Final Feasibility Report of Wind Energy Development for the Confederated Tribes of the Colville Reservation

Four Selected Sites for Assessment: Omak Mountains, Bridgeport Area, Keller Butte, and Cody Butte

December 21, 2010

Table of Contents

Executive Summary

This feasibility report assesses the four sites within the Colville Tribes prospected by Clipper Windpower for wind energy development. Four properties were identified by Clipper Windpower and the Confederated Tribes of the Colville Reservation as sites of potential wind energy development on the reservation. Those sites are Cody Butte ("Cody"), Keller Butte ("Keller"), Omak Mountain ("Omak") and the Bridgeport area ("Bridgeport"). See Appendix A for a map of all four sites.

The feasibility of wind energy project development is measured with a combination of criteria necessary to gauge whether a "fatal flaw" may exist. Fatal flaws can be found in many areas, but some are more common than others. For this report, Clipper assessed the sites within the Colville Tribes Reservation from the perspectives of 1) environmental and permitting constraints, 2) interconnection and grid access constraints, 3) meteorological constraints, 4) construction constraints, and 5) economic feasibility. Typically, within one or more of these arenas a difficulty or problem will arise and the determining factor of whether the wind energy development will be able to sustain the issue depends on its severity.

Within the four areas identified in the Colville Tribes reservation, each has its flaw. Two of the three sites have fatal flaws and two others are potentially developable, one being more attractive than the other. The Bridgeport and Keller site host the same fatal flaw—insufficient wind resource to build and sell a project. Typically, the minimum net capacity factor ("NCF")[1] a project in Washington must produce in order to be attractive to power partners, as well as economically-justifiable is roughly 28%. The Bridgeport area's NCF is less than half of what is necessary to justify a project at 14.15% NCF, slightly improving to 16.36% with the Clipper C-104 model. The Keller project's NCF was not as poor as Bridgeport's, but still undevelopable at 17.74% with the Clipper C-99 turbine. When lengthening the blade to a C-104, the NCF improves slightly to 20.31%. The C-104 is not yet on the market.

Cody's wind data has been collected since November 25, 2008. The site's winds measure at a 25.29% NCF with the largest Clipper blade available on the market, though the site's productivity would improve to a 29.01% NCF with a Clipper C-104 turbine blade. However, given the short time frame in which the wind has been surveyed, it is recommended that the best course of action is to continue monitoring Cody's wind data for a minimum of one more year to determine whether or not Clipper's future technology can meet the site's demands, potentially improving the NCF with a turbine able to perform in Class III wind regimes.

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[1] A wind energy project's net capacity factor is the ratio of the wind project's actual output over a period of time to its output if it operated at full nameplate capacity the entire time.

The Omak site does not have a meteorological tower, though it was surveyed by Clipper's internal and contract meteorologists. The site appears to have a wind regime that is superior to the other three sites, but it is recommended that one or more meteorological towers be erected on the site to gauge the actual wind profile in the area for a minimum of one year before any firm predictions about the performance of turbines in the area can be made. A wind regime of 6 to 7.5 meters per second of wind seems probable; however, before the development process is furthered it is of paramount importance to gain accurate data from an on-site meteorological tower.

The Omak site, along with Bridgeport, Keller and Cody was assessed for constructability by Clipper's construction team. Although the team surveyed each site, they paid particular attention to Omak, given that it may be the only site with development potential after the meteorological results of the other three sites were compiled. Both Omak and Cody prove to be challenging terrains to construct upon, hosting similar challenges, such as geologic composition of granite, requiring blasting in order to install turbine foundations, as well as haul-off of the rock and synthetic fill to surround the pad mounts. Furthermore, both sites host steep terrain, switchbacks, and narrow roads, all of which will have to be negotiated in the construction process, requiring a great deal of cut and fill, pull-assist trucks, and other costly equipment and labor. The Balance of Plant (BOP) costs for the Omak project have the potential to make the project economically insolvent due to high construction costs, which will push the needed power price out of the region's market price. The only way to ascertain the project's true economic feasibility, as aforementioned, is to install one or more meteorological towers on site and measure the winds for a minimum of one year.

