing view of Viewpoint 2, Watson Cutoff Road (Lower)



Figure 2b: Conceptual illustration of Viewpoint 2, Watson Cutoff Road (Lower)



Figure 3a: Existing view of residences ¼ mile west of Lambert Road



Figure 3b: Conceptual illustration of residences ¼ mile west of Lambert Road



Figure 4a: Existing view of Viewpoint 4, Ridgewater Drive



Figure 4b: Conceptual illustration of Viewpoint 4, Ridgewater Drive



Figure 5a: Existing view of Viewpoint 5, residential area near Wiehl Road



Figure 5b: Conceptual illustration of Viewpoint 5, residential area near Wiehl Road



Figure 6a: Existing view from Viewpoint 6, a residence approximately 800 feet east and southeast of the nearest PV array block



Figure 6a: Conceptual illustration from Viewpoint 6, a residence approximately 800 feet east and southeast of the nearest PV array block



Figure 7a: Existing view from Viewpoint 7, a residence approximately 800 feet south of the nearest PV array block

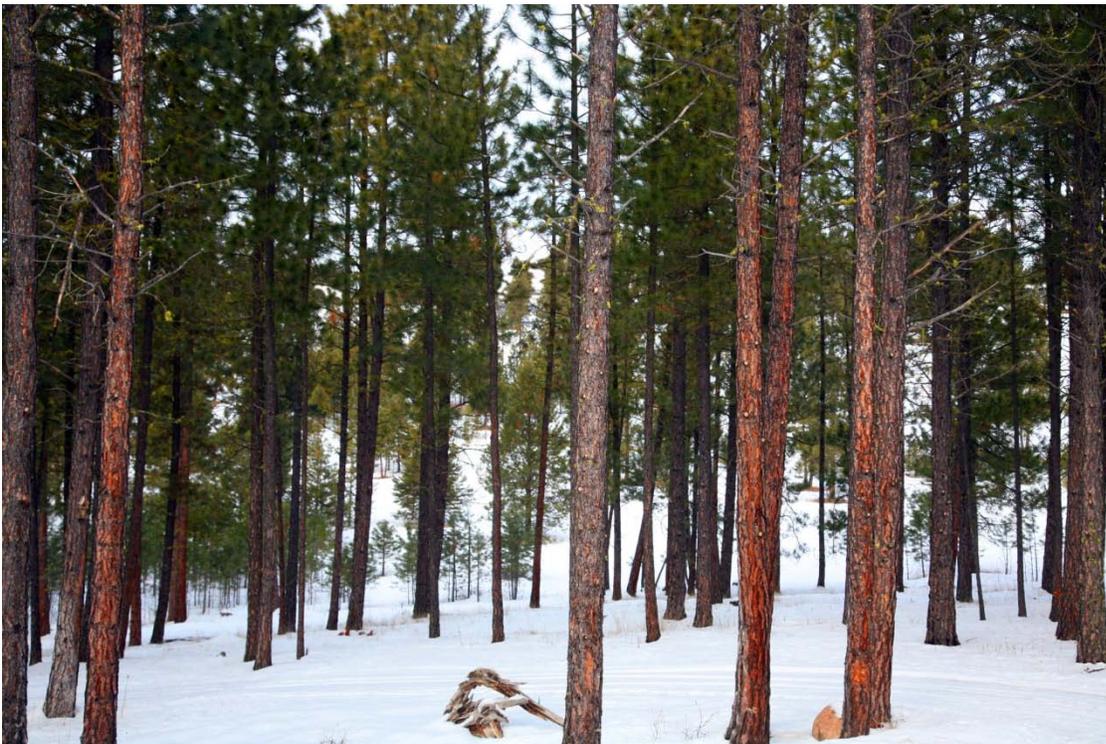


Figure 7b: Conceptual illustration from Viewpoint 7, a residence approximately 800 feet south of the nearest PV array block (note some trees in the background would be removed)



Figure 8: Existing condition photograph from SR 970 looking north to northwest at the southern edge of the "plateau" the project would be built on



Figure 9: Existing condition photograph of BPA transmission line right-of-way from Teanaway Road in the Teanaway River valley.



Figure 10a: Existing view from Viewpoint 10 at Loping Lane where it crosses over BPA transmission line corridor.



Figure 10b: Conceptual illustration from Viewpoint 10, where the proposed transmission line would tie into the existing BPA 345 kV transmission line from the intersection of its right-of-way and Loping Lane.

ATTACHMENT M

**Fire Protection Agreement (pending
approval)**

ATTACHMENT N

Economic Impact Analysis

Revised Report

Economic Impact Analysis for the Teanaway Solar Reserve Kittitas County, Washington

Prepared for
Teanaway Solar Reserve, LLC

October 2009

Prepared by
CH2MHILL
Fatuma Yusuf, Ph.D., Senior Economist
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Dave Gray, Management Consultant, Energy and Utility Economics



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Executive Summary

Teaway Solar Reserve, LLC (Applicant) proposes to construct and operate a solar energy project known as the Teaway Solar Reserve project (project) on private land in an unincorporated area of Kittitas County, Washington. The project will generate up to 75 direct current megawatts (dcMW) of photovoltaic (PV) solar energy on approximately 477 acres of land within the 982-acre proposed project boundary. Although project construction is expected to occur over a 2- to 3-year period, the analysis presented in this report assumes that construction would occur over a 3-year period. A summary of the estimated development costs for the project is provided in Table ES-1.

TABLE ES-1
Estimated Development Costs of the Proposed Teaway Solar Reserve, 2009 Million Dollars

	Total Capital Cost	Total Materials Expenditure	Total Construction Payroll
Out of County	\$150 - \$200	\$142.5 - \$190	\$7.5 - \$10
In-County (local)	\$150	\$97.5	\$52.5
Total	\$300 - \$350	\$240 - \$287.5	\$60 - \$62.5

Source: CH2M HILL, 2009.

This report provides a screening-level economic analysis of the project's impacts on Kittitas County and a regional economic analysis of the project's benefits to the County. The amounts shown are based on current estimates and are subject to change as the project definition evolves.

Property and Sales Tax Effects

Kittitas County will benefit from substantial property and sales taxes collected during construction and operation of the project.

The total value of goods and services that will be purchased locally (within Kittitas County) during the three construction seasons is estimated to be \$97.5 million. The total value of goods and services that will be purchased locally during operation is estimated to be \$525,510 per year. Table ES-2 shows the resulting sales tax revenue in Kittitas County during construction and operation of the project.

TABLE ES-2

Estimated Annual Sales Tax Revenue on Goods and Services During Construction and Operation

	Construction	Operations
State	\$2,112,500	\$34,160
County	\$487,500	\$7,880
Total Annual Sales Tax Revenue from Project	\$2,600,000	\$42,040
Percent Increase in County Sales Tax Revenues*	13.3%	0.2%

Sources: CH2M HILL, 2009; Kittitas County, 2009b.

* Kittitas County fiscal year 2008-09 amended budget sales taxes were \$3,679,244.

In addition to the sales tax revenue generated during construction and operation, the project also provides property tax revenues. The property tax rate is assumed to be \$5.20134 per \$1,000 of assessed value and does not include a fire district levy because the property is currently undeveloped. Of the total annual property tax revenues of \$1,560,470 to \$1,820,470 generated by the project, \$267,610 to \$312,210 goes to the County while the remaining \$1,292,800 to \$1,508,260 goes to the various taxing districts within the county. The \$267,610 to \$312,210 that goes to the County constitutes between 5.4 and 6.3 percent of the total 2008 County property tax revenues. Table ES-3 shows the distribution of the estimated annual property tax revenue between the various taxing districts in Kittitas County.

TABLE ES-3

Estimated Annual Property Tax Revenue During Operation

Taxing Districts	Operation (assuming \$300M capital cost)	Operation (assuming \$350M capital cost)
State (Public Schools)	\$605,530	\$706,460
County Funds	\$267,610	\$312,210
Road District No. 1	\$330,880	\$386,030
School District No. 404, Cle Elum-Roslyn Bond	\$263,680	\$307,630
Hospital District #1	\$92,700	\$108,150
Total Annual Property Tax Revenue from Project	\$1,560,400	\$1,820,470
Percent Increase in County Property Tax Revenues*	5.4%	6.3%

Sources: CH2M HILL, 2009; Kittitas County, 2009b.

* Kittitas County fiscal year 2008-09 amended budget property taxes were \$4,985,000.

Regional Income Effects

During the 3-year construction phase of the project, it is estimated that \$44.75 million in income will be directly generated in Kittitas County from spending for construction of the project annually. In addition, it is estimated that another \$19.3 million in secondary

(indirect¹ and induced²) income will be generated annually for the County. Similarly, during operations, the annual operations and maintenance expenditures of \$2,368,660 will generate \$397,700 in secondary income for the County. Table ES-4 provides an overall summary of project effects on income in the County.

TABLE ES-4
Summary of Income Effects on Kittitas County

	Construction	Operations
Direct Income	\$44,750,000	\$2,368,660
Indirect Income	\$14,814,500	\$45,630
Induced Income	\$4,504,400	\$352,070
Total Income	\$64,068,870	\$2,766,360
Income Multiplier	1.4	1.1

Employment Effects

As shown in Table ES-5, the direct average employment in Kittitas County during each of the three 7-month construction periods is estimated at 225 workers³. Secondary (indirect and induced) employment in the County is estimated at 563 employees. Construction of the project will generate a total of about 789 jobs per year during the 3-year construction period.

In addition to the direct employment of 35 staff, the operational phase of the project will result in secondary employment within Kittitas County of 14 jobs. The project is anticipated to create a total of 49 long-term jobs in the County.

The employment multiplier associated with construction employment is calculated to be 3.5. This means that for every one construction job provided by the project, more than two additional jobs are created in a support capacity. Similarly, the annual operation of the project will generate 49 long-term jobs in the County, with an employment multiplier of 1.4, or for every permanent job created by the project there will be just less than one permanent job created for support services.

¹ Indirect project impacts on the economy include income and employment impacts that result when entities that receive direct purchases from a project in turn purchase goods and services from their own suppliers and additional rounds of expenditures from suppliers continue to occur.

² Induced project impacts on the economy include income and employment impacts from employees directly or indirectly receiving income from the project and respending the income within the economy.

³ Data are calculated on an average annual basis. Because three 7-month construction periods over 3 years are anticipated, the actual number of workers will be proportionally higher based on the actual construction period.

TABLE ES-5
Summary of Employment Impacts to Kittitas County

	Construction	Operations
Direct Employment	225	35
Indirect Employment	403	1
Induced Employment	160	13
Total Employment	789	49
Employment Multiplier	3.5	1.4

Note:
Numbers may not add as a result of rounding.

1.0 Introduction

Teaway Solar Reserve, LLC (Applicant) proposes to construct and operate a solar energy project known as Teaway Solar Reserve (project) on private land in an unincorporated area of Kittitas County, Washington. The project will generate up to 75 direct current megawatts (dcMW) of photovoltaic (PV) solar energy on approximately 477 acres of land within the 982-acre proposed project boundary.

This report provides a fiscal and regional economic analysis of the proposed project's effects on Kittitas County, Washington. Although, construction of the project is expected to occur over a 2- to 3-year construction period, the analysis presented in this report assumes that construction would occur over a 3-year period.

2.0 Economic Setting

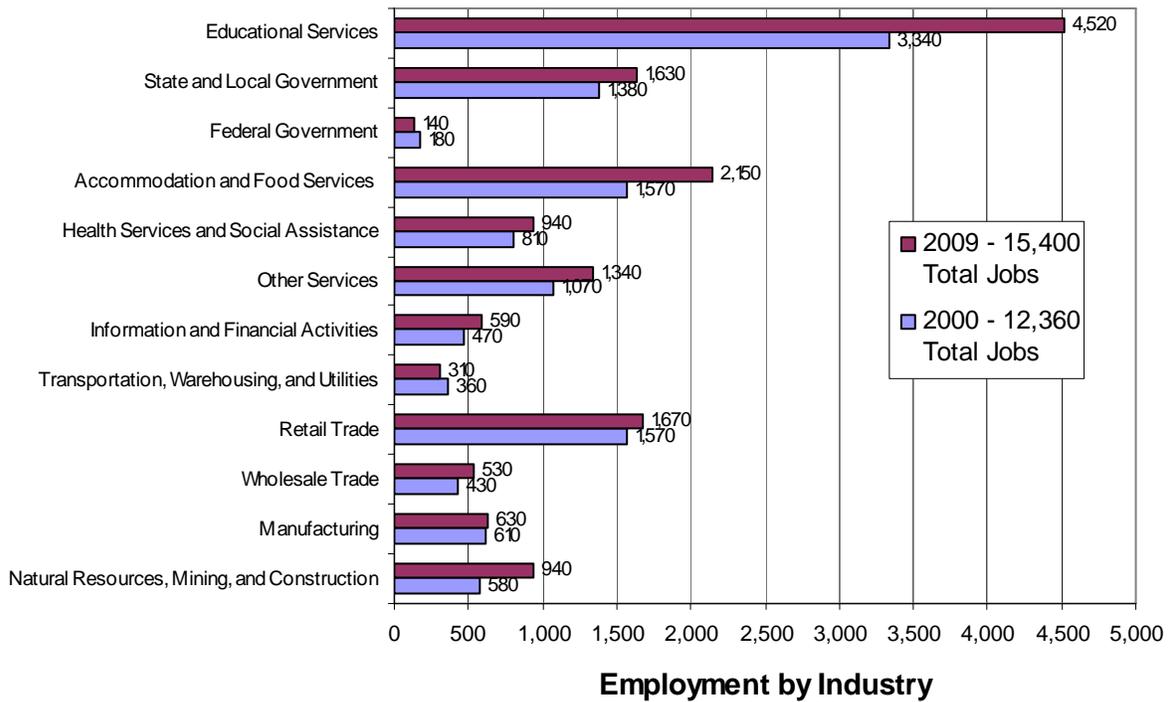
This section describes the existing economic setting in Kittitas County. Employment, income, and fiscal resources are addressed. For purposes of this analysis, the regional area of influence is defined as Kittitas County.

2.1 Existing Economy and Employment

2.1.1 Employment by Industry

Figure 1 displays average employment by industry for Kittitas County. In 2000, an estimated 12,360 people were employed in the County. By 2009, average annual employment had increased nearly 25 percent to 15,400. Employment in the County is concentrated in the educational services, accommodation and food services, state and local government, and retail trade sectors. The educational services sector is dominated by activities at Central Washington University and accounts for approximately 29 percent of total employment in the county. Accommodation and food services represent 14 percent while the retail trade and local and state government sectors each account for approximately 11 percent of total employment.