From a transmission perspective, no certain determination can be made without an interconnection request. However, the nearby transmission lines show that a project between 115MW and 200MW could potentially be supported by the local transmission capacity. The closest site to major transmission is Omak, which could hold up to 200MW (80 2.5MW turbines). Further analysis will be needed to determine with certain accuracy the implications of interconnecting to a nearby power source. The next step, if the Omak site proves feasible from a wind resource perspective, would be to enter the Bonneville Power Administration's queue with an Interconnect Request and ensure the site will be able to supply power to the local transmission grid without overly burdensome transmission and interconnection upgrades.

The permitting and environmental review of the Omak site revealed three issues of importance: Summer Steelhead, an endangered fish under the Endangered Species Act, Spring Chinook Salmon, another fish with an endangered status under the Endangered Species Act, and sensitive spiritual and cultural features that could be located on site. Consultation with the National

Marine Fisheries Service may be necessary to evaluate whether the construction of the project would impact Summer Steelhead and Spring Chinook Salmon.

From this point forth, the remainder of the feasibility report assessed each project from a permitting and environmental perspective, a meteorological perspective, a transmission and interconnection perspective, and a construction feasibility perspective; however, only the Omak site is assessed from an economic feasibility perspective, since the other three sites are likely defunct as development assets due to poor wind regimes.

Section I. Permitting and Environmental Assessment

1.0 Summary of Critical Issues Analysis

A Critical Issues Analysis ("CIA") was prepared for four sites on the Colville Indian Reservation in northern Washington by environmental consultant URS in December of 2009. Addressed within the CIA are biological, archeological, cultural, historical, and hydrological resources, as well as aviation constraints. Data referenced in the compilation for the Critical Issues Analysis includes a variety of federal, state and local sources. The report determined that, from a permitting and environmental perspective, the Bridgeport, Omak, and Keller Sites may be feasible locations for potential wind energy development. However, the Cody Site should be re-evaluated because of its inclusion in a wilderness area.[2]

Recommended Actions

Six items considered to be critical issues were discovered in the analysis process that will require special attention during the development process. They are:

1. Conformance with the Colville Indian Reservation Record of Decision and Plan for Integrated Resources Management (2000-2014);
2. Construction and/or operation of the proposed project could adversely affect historic properties protected under the National Historic Preservation Act;
3. Impacts of wind power on Greater Sage Grouse within Bridgeport and near Omak ;
4. Development at the Omak Site may impact spawning habitat for Spring Chinook salmon and a threatened population of summer steelhead;
5. Construction and/or operation of the proposed project could adversely affect Regulated Waters.
6. The Cody project site being within the Grizzly Mountain protected wilderness area.

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[2] In conversations between Clipper's Project Development Manager, Krista Gordon, and Colville Tribes representative , Ernie Clark, Mr. Clark communicated that the Cody site in not within the Wilderness area, as URS had projected. From this point forth in the report, the mention of Grizzly Mountain within the Cody site will remain in the report, as represented by URS and, upon the request and approval from the Colville Tribes, will be removed in its final draft.

An assessment of the most efficient approach to mitigate each of these issues is as follows:.

1. Firstly, because the Colville Indian Reservation has enacted a Plan for Integrated Resource Management in place of the Bureau of Indian Affairs' approved forest management plan, the following measures should be followed to ensure a smooth development process: 1) a close development effort between Clipper, the Colville Tribes, and the Bureau of Indian Affairs authorized officer; 2) completion of the National Environmental Protection Act (NEPA) checklist to determine what level of environmental assessment is required; 3) the preparation of a Preliminary Plan of Development; and 4) close work between Clipper and Tribal staff on cultural, wildlife, and biological resources.

2. Secondly, because the operation of the proposed project could adversely affect historic properties protected under the National Historic Preservation Act, it is recommended that the Clipper and tribal members identify significant cultural properties and conduct pre-construction archeological surveys in order to avoid any significant archeological sites. As a last resort, archeological disruptions to the site that cannot be avoided should be mitigated with an agreed to plan.

3. Thirdly, because the impacts of wind power on Greater Sage Grouse are of growing concern and the United States Fish and Wildlife Service has placed the species on the candidate list for threatened or endangered status, onsite monitoring to evaluate potential presence will be necessary. Continued monitoring of the listing status of the species and close consultation with the FWS is recommended.