FIGURE 1
 Average Annual Employment by Industry Sector, 2000 and 2009

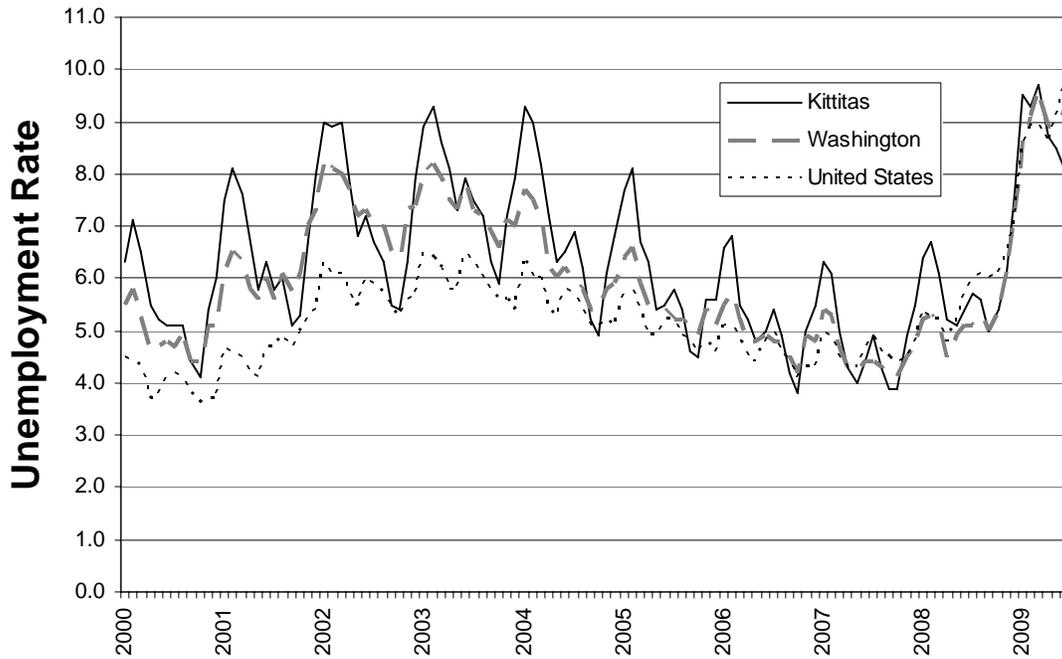


Source: Washington State Employment Security Department (WSES), 2009a.

2.1.2 Unemployment

Recent unemployment rate trends for Kittitas County, Washington State, and the United States are shown in Figure 2. In general, the County's unemployment rate has trended higher than the state's average, and has experienced greater volatility. By the end of 2000, the average unemployment rate for the County exceeded the State's rate by more than 2 percentage points, 6.0 percent versus 3.7 percent. During the strong economic growth period in 2005-2006, the County's unemployment rate dipped below the state's average for a short period of time. With the recent national economic recession, unemployment has risen in both the County and State. The June 2009 unemployment rate was 8.1 percent in Kittitas County, 9.2 percent in Washington State, and 9.7 percent in the United States.

FIGURE 2
Unemployment Rate for Kittitas County, Washington State, and the United States

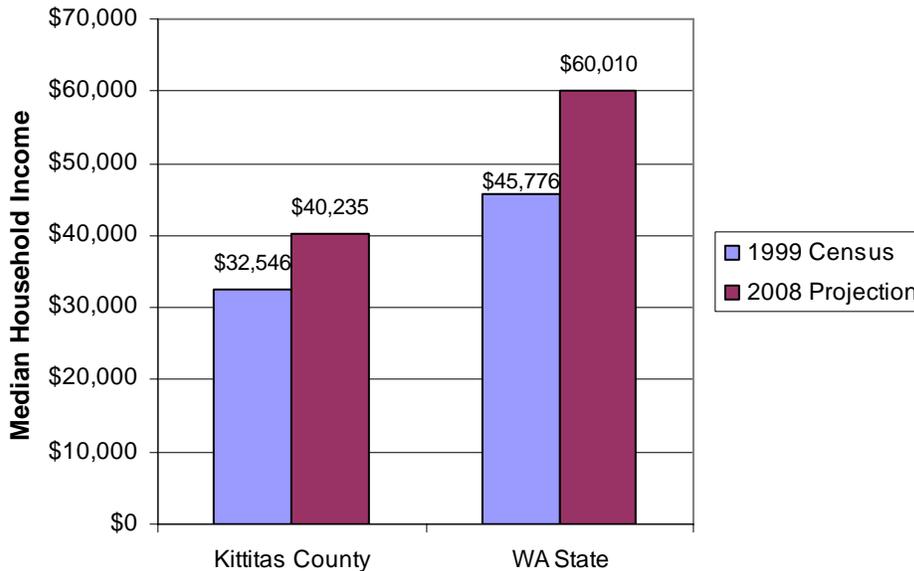


Source: Washington State Employment Security Department (WSES), 2009b.

2.2 Median Household Income

Figure 3 presents median household income data for Kittitas County and Washington State. From 1999 to 2008, median household income in the County increased approximately 24 percent from \$32,546 to \$40,235. Over the same time period, median household income in Washington increased approximately 31 percent from \$45,776 to \$60,010.

FIGURE 3
Median Household Income



Source: Washington State Office of Financial Management (OFM), 2009.

2.3 Existing Fiscal Resources

This section describes the historical and current general fund revenues and expenditures of Kittitas County for the years 2004-2009. Assessed value and sales tax revenues are addressed.

2.3.1 General Fund Revenues and Expenditures

Kittitas County is the local agency with taxing power over the project. Revenues from property taxes are used to fund Kittitas County government, local school districts, county roads, local fire departments, libraries, and emergency medical services. These property tax revenues are also a major source of revenue for the local governments. Incorporated into the consolidated tax levy are local levies collected by the County Assessor and returned to the local jurisdictions as general fund revenues.

Table 1 presents actual revenues and expenses for the Kittitas County general fund from 2004 to 2007. In each year, revenues have exceeded expenditures. In 2007, the Kittitas County general fund had revenues of about \$20 million and expenses of approximately \$18.2 million. Approximately 48 percent of the revenue in 2007 came from taxes. Other sources of revenue include licenses and permits, fines and forfeits, and intergovernmental transfers. Sales taxes were the largest contributors to revenues in 2007. Sales taxes generated about \$5.0 million in revenues. Property taxes, including real and personal property, totaled approximately \$4.3 million in 2007, providing approximately 21 percent of total revenues for the general fund.

TABLE 1
 General Fund Revenues and Expenditures, 2004-2007

	2004	2005	2006	2007
Beginning Fund Balance	\$2,533,530	\$3,799,548	\$4,773,644	\$7,150,020
Revenues				
Taxes	\$7,038,968	\$7,757,197	\$9,212,673	\$9,750,240
Licenses and Permits	\$1,018,938	\$1,311,638	\$1,807,461	\$2,091,382
Intergovernmental	\$2,272,802	\$3,102,970	\$3,096,941	\$2,481,261
Charges for Services	\$1,804,983	\$2,003,743	\$2,260,212	\$2,419,214
Fines and Forfeits	\$1,462,387	\$1,248,953	\$1,422,409	\$1,584,200
Miscellaneous	\$705,529	\$1,058,992	\$1,510,483	\$1,864,709
Total Revenue	\$14,303,607	\$16,483,493	\$19,310,179	\$20,191,006
Expenditures				
General Governmental	\$3,321,550	\$4,601,377	\$5,178,409	\$5,820,867
Judicial	\$2,716,999	\$1,896,031	\$2,055,863	\$2,187,140
Security of Persons and Property	\$4,984,954	\$5,435,470	\$5,979,331	\$6,339,222
Physical Environment	\$72,264	\$80,035	\$82,380	\$85,195
Transportation	\$3,717	\$3,717	\$3,717	\$3,717
Economic Environment	\$618,456	\$698,017	\$882,229	\$1,216,431
Culture and Recreation	\$948,845	\$976,285	\$1,127,493	\$1,430,387
Debt Service	\$90,837	\$181,340	\$357,964	\$334,506
Capital Outlay	\$330,351	\$1,982,998	\$1,088,785	\$867,558
Total Expenditure	\$13,087,973	\$15,855,270	\$16,756,171	\$18,285,023
Excess (Deficit) Revenues	\$1,215,634	\$628,223	\$2,554,008	\$1,905,983
Other Financing Sources (Uses)	\$52,301	\$345,876	(\$177,632)	(\$148,829)
Net Change in Fund Balance	\$1,267,935	\$974,099	\$2,376,376	\$1,757,154
Ending Fund Balance	\$3,801,465	\$4,773,647	\$7,150,020	\$8,907,174

Source: Kittitas County, 2009a.

Table 2 presents the amended budget for 2008 and the adopted budget for 2009. Property taxes are expected to account for approximately 24 and 30 percent of total revenues, respectively, in 2008 and 2009. While property tax revenues increased from 2008 to 2009, nearly all other sources of revenue are expected to decrease. The decline in other sources of revenue may be a reflection of the current economic recession. The County also decreased its total expenditures budget by over \$2.6 million dollars from 2008 to 2009.

TABLE 2
 General Fund Revenues and Expenditures, 2008-2009

	2008 Amended Budget	2009 Adopted Budget
Beg Fund Balance	\$5,864,631	\$5,945,249
Revenues		
Property Taxes	\$4,985,000	\$5,485,000
Timber Harvest	\$20,000	\$0
Sales and Use Tax	\$3,679,244	\$3,700,000
Excise Tax	\$19,500	\$19,000
Penalties on Taxes	\$375,000	\$300,000
Licenses and Permits	\$1,847,820	\$1,029,400
Intergovernmental	\$3,056,457	\$2,355,102
Charges for Services	\$2,192,853	\$1,844,125
Fines and Forfeitures	\$1,686,600	\$1,634,900
Misc. Revenue	\$1,312,892	\$1,067,678
Interfund Transfers	\$1,223,810	\$631,590
Total Revenue	\$20,399,176	\$18,066,795
Expenditures		
Salaries and Benefits	\$13,521,218	\$12,705,621
Supplies	\$893,054	\$766,627
Charges for Services	\$5,312,752	\$4,907,853
Capital Outlay	\$1,783,859	\$627,912
Non Expense	\$788,043	\$640,285
Total Expenditures	\$22,298,926	\$19,648,298
Ending Fund Balance	\$3,964,881	\$4,363,746

Source: Kittitas County, 2009b.

2.3.2 Assessed Value

According to the County Assessor, Kittitas County had an assessed value of approximately \$6.1 billion in 2008-09 (Kittitas County, 2009c). The 2008-09 average consolidated tax per thousand dollars of assessed value for the County was about \$7.23.

2.3.3 Sales Tax Revenue

The current (third quarter 2009) combined sales and use tax rate in Kittitas County is 8.0 percent (DOR, 2009a). The state sales and use tax accounts for 6.5 percent of the total sales and use tax rate and the remaining 1.5 percent tax rate goes to the County.

Recent trends in taxable retail sales in Kittitas County and Washington State are compared in Table 3. In 2004, retail sales in the County totaled approximately \$538 million. From 2004 to 2008, taxable retail sales in the County increased at an average annual rate of 8.3 percent to \$740 million. Over the same period, sales statewide increased at an annual rate of 5.1 percent. Both the County and the State experienced a decline in taxable retail sales from 2007 to 2008. This decrease in retail sales is likely attributed to the overall slowdown in the regional and national economies.

TABLE 3
 Taxable Retail Sales (000s), 2004-2008

Area	2004	2005	2006	2007	2008	Average Annual Growth Rate
Kittitas County	538,556	601,941	704,543	795,557	740,684	8.3%
Washington State	92,719,153	101,367,459	110,515,076	118,242,922	113,223,051	5.1%

Source: Washington State Department of Revenue (DOR), 2009b.

3.0 Direct Project Impacts

3.1 Construction Impacts

Construction of the project is expected to occur in a 7-month period during each year of a 3-year planned construction period. The construction impacts of interest in this analysis are those relating to direct changes in employment, income, and taxes. As such, the following discussion will evaluate the impacts of the changes in the above-listed variables.

For the following subsections, the number of construction workers that are likely to relocate to Kittitas County (from other parts of Washington or elsewhere in western US) is conservatively assumed to be 50 percent (or 225 workers) of the peak onsite workforce of 450. The remainder (50 percent, or 225 workers) will come from within Kittitas County. In the absence of any data that show how many construction workers typically relocate to a rural construction site, the assumption of 50 percent relocation was derived as a conservative estimate that will likely result in underestimating the positive benefits to employment and income. Therefore, it is anticipated that the actual impacts are likely to be substantially more than those indicated in the following paragraphs.

3.1.1 Construction Workforce

The project is expected to employ an average onsite workforce of 225 and a peak onsite workforce of 450 during each of the three construction seasons. Assuming that the number of the construction workers who relocate to Kittitas County during each construction season is 50 percent of the peak workforce, the average number of relocated workers will be about 225. The number of local workforce will be 225, or about 1.4 percent of the County's total 2009 nonfarm employment of 15,400 and about 24.4 percent of the County's total in the natural resource, mining, and construction workforce sector (see Figure 1).

3.1.2 Sales Tax

The Washington State legislature enacted ESSB 6170 during the 2009 session that provides retail sales tax exemptions or remittance for renewable energy production equipment. The tax exemption amount is 100 percent beginning July 1, 2009, through June 30, 2011. Beginning July 1, 2011, through June 30, 2013, the exemption is equal to 75 percent of the state and local sales tax. The sales tax exemption expires on June 30, 2013 (DOR, 2009c). According to the County Assessor’s office, it is unclear whether solar equipment is currently included in this exemption (Weyand, 2009). However, assuming that the solar equipment is included and that the project’s construction window falls within the tax exemption period, neither the state nor the county is likely to receive any sales or use tax revenues on production equipment during the construction of the project.

The total value of project goods and services that will be purchased locally (within Kittitas County) during the 3-year construction period is estimated to be \$97.5 million. This number excludes the solar modules and related equipment. The effect on fiscal resources during construction, assuming that the project is not completed before June 30, 2011, will be from sales taxes realized on goods and services purchased in Kittitas County. The total sales tax expected to be generated during construction is \$7.8 million (i.e., 8 percent of local sales). Of this amount, \$1.46 million will go to Kittitas County. Since construction will occur over 3 years, the expected annual sales tax revenues will be \$2.6 million, of which \$487,500 will go to Kittitas County. Table 4 summarizes the estimated annual sales tax revenue during construction.

TABLE 4
 Estimated Annual Sales Tax Revenue on Goods and Services During Construction

	Annual Sales Tax Revenues
State	\$2,112,500
County	\$487,500
Total Annual Sales Tax Revenue from Project	\$2,600,000
Percent Increase in County Sales Tax Revenues*	13.3%

Sources: CH2M HILL, 2009; Kittitas County, 2009b.

* Kittitas County fiscal year 2008-09 amended budget sales taxes were \$3,679,244.

Total sales tax revenue in Kittitas County in FY 2008-09 was \$3,679,244. The annual sales tax revenue to Kittitas County during each of the 3 years of construction represents about 13 percent of the total sales tax revenue in FY 2008-09.