4. It is believed that development at the Omak Site may impact spawning habitat for Spring Chinook salmon and a threatened population of summer steelhead if soil runoff during construction is not adequately controlled. This result would be due to the increased amounts of sediment resulting from development, which would impair the spawning and other life history stages of salminoids. Recommendations of how to proceed with this sensitive species are to: 1) work with the National Marine Fisheries Service to identify areas of concern and discuss potential impacts, 2) implement best management practices, and 3) minimize or avoid steam crossings during development.

5. Construction and/or operation of the proposed project could potentially adversely affect federally regulated waters within the greater Colville Tribal Reservation if proper design measures are not implemented. Therefore, it is recommended that, after determining a layout and array of the project, the area be surveyed by a qualified wetland specialist in

order to identify jurisdiction waterways under regulatory authority of the Army Corps of Engineers.

1.1 Project Location

The Omak Mountains Site is situated primarily among evergreen forest—comprising 69% of the ground cover—with some shrub and scrub brush, as well as a small amount of herbaceous land. Considerable forestry and sustainable logging activity takes place on the Omak site. The Cody Site is composed primarily of evergreen forest (approximately 84%) with shrub and scrub scattered throughout. The majority of the Bridgeport Site is developed, open space with roughly 40% cultivated crops, scattered water bodies, and some hay/pasture on the southwest border and herbaceous cover in the south. The Keller Site is primarily composed of evergreen forest (approximately 68%) with shrub and scrub scattered throughout. See Appendix B for land cover maps of each site.

1.1.1 Types of Ground Cover in the Project Area

Shrub/Scrub Cover

The project sites have 30,000+ acres of shrub/scrub. This cover dominates the Bridgeport site. This habitat typically hosts sage sparrow, sage thrasher, sagebrush lizard, migratory birds, elk, deer, and sharp-tailed grouse.

Herbaceous Cover

The four project areas contain 4,262 acres of herbaceous land cover. These areas provide important forage for big game, migratory birds and small mammals.

Woody Wetlands and Emergent Herbaceous Wetlands Cover

The Bridgeport site hosts a minimal amount of emergent herbaceous wetlands. This ground cover hosts a number of floral species, though no specific faunal species.

Evergreen forest

Evergreen forest is the most common cover type in all sites except the Bridgeport site. Huckleberries are an important food source for wildlife grown in the sites' evergreen forests. Wildlife species that dwell in evergreen forest include: mule deer, elk, grouse, bear, cougar, lynx, fisher, wolverine, eagles, osprey, hawks, owls, and woodpeckers.

1.2 Federal Endangered, Threatened, and Candidate Plant Species

No federally listed threatened or endangered plant species are known to occur in the Reservation. One federally listed plant species in known to occur in an area adjacent to the reservation: Ute's ladies-tresses. This is an orchid that inhabits wetlands and riparian areas above 1,500 feet of

elevation. Although suitable habitat for the ladies tresses occurs in the reservation, there is no known presence of the plant species in the four areas.

1.3 Fish and Wildlife Species of Concern

1.3.1 Resident Fish

The Colville Tribes Fish and Wildlife Department prioritize fish and wildlife species for conservation by the following criteria:

1. Tribal importance for subsistence, cultural, and traditional use;
2. Population status;
3. Sensitivity to habitat alteration;
4. Estimate of long-term viability on the Colville Reservation; and
5. Dependence upon mature forest structure.

The tribe's goal is to maintain populations of fish and wildlife as well as their ecosystems to meet cultural, subsistence, recreational and economic needs of the tribal membership. Resident salminoids are particularly important, especially since the Columbia River Dams were established and reduced the native fish species. The restoration of these water habitats are Resident Fish Goals 1, 2, and 5 of the Colville Tribe. Fish species of concern are Red Rainbow Trout, Adfluvial Rainbow Trout, Kokanee, White Sturgeon, Westslope Cutthroat Trout, Bull Trout, Lahotan Cutthroat Trout, Mountain Whitefish, Eastern Brook Trout, Burbot and Eel. The following list outlines these species' 1) presence and 2) potential impact mitigation strategy.