3.2 Operational Impacts

The operational impacts of interest are those relating to changes in employment and taxes. As such, the following discussion will evaluate the impacts of the changes in these variables.

3.2.1 Operational Workforce

The project is expected to begin commercial operation in 2010, with additional capacity brought online in 2011 and 2012. The total direct operational workforce is expected to consist of 35 full-time staff. It is expected that all of the operational workers will be drawn from the local workforce. Consequently, only a slight decrease in the County's unemployment is anticipated as a result of the project.

3.2.2 Property and Sales Tax

The operation of the project will generate a significant, long-term beneficial impact to County revenue. The greatest benefit will be derived from the payment of property taxes with a smaller contribution from sales tax revenue. The project will create sales tax revenue through local expenditures on goods and services. This section presents the property and sales tax impacts from operations-related purchases.

The project is located within land zoned Range and Forest (R/F) by Kittitas County. The current levy rate for taxing district 32 is \$5.20134 per \$1,000 of assessed value (Weyand, 2009). The parcels do not currently pay a fire district levy because the land is not improved. If the parcels are improved, the property will have to pay the fire district levy. The improved parcels will pay a levy rate of \$5.746790 per \$1,000 assessed value, which includes a levy for the fire district⁴. Table 5 presents the breakdown of the levy rates for the affected new tax district 32, which now includes the fire district levy.

TABLE 5
 Levy Rates for Tax District 32

Taxing District	Levy Rate (\$/1,000 Assessed Value)
State (Public Schools)	2.018444
County Funds	0.892025
Road District No. 1	1.102931
School District No. 404, Cle Elum-Roslyn Bond	0.878933
Fire District #7	0.545450
Hospital District #1	0.309007
Total	5.746790

Source: Kittitas County, 2009c.

The Kittitas County Assessor suggests using project cost to estimate fiscal impacts because the actual assessed value of the improvements are difficult to quantify at this time. When assessing property with improvements, the Kittitas County Assessor's office typically values the land first and then uses the Marshall Swift Cost Manual to estimate the value of the structures. The value so derived is then adjusted for market conditions through the use of comparable sales (Weyland, 2009). However, the market adjustment may be difficult to do because there are no other solar farms in the area.

⁴ Alternatively, Teanaway may enter into a contract with the County to provide funding for fire prevention services.

In 2001, voters in Washington State overwhelmingly approved Initiative 747, which imposed a 1 percent cap on increases in state and local property tax collections. The initiative was ruled unconstitutional by the State Supreme Court in 2007 (Seattle Times, 2007).

The valuation of the solar improvements may be considered personal property. Whether the improvements are considered personal or real property depends on whether the solar panels are considered fixed to the property. Generally, real property has concrete footings or some other type of permanent foundation. If the improvements are considered personal property, the solar generation equipment might be considered new construction and may not be subject to Initiative 747. A law is currently in effect that specifically exempts wind turbines from the limits imposed by Initiative 747. According to the County Assessor's office, the solar panels and other equipment are likely to be assumed to be similar to wind turbines in that they will be exempt from the one percent limit imposed by Initiative 747. As such, the project can be assumed to provide additional tax benefits to the taxing district.

Assuming the parcels are assessed on the basis of the current classification as Designated Forest land (current levy rate of 5.20134 per \$1,000 of assessed value) and using the total project capital cost of \$300 million to \$350 million, the assessed property tax revenues generated by the project will be between \$1,560,400 and \$1,820,470 annually. Of this amount, about \$267,600 to \$312,200 goes to Kittitas County while the remaining is distributed between the other taxing districts (with the exception of the fire district) as shown in Table 5 above. According to the 2008 amended budget (see Table 2), the total property tax revenues in Kittitas County in FY 2008-09 were \$4,985,000. The annual property tax revenues going to Kittitas County during operation of the project represents about 5.4 percent to 6.3 percent of the total property tax revenues. Thus, operation of the project will be beneficial to the economy of Kittitas County. Table 6 shows the distribution of the estimated annual property tax revenue between the various taxing districts in Kittitas County.

TABLE 6
Estimated Annual Property Tax Revenue During Operation

Taxing Districts	Operation (assuming \$300M capital cost)	Operation (assuming \$350M capital cost)
State (Public Schools)	\$605,530	\$706,460
County Funds	\$267,610	\$312,210
Road District No. 1	\$330,880	\$386,030
School District No. 404, Cle Elum-Roslyn Bond	\$263,680	\$307,630
Hospital District #1	\$92,700	\$108,150
Total Annual Property Tax Revenue from Project	\$1,560,400	\$1,820,470
Percent Increase in County Property Tax Revenues*	5.4%	6.3%

Sources: CH2M HILL, 2009; Kittitas County, 2009b.

* Kittitas County fiscal year 2008-09 amended budget property taxes were \$4,985,000.

Assuming that the \$525,510 in annual operational expenditures on materials are not exempt from sales tax and that the sales tax rate is 8 percent, the project will generate annual sales tax revenues of \$42,040. The annual sales tax revenues going to the county will be \$7,880 which about 0.2 percent of the total sales tax revenues (\$3,679,244) in Kittitas County in FY 2008-09. Table 7 summarizes the estimated annual sales tax revenue during operation.

TABLE 7
Estimated Annual Sales Tax Revenue on Goods and Services During Operation

	Annual Sales Tax Revenues
State	\$34,160
County	\$7,880
Total Annual Sales Tax Revenue from Project	\$42,040
Percent Increase in County Sales Tax Revenues*	0.2%

Sources: CH2M HILL, 2009; Kittitas County, 2009b.

* Kittitas County fiscal year 2008-09 amended budget sales taxes were \$3,679,244.

4.0 Secondary Project Impacts

Section 3.0 looked at the project's direct impacts resulting from such factors as the payment of property taxes and the influx of temporary workers. This section looks at the indirect and induced impacts that the project will have on the County economy as a whole. The evaluation of indirect and induced impacts is achieved through regional economic analysis.

4.1 Regional Economic Impacts

Regional economics is the study of the economy of a small region. Regional economic impacts result from changes in the economy of the region. The magnitude of the economic impacts is determined by the interactions between linkages within the local and regional economy and the leakages from this economy to the larger economy.

4.1.1 Economic Linkage

Economic linkages are the relationships between industries, businesses, labor, household, and government created by trade and other exchange, such as taxes, within and among regions. Economic linkages create multiplier effects in a regional economy as money is circulated by trade. For example, suppose a construction company is paid \$100 million to construct a power plant. The construction company spends part of the \$100 million to purchase materials (such as concrete) and part to pay construction workers. The purchase of the materials constitutes a direct effect and will lead to increased output from the concrete manufacturing sector, which in turn will lead to increased output from the sectors that provide input into the concrete manufacturing sector such as the cement manufacturers or sand suppliers (as well as those sectors that provide inputs to the cement and sand, and so on). The increased expenditures on construction materials will have the effect of not only increasing output from sectors directly linked to the economic activity but those that supply the inputs to the directly affected sectors. The initial expenditure on materials (e.g., cement) is typically referred to as the direct effect or impact. (These factors were described and analyzed in the Direct Project Impacts section above). The second set of impacts (those resulting from the purchases made by the directly affected sector) are referred as the indirect effect or impact. The construction workers hired for the project spend part of their income to purchase food at the grocery store, which in turn pays for labor at the store and other inputs from the food suppliers. The impacts resulting from construction worker payroll expenditures are referred to as the induced effect or impact.

4.1.2 Economic Leakage

The magnitude of impacts resulting from economic linkages is limited by the amount of leakage that occurs within the region. Economic leakages are a measure of the income shares spent outside of the region. The more economic leakage, the less the multiplier effect. Conversely, the better a region is able to capture expenditures, the higher the multiplier effect. Economic leakages are generally higher the smaller the regional economy because the local region may not supply all of the needs of the project or its employees. For example, if one needs a new car, and there are no local car dealers, one may go to the next county to purchase a car. Therefore, the economic leakages for a county are larger than those for the state which are larger than those for the nation.

4.1.3 Regional Modeling Systems

A number of regional economic analysis modeling systems (consisting of data as well as analytical software) are available for use in regional economic analysis, e.g., REMI (Regional Economic Models Inc.), RIMS II (Regional Industrial Multiplier System II), and IMPLAN (Impact Analysis for PLANning). IMPLAN is a computer database and modeling system used to create input-output (I-O) models for any combination of U.S. counties. For this study, IMPLAN was selected because it has a current database and is readily available.

The IMPLAN package includes: (1) estimates of final demands and final payments developed from government data, (2) a national average matrix of technical coefficients, (3) mathematical tools that help the user structure the I-O model, and (4) tools that allow the user to input more accurate data or add data refinement, conduct impact analysis, and generate reports.

Sections 4.2 and 4.3 describe the regional economic impacts associated with the construction and operation of the project, respectively. Because the duration of the construction and operational phases of the project are different, the impacts are separately evaluated and presented for each phase of the project.

4.2 Construction Phase Impacts

An IMPLAN I-O model of the Kittitas County economy was constructed. For this analysis, the following assumptions were made:

- The region of influence for the economic impact analysis is Kittitas County, Washington.
- The 75-dcMW project will be constructed over three construction seasons in roughly 25-dcMW blocks.
- The construction window for the site is assumed to be from April 1 to October 31, a period of 7 months.
- There will be an annual average onsite workforce of 225, including subcontractors, during each construction season.
- Fifty (50) percent of the onsite peak construction workforce of 450 is assumed to be from the local labor market (within Kittitas County) while the remaining 50 percent, or 225 peak period workers could come from outside the County and are assumed to relocate to Kittitas County for the duration of the construction period or phase.
- Construction is anticipated to start in 2010 with the first 25 MW placed in commercial operation in 2010.
- Disposable labor income is 70 percent of total labor income. This means that 30 percent of gross income is used for taxes and savings.
- The base year of analysis is 2007⁵, but the impacts were adjusted to reflect year 2009 price levels because all project costs are in 2009 dollars.

Table 8 shows the capital cost, materials costs, and labor costs for the project split by estimated costs assumed to be spent with Kittitas County (local) and those assumed to be spent outside the county. Since engineering design on the project is at a preliminary level, the cost estimates used in this analysis are also at a preliminary level.

The total capital costs for the project, over the 3 years, is between \$300 million and \$350 million, in 2009 dollars. Expenditures on materials are estimated to be between \$240 million and 287.5 million while construction payroll is expected to be between \$60 million and \$62.5

⁵ Available IMPLAN data.

million. The local (within Kittitas County) portion of the construction expenditures on materials and labor are \$97.5 million and \$52.5 million, respectively.

TABLE 8
 Development Cost of the Proposed Teanaway Solar Reserve, 2009 Million Dollars

	Total Capital Cost	Total Materials Expenditure	Total Construction Payroll
Out of County	\$150 - \$200	\$142.5 - \$190	\$7.5 - \$10
In-County (local)	\$150	\$97.5	\$52.5
Total	\$300 - \$350	\$240 - \$287.5	\$60 - \$62.5

Source: CH2M HILL, 2009.

Given that regional indirect and induced economic impacts arise from the infusion of “exogenous” or outside dollars into the local economy, only the portion of the expenditures on labor for the relocated workers and the local expenditures on goods and services are used to evaluate the economic impacts of expenditures on construction goods and services, and labor. For this analysis, the portion of the expenditures on labor was assumed to be the disposable portion of the income received by the labor assumed to move into the county, while the local portion of the expenditures on materials was assumed to be the entire amount. The total local expenditures on materials and the total local labor local cost for the project are shown in Table 8 above.

Table 9 shows the results of the regional economic impact analysis of the construction phase of the project. As the numbers in the table show, in addition to the average direct employment of 225, the construction phase of the project will result in secondary (indirect and induced) employment within Kittitas County. Along with the average annual direct 225 construction jobs, the estimated annual indirect and induced employment will be 403 and 160, respectively. Assuming an average annual direct construction employment of 225, the employment multiplier associated with the construction phase is 3.5⁶. This project construction phase employment multiplier is based on a Type Social Accounting Matrix (SAM) model.

The annual estimated indirect and induced income within the region will be about \$14,814,500 and \$4,504,400, respectively. Assuming a total annual local construction expenditure (payroll, goods and services) of about \$44,750,000 (\$12,250,000⁷ in disposable payroll and \$32,500,000 in goods and services), the project’s construction phase income multiplier based on a Type SAM model is approximately 1.4⁸.

Because of the short-term nature of construction, the regional economic impacts associated with the construction of the proposed project are temporary.

⁶ The 3.5 employment multiplier is derived as [225 construction jobs + 403 indirect jobs + 160 induced jobs]/225.

⁷ The total construction payroll of \$60 million to \$62.5 million is assumed to be divided evenly over the three construction seasons resulting in an annual construction payroll of \$20 million to \$20.8 million. The local portion of the construction payroll is \$52.5 million. Of this, \$17.5 million is assumed to be spent within Kittitas County annually. The \$12,250,000 is assumed to be 70 percent of the annual local construction payroll of \$17.5 million.

⁸ The 1.4 income multiplier is derived as [\$44,750,000 in annual local construction income from expenditures + \$14,814,500 indirect income + \$4,504,400,100 induced income]/\$44,750,000.

TABLE 9
Estimates of Annual Direct, Indirect, and Induced Impacts Associated with the Construction Phase of the Teanaway Solar Reserve

	Employment
Direct	225
Indirect	403
Induced	160
Total	789
Employment Multiplier	3.5
	Income
Direct	\$44,750,000
Indirect	\$14,814,500
Induced	\$4,504,400
Total	\$64,068,870
Income Multiplier	1.4

Notes:

Numbers may not add as a result of rounding.

Income estimates are in 2009 dollars.

4.3 Operations Phase Impacts

The project is expected to begin operations in 2010. The costs associated with the O&M phase of the project relate to labor and materials. Operations labor is assumed to be local. For the regional economic impact analysis, the expenditures on locally purchase goods and services and the payroll for the relocated labor are used. Table 10 shows the annual O&M costs.

TABLE 10
Annual Operations and Maintenance Cost of Proposed Teanaway Solar Reserve, 2009 Dollars

Costs	In-County	Out of County
Labor	\$2,368,660	\$350,000
Materials	\$525,510	\$1,875,000
TOTAL	\$2,894,170	\$2,225,000

Source: CH2M HILL, 2009.

Table 11 shows the annual regional economic impacts of the O&M expenditures on labor and materials. As the numbers in the table show, in addition to the direct employment of 35 staff resulting from the local O&M payroll expenditures, the operational phase of the project will result in secondary (indirect and induced) employment within Kittitas County. Thus, the estimated annual indirect and induced employment within Kittitas County will be about 1 and 13 jobs, respectively. Assuming an average annual direct operational phase

employment of 35, the employment multiplier associated with the operations phase is about 1.4.⁹ This construction phase employment multiplier is based on a Type Social Accounting Matrix (SAM) model.