Red Rainbow Trout

Red Rainbow Trout occur in both the Cody site and the Keller Site. Use of best management practices is recommended for the Cody Site, which drains into the Twin Lakes, Twenty-Three Mile Creek, and Bridge Creek, as well as for the Keller Site, which drains into Brush Creek, Jack Creek, and Meadow Creek.

Adfluvial Rainbow Trout

Information on the distribution of this fish in the Reservation is scarce, though it appears impact to these trout would be minimal. Best management practices should be used.

Kokanee

The Keller site is 1.5 miles west of the Buffalo Lake, which hosts Kokanee. Waters from the Keller site will drain into the lake. If the Keller site is developed, identification of spawning habitat near the Keller site will need further assessment, in collaboration with the Colville Tribes.

Westslope cutthroat
There should be no impact to Westslope cutthroat.

Bull Trout
There is likely to be no impact to bull trout.

Lahontan cutthroat trout
No impacts to Lahontan Cutthroat trout are expected.

Mountain Whitefish
Mountain Whitefish are expected to occur in streams and lakes in all four project sites. Implementation of best management practices should reduce any impacts the species incur due to project development.

Eastern Brook Trout
Eastern Brook Trout occur in several lakes on the reservation. Development is unlikely to impact this species. However, Colville Tribes Fish and Wildlife Department's input is recommended to understand the potential impacts to the species since available public records of the species' occurrence are scarce.

Burbot
It is unlikely Burbot will be impacted by any development.

1.3.2 Anadromous Fish
Anadromous fish are used in ceremonial and subsistence fisheries. Those anadromous fish the CTFWD lists as species of concern are: Summer Steelhead, Spring Chinook Salmon, Summer Chinook Salmon, Fall Chinook Salmon, and Sockeye Salmon.

Summer Steelhead
Summer Steelhead are considered threatened under the Endangered Species Act in the Upper Columbia River; they spawn in the Omak Creek. The Omak site drains into the Omak Creek. Wind power development in this area may require consultation with the National Marine Fisheries Service (NMFS) and/or the CTFWD. There are current efforts to improve habitat and increase Summer Steelhead spawning in the Omak Creek

Spring Chinook Salmon
Spring Chinook are listed as endangered under the Endangered Species Act, but they are extinct in the Okanogan River. Regardless, impacts to the species should be taken into consideration. There are current efforts to improve habitat and increase Spring Chinook spawning in the Omak Creek.

Fall Chinook salmon
Fall Chinook are not listed in the Endangered Species Act and are unlikely to be impacted by wind power development.

Sockeye Salmon
Wind power development is not likely to affect Sockeye Salmon because of their temporary residence in the Okanogan River.

1.4 Wildlife
The following is a list of those species that possess a status of either/both threatened or endangered in either state or federal regulations or are otherwise environmentally significant species.

Lynx (Federal Threatened and State Threatened)
There is no designated or proposed critical habitat within the project area; however, designated critical habitat for Canada Lynx and Northern spotted owl are within 30 miles of the project areas in Okanogan County. Lynx have been sighted on the reservation. Potential habitat is larger contiguous areas of more than 4,300 feet in elevation that contain lodgepole pine, Engelmann spruce, and sub-alpine fur thickets. The Omak, Cody, and Keller Sites all have these characteristics. A majority of the Cody site is potential habitat, as well as a portion of the Omak site.

Grizzly Bear (Threatened under the Endangered Species Act)
Three documented sightings of Grizzlies have occurred within 15 miles of the Cody site; the most recent of these sightings was in 1993. Occurrence within the project areas is possible and most likely within Cody, Omak, and Keller Sites. Loss of habitat and habitat fragmentation could affect the bears, but this impact needs further research.

Big Game
Within the project areas, big game winter range exists along the eastern boundary of the Bridgeport site as well as within the southern half of the Keller Site and along its eastern border, but the Keller site is the only area with significant amounts of identified big game winter range occurring.

Bats

Although the CTFWD does not recognize bats as species of concern, the Washington Department of Fish and Wildlife recognizes two species within the area as having special status. They are Pacific Townsend's big eared bat and the pallid Townsend's big eared bat; the two species are virtually indistinguishable from one another. A large communal roost is located just east of the Bridgeport site.