The annual estimated indirect income within the region will be \$45,630 while the annual estimated induced income will be \$352,070. Assuming a total annual local operations expenditure (payroll, goods and services) of about \$2,894,170 (\$2,368,660 in payroll and \$525,510 in goods and services), the project's operations phase income multiplier based on a Type SAM model is approximately 1.1.¹⁰

TABLE 11

Estimates of Annual Direct, Indirect, and Induced Impacts Associated with the Operational Phase of the Teanaway Solar Reserve

	Employment
Direct	35
Indirect	1
Induced	13
Total	49
Employment Multiplier	1.4
	Income
Direct	\$2,368,660
Indirect	\$45,630
Induced	\$352,070
Total	\$2,766,360
Income Multiplier	1.1

Notes:

Numbers may not add as a result of rounding.

Income estimates are in 2009 dollars.

Because of the long-term nature of operations, the regional economic impacts associated with project operation are expected to last at least 20 years. However, these economic impacts are likely to change if the underlying economic linkages and leakages that produced them change over the course of project operations.

⁹ The 1.4 employment multiplier is derived as $[35 \text{ operation jobs} + 1 \text{ indirect job} + 13 \text{ induced jobs}] / 35 \text{ operation jobs}$.

¹⁰ The 1.1 income multiplier is derived as $[\$2,368,660 \text{ in annual local operation income from expenditures} + \$45,630 \text{ in indirect income} + \$352,070 \text{ in induced income}] / \$2,368,660$.

5.0 References

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ATTACHMENT O
Public Outreach

Public Events • Teanaway Solar Reserve				
Date	Event	Audience	Material Produced	Method
July 9, 2009	Announcement	General Public	Press Release	Email to press; posted on website
July 9, 2009	Announcement	General Public	Howard Trott interview	Phone Press Conference
July 9, 2009	Announcement	General Public	Website www.teanawaysolarreserve.com	Website live
July 9, 2009	Announcement	Neighboring Property Owners	Letter of Introduction from Howard Trott (Appendix A)	Mailed to approximately 300 addresses from Ameri Title list of property owners
August 18, 2009	Application Submission	General Public	Press Release	Email to press; posted on website
August 18, 2009	Application Submission	General Upper County	Press Conference and question period at Cle Elum Centennial Park : Howard Trott and Ron Dotzauer	Public press conference, interview, and public questions
August 18, 2009	Application Submission	General Public	SEPA and CUP materials available	Posted on TSR website
September 28, 2009	Facebook and Twitter online	General Public	Facebook and Twitter page running	Online
October 16, 2009	Kittitas Renewable Energy Consortium	Renewable Energy Group	Presentation by Al Aldrich outlining project and updates	Presentation during regular meeting
October 22, 2009	Economic Impact Study Release	General Public	Press Release	Email to press; posted on website
October 22, 2009	Economic Impact Study Release	General Upper County	Public Q&A forum: Howard Trott, Ron Dotzauer, Matt Steuerwalt, Al Aldrich (S360) and Nichole Seidell (CH2M Hill)	Q&A forum at Walter Strom Middle School
October 27, 2009	Cle Elum City Council Meeting	City Council and Public	Presentation by Al Aldrich outlining project and updates	Presentation and Power Point to City Council
December 4, 2009	TSR Holiday Party	General Upper County	Holiday Party/Food Fundraiser with Howard Trott, Ron Dotzauer, Meagan Walker, Al Aldrich, and Dave Pringle	Evening social gathering to discuss project
December 16, 2009	TSR Update	General Upper County	TSR Newsletter with information and updates (Appendix B)	Mailed to 98922 Zip Code
December 23, 2009	Blog "Under the Cle Elum Sun" online	General Public	"Under the Cle Elum Sun" blog online – project updates http://underthecleelumsun.wordpress.com	online
January 4, 2010	Cle Elum Office opened	General Upper County	Meagan Walker in TSR office three days a week in Cle Elum	Open to public

Public Events • Teanaway Solar Reserve				
Date	Event	Audience	Material Produced	Method
February 3, 2010	MOU Announcement	General Public	Press Release	Email to press; posted on website
February 3, 2010	Cle Elum Kiwanis	Members		
February 4, 2010	Cle Elum Roslyn Chamber of Commerce	Board and members	Meagan Walker presentation	presentation

APPENDIX A

Letter of Introduction



July 9, 2009

Dear Property Owner,

As a property owner in the Teaway Valley we thought you would be interested in learning about an exciting new project proposed for the area.

A privately-held energy company, Teaway Solar Reserve, LLC, has announced plans to file a permit with the county to install a photovoltaic (PV) solar farm on property north of Cle Elum it has leased from American Forest Holdings, LLC which is managed by American Forest Land Company, LLC of Ellensburg. The Teaway Solar Reserve project will be located on a 400-acre parcel of previously-logged land that will be accessed by Weihl Road and Loping Lane off Red Bridge Road. The proposed site is situated near an existing transmission line.

Once complete, the Teaway Solar Reserve will generate up to 75 megawatts (MW) of clean, renewable energy that will be linked to the electricity grid.

Solar farms do not pose a threat to the environment or to wildlife. The project will be subject to Kittitas County's SEPA (State Environmental Policy Act) process and an environmental assessment is currently underway. Likewise, we want to assure you that the proposed reserve should have no adverse impact on your property value or your quality of life in the valley, as you will neither be able to see nor hear the system.

In fact, the local community is poised to realize numerous benefits. Not only will a solar reserve result in new jobs, an increased demand for goods and services and a source of taxes for the county, but it will also have an enormous positive effect on the environment. Based on U.S. Department of Energy formulas, 75 MW of PV solar-produced power will offset nearly 275 million pounds of carbon dioxide every year as compared to an equivalent amount of energy derived from coal.

We encourage you to visit our website (www.teawaysolarreserve.com) to learn more about this project and contact us via email if you have any questions. We feel certain that you will embrace the opportunities it affords the Upper County as the region leads the way in pioneering this renewable energy resource for the entire nation.

Sincerely,

Howard Trott, Managing Director
Teaway Solar Reserve, LLC
Cle Elum, WA

APPENDIX B
TSR Newsletter



Whether you've attended one of our presentations, read about the project in the newspaper or got word of it somewhere around town, chances are you've probably heard about the Teaway Solar Reserve by now.

We are excited about the opportunities this project will afford your region, as it adds new jobs, a significant revenue stream to support local schools and services, and a source of clean, renewable energy.

Since our initial announcement in July 2009, we have received several questions via our Web site email, our toll-free phone number and at our public events. We want to take this opportunity to answer some of the questions most frequently posed to us.

As always, you are welcome to contact us via www.teawaysolarreserve.com and we will be happy to respond. In the meantime, we hope that you will attend one of our events and check our Web site for updated information including our new blog "Under the Cle Elum Sun".



Howard Trott
Managing Director
Teaway Solar Reserve

What People Are Saying About Teaway Solar Reserve

"Teaway Solar Reserve is adding to Washington State's reputation as a leader in developing and investing in clean energy technologies."
– Senator Maria Cantwell (D-WA)

"I applaud the project's sponsors for recognizing that Washington state has the workforce and natural resources to be an ideal home to this groundbreaking facility."
– Senator Patty Murray (D-WA)

"The Teaway Solar Reserve exemplifies what many of us have dreamed of. It presents Kittitas County with an opportunity to bring in family-wage jobs, diversify our energy portfolio and get in on the front end of renewable solar energy. This is clearly a future trend and I feel blessed that, of all the places this project could have been located, that it's coming to us."
– State Rep. Bill Hinkle (13th LD)

"The mine shut down; M.C. Miller closed down; the logging closed down. There's no industry. Our biggest export here is our children. So what I'm trying to tell you is this is just great. I'm beside myself."
– Charles Glondo, Mayor of Cle Elum

Q: What exactly is the Teanaway Solar Reserve?