Migratory Birds

The project is located in the Pacific Flyway, a major north-south route of travel. Migratory birds of concern are identified by the CTWFD Fish & Wildlife Management Plan, the Washington Department of Fish & Wildlife Washington Comprehensive Wildlife Conservation Strategy, and the United States Fish & Wildlife Service Birds of Conservation Concern, the latter of which sites the Project Area within two conservation regions: Bird Conservation Region 9 and Bird Conservation Region 10. Additionally, four Important Bird Areas, as identified by the National Audubon Society are within 5 miles of the Reservation.

The significant migratory birds of concern include:

1. Osprey: known Osprey nests are within 5 miles of the Cody site and 1 mile of the Omak site.
2. Golden Eagles: Golden Eagle nests are documented within 5 miles of the Keller site and 1 mile of the Bridgeport site. The latter site is where they forage and may be impacted.
3. Loons: Loon nests are documented within 5 miles of the Cody site and within 2 miles of the Keller Site. Common loons have been seen within 1 mile from the Cody site.
4. Sharp-tailed grouse: Sharp-tailed grouse are located just north of the Omak site. Known and historic leks are within 2 miles of the Omak site and within 1 mile of the Keller site and a known lek occurs within the Bridgeport site.
5. The Bridgeport site is located in or near potential sage grouse habitat and is part of the sage Grouse Management Unit identified by Washington Department of Fish and Wildlife as a potential expansion and reintroduction area for greater sage grouse. Sage grouse exist 2 miles away—if further developed, this site needs to be further studied for sage grouse. Implementation of responsible setbacks can alleviate potential impacts to sage grouse.

1.5 Managed Lands

Two areas—Grizzly Mountain Wilderness Area, and Moses Mountain Wilderness Area—have been designated as spiritual, educational, historic, and limited recreational areas. The Omak site is 5 miles from Moses Mountain Wilderness and the Cody site occurs within the Grizzly Mountain Wilderness Area. This constitutes a critical issue. The site boundaries of the Cody site may have to be reevaluated.

Washington Department of Fish and Wildlife manages 32 parcels of land designated as wildlife areas. Four of them are within the vicinity of the Project Areas.

1.6 Wetlands and Other Waters

The Project Areas contain several perennial and intermittent streams as well as a few artificial waterways. The Bridgeport site contains the most wetlands. It appears that all of the streams and adjacent wetlands mapped for the project are likely to be jurisdictional under Federal Law. A wetland delineation would be completed to evaluate whether there are jurisdictional waterways that fall under the jurisdiction of the Army Corps of Engineers.

1.7 Archeological, Cultural and Historic Resources

The Confederated Tribes of the Colville Indian Reservation maintain their own Tribal Historic Preservation Office. Of the 1995 Department of Archeology and Historic Preservation ("DAHP") data available, ten previously-recorded archeological sites are located within the project boundaries: two at Bridgeport, one at Cody, and seven at Omak. Archeological sites such as mills, railroads, and camps related to forestry activities could be expected in any of the Project Areas. There is potential of traditional cultural properties and sacred places within the four site areas. Due to the nature of these types of places, knowledgeable Tribal elders or representatives are the only persons who can identify them.

Very few archeological surveys have been conducted for the project areas, so little information is available. The presence of numerous previously recorded rock features on two of the prominent peaks characterizing the Project Area, Omak Mountain and Grizzly Mountain, are indicative of spiritual or sacred importance of these high places to ancestral and possible contemporary Indians. All ridge tops with unobstructed views should be considered as having potential sensitivity for cultural resources.

1.8 Federal Aviation Administration

Four public airports are located in the vicinity of the Reservation. Grand Coulee Dam Osborn, WA) is about 12 miles southwest of the Keller Site and 23 miles southeast of the Bridgeport Site. The Colville Municipal airport is 28 miles northeast of the Cody Site. The Anderson Field Airport (Brewster, WA) is 4 miles west of the Bridgeport Site. The Chelan Municipal Airport is 18 miles southwest of the Bridgeport Site. Coordination with the Federal Aviation Administration will be necessary to evaluate potential impacts to airspace.

1.9 Permitting and Regulatory Environment

Because the project is located on a reservation of a federally recognized tribe, state and local jurisdictions do not have any permitting authority, unless project components are sited outside

the reservation boundary. Federal laws and policy may apply regarding conservation and/or management of biological, cultural, hydrological and historic resources, as well as the construction and siting of the project.

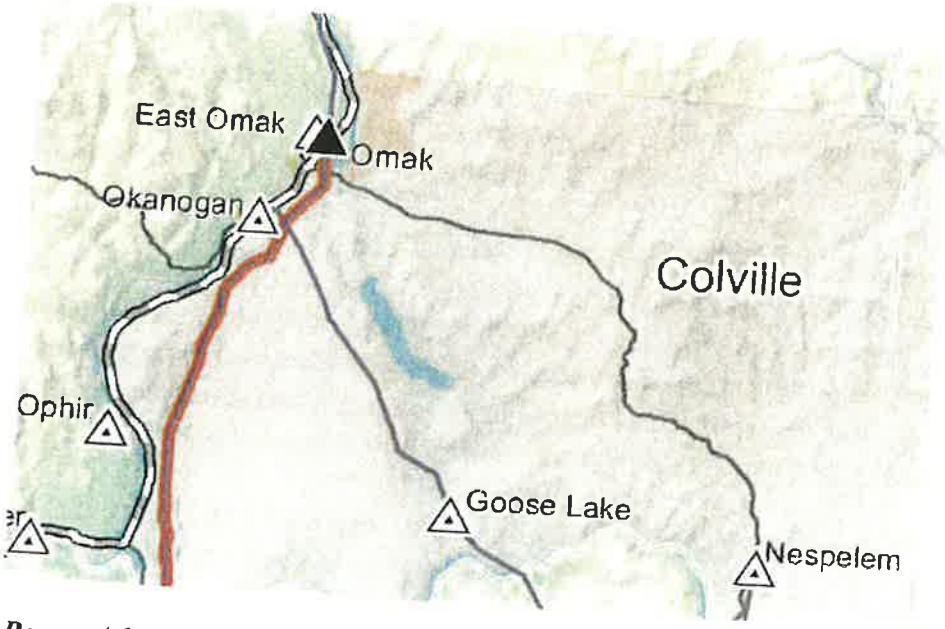
The project will require conformance with the Colville Indian Reservation Record of Decision and Plan for Integrated Resources Management (PIRN). In addition, the management of the reservation's natural resources is governed by:

- the Colville Tribal Code;
- National Environmental Policy Act (NEPA);
- Endangered Species Act;
- The Clean Air Act;
- The Clean Water Act; and
- Secretary of the Interior on behalf of the National Indian Forest Resources Management Act (manages forest production).

Because the Colville Confederated Tribes rejected the Bureau of Indian Affairs' approved forest management plan in its decision to compile the tribe's own Plan for Integrated Resource Management (PIRN), the Bureau of Indian Affairs may require an amendment to the PIRN in order for the permitting of the Colville site to proceed, due to the fact that the PIRN does not discuss wind energy development. A National Environmental Protection Act (NEPA) checklist will determine the level of environmental analysis that could be triggered, which would determine whether or not the project conforms to the PIRN. A table of the potential permits the project must receive and regulations it may need to comply with are included in Appendix C.

Clipper

Section 2. Summary of Interconnection and Transmission Options for Multiple Sites on the Colville Indian Reservation, Washington



Bonneville Power Administration Map *- Purple lines are 115kV, and the red line is 230kV*

Clipper's internal Grid Access team has preliminarily assessed the Colville area for potential capacity on existing transmission lines and nearby potential sites for interconnection. The Colville Tribes region lies within the Bonneville Power Administration's ("BPA") transmission territory. The BPA's transmission system has integrated a great deal of wind energy in the past few years and, despite curtailment issues, plans to add an additional 10,000MWs of wind its system in the next five years.

The amount of capacity existing on local transmission lines is unknown and is difficult to determine without applying to the BPA for an interconnection request. Given what is known at this point, there could be existing capacity on the line or there might be a great deal of physical and/or contractual congestion. Albeit, many features unique to the Colville site bode both well and ill for the project's transmission capacity potential.

Of the four Colville sites, Omak is closest to both a 115 kV line (Okanogan-Grand Coulee), as well as a 230kV line (East Omak-Chief Joseph), both west of the Omak site. The East Omak-Chief Joseph 230kV high-voltage line terminates at the Omak substation. This is problematic because connecting to a radial feeder introduces reliability risk in the project's interconnection

path in an "N-1" contingency situation, which is a failure threshold characterized by one line becoming overloaded when one element on the system is out of service.

Fortunately, there is an 115kV line running through the East Omak substation (depicted in purple in the above diagram), so if the high voltage line fails, there may still be capacity to get power onto the system. With normal transmission line design, a single typical 115kV line should be able to support 100-120MW without thermally overloading. There are multiple 115kV+ transmission lines in the vicinity. Any project formally proposed on the Colville Tribe's land will be sized to integrate into the existing transmission system with minimal required upgrades. At present, the project proponents are considering a 200MW project.

The Grand Coulee dam is a 7GW generator as shown in Appendix D. It appears that this network is designed to carry power from Grand Coulee throughout the Pacific Northwest, and it is likely that power currently flows north on the lines near Colville. A determination of the project's congestion on the surrounding lines will be made during the interconnection and transmission study processes, but since the wind generation patterns are not identical to the hydro generation patterns, it is possible that some net leveling of generation will occur.

In order to assess the project's transmission potentiality further, an interconnection request will need to be made to the Bonneville Power Administration. Upon the determination of meteorological feasibility, entering the interconnection queue would be the next advisable step in the development process.

Section 3. Meteorological Assessment

There are three 60 meter meteorological towers in the Colville Tribes area: one in Bridgeport, one in Cody, and one in Keller. The Omak site never received a tower, though an unsuccessful attempt was made in Fall of 2009. The combination of difficult weather and geographic challenges of Omak Mountain prevented the meteorological tower team from a successful installation.

There is a 60 meter meteorological tower at Bridgeport (an area in Southwestern Colville Tribes Reservation, displaying low elevation, agricultural landscape, and easy constructability), one at Keller (an area in Southeastern Colville Tribes Reservation, with a North-South oriented tree-covered ridgeline) and one at Cody (an area in Northeastern Colville Tribes Reservation, with a North-South tree-covered ridgeline).

The Bridgeport and Keller areas had a full year of data as of the last meteorological report, which is adequate to determine that the wind assessment is reasonably accurate. The estimated long-term hub-height winds at those two sites are weak and non-competitive statewide at 4.9 meters

per second and 5.7 meters per second, respectively. One potential upside at Bridgeport, despite the very low winds, is the tendency for higher winds in summer and the likelihood of higher winds if the met tower is shifted to the southeastern edge of the mesa-like geographic feature. The winds at the mesa-edge could be as much as 5.5-6.0 meters per second compared with the current 4.9 meters per second, a wind resource proving more interesting, though unlikely proving more feasible, developmentally.

The Cody site experienced significant tower downtime (due to icing) so its wind speed estimate is preliminary. It is the highest wind speed estimate of the three sites with meteorological towers at 6.5 m/s. This met tower is likely to average between 6.5 – 7.1 meters per second once the data is fully captured; the entire turbine array on average is likely to fall within that range as well. A second met tower would be very helpful in assuring more sophisticated data for the Cody area. If significant tree clearing were employed at the Cody site, the turbines would have improved exposure and a greater net capacity factor.

Regarding the Omak site, although the site lacks a met tower, prevailing winds are expected to be from the southwest across a generic project area covering the Omak Mountain region. Omak Mountain itself has nearly the highest elevation in the potential project area at more than 5700ft. Omak's tentative 200MW array (see Appendix E) spans east and west across Omak Mountain. The eastern 100MW of that array is better exposed and should experience higher winds.

The better exposed eastern portion of the 200MW array (Omak Mountain eastward) is expected to have long-term average 80 meter hub height winds averaging near 7 meters per second (6.5-7.5 meters per second). The western portion is expected to have winds of 6.0-6.5 meters per second. Thus the eastern portion of the array could be competitive with other prospected