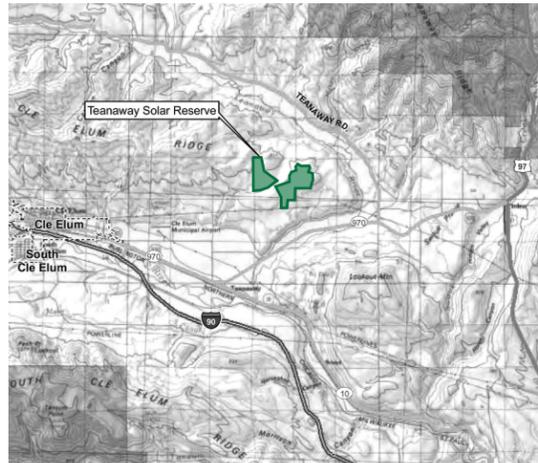
The Teanaway Solar Reserve is a privately financed project that will produce 75 megawatts of renewable photovoltaic (PV) solar energy. At peak capacity it will supply enough energy to power approximately 45,000 households. The energy will be linked to the grid so it can be sold to electric utilities.



Q: Why do you want to put it on the ridge near Cle Elum?

The most important considerations in siting a solar project are ample sunlight, southern exposure, proximity to a major transmission line, and a willing landowner. The proposed site meets all of these criteria.

Q: Won't the panels be buried in snow during the winter months?



No. The panels will be mounted more than 3 feet above the ground, and decades of weather data show that the average snow depth at this location ranges from 1 to 8 inches in winter. *Most snowfall will melt or slide off the panels; any snow that does accumulate on the panels will be removed. The Teanaway Solar Reserve will not be the first solar project located in a region that receives snow. There is a solar system in operation at the Denver International Airport that uses the very same technology.

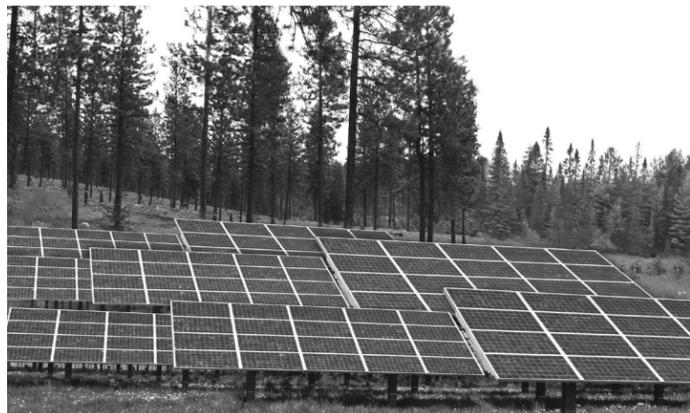
Our estimates take into account the fact that on snowy, rainy or cloudy days the Teanaway Solar Reserve will generate power at reduced levels. Most renewable energy sources are subject to climatic variables. Wind farms don't generate when the wind isn't blowing; dams don't produce as much at times of year when water levels are low.

Q: Why not put it out in the desert, near Hanford, or further south where it is hotter?

First, it's light, not heat, that is important to photovoltaic projects. So we don't need hot weather, we just need the sun to shine on the project. Second, some of those locations are among our state's most important habitats to protect. For example, the shrub-steppe habitats of the Columbia Basin and eastern Washington are priorities for protection. Third, PV technology is more efficient in cooler weather than in hot weather.

Q: What will the Teanaway Solar Reserve look like when it's completed?

Typically, large solar projects are installed on flat pieces of property that are covered in gravel or asphalt and enclosed with a fence. In an effort to minimize the visual impact and preserve the property's natural setting, the Teanaway Solar Reserve will take a very different approach. The non-reflective panels, which if placed side-by-side would occupy 150 acres, will be spread across approximately 600 acres with corridors of green space running between them. Grasses and shrubs will be left to grow underneath and around the panels. A ring of pine trees will buffer the entire project and the property will not be fenced.



*NOAA, National Weather Service and American Association of State Climatologists web site at www.wrcc.dri.edu for Cle Elum, WA (451504)

Q: What impact will it have on wildlife and habitat?

The Teanaway Solar Reserve will have a minimal impact on plants and animals. The property has been managed as timberland for more than a century and was last logged in 2001. For that reason, there are few trees on the site. Any trees that need to be removed will be replaced by planting three more along the perimeter. As part of the permitting process, teams of biologists carefully studied the proposed site. There are no threatened or endangered species, no areas of archeological significance, and nominal wetlands. With the exception of 0.1 acre, the wetlands will be avoided.



Q: What are the advantages of having this project in Upper Kittitas County?

The advantages fall under two categories. First are the environmental benefits. PV technology provides a quiet, carbon-free, non-polluting source of renewable energy. This project is part of a commitment to help grow green energy sources in Washington in order to decrease our reliance on foreign oil. Second are the economic benefits. According to an economic analysis, the Teanaway Solar Reserve will create approximately 225 jobs during a 2-3 year construction period, and 35 permanent jobs once the project is operational. It will also contribute to Kittitas County's revenue stream. The total project cost is estimated to run between \$300-350 million, with more than \$97 million in purchases of goods and services in Kittitas County during construction. Once complete, property tax revenues will fund county services including an estimated \$264,000 annually for Cle Elum-Roslyn public schools and \$331,000 annually for local roads.

Q: Will you really be locating a plant in Cle Elum?

Yes. Teanaway Solar Reserve is close to finalizing agreements with manufacturing partners. The negotiations include the location of a permanent assembly plant in Cle Elum. Initially the workforce will perform jobs critical to the construction and installation of the project. Once the project is complete, workers will use their expertise to focus on the production of solar applications for the national marketplace.

Q: What is the process to ensure that the community's interests are safeguarded and that an informed decision is made?

We chose to seek a permit for our project from Kittitas County because it invites considerable community involvement, which has given us the opportunity to hear your concerns and address them. The county process is a thorough one. Our conditional use permit (CUP) application requires rigorous documentation including adherence to the State Environmental Policy Act (SEPA), detailed descriptions of the project, construction process and operation, and evidence of zoning compliance.

We are currently in the process of conducting additional studies and analyses, and remain committed to continuing our close work with the reviewing state and county agencies, as well as with the public. You can view the CUP application on the county Web site or under "updates" at www.teanawaysolarreserve.com.





Contract

TEANAWAY SOLAR RESERVE'S CONTRACT WITH THE COMMUNITY OF CLE ELUM AND THE UPPER VALLEY

The Teanaway Solar Reserve pledges its intention to proceed in the process of planning, manufacturing, installing, operating and maintaining its project with full respect to the people who live, work and enjoy time in Kittitas County.

Like you, we appreciate the natural beauty of the Teanaway and all that it nurtures, from the western larch that rise from its hillsides to the cutthroat trout that run its rivers to the osprey and eagles that soar on its air. It is our goal to proceed with care to ensure that this rich land is honored and protected in such a manner that it can continue to support you and your families for generations to come.

As such, we pledge:

- To be a responsible member of your community**
- To be honest and clear in our representations and actions**
- To listen and respond to your concerns**
- To minimize our impact on the environment, wildlife and its habitat**
- To follow through on our promises**

Signed by Howard Trott, Managing Director, on behalf of the Teanaway Solar Reserve and all of its authorized employees and sub-contractors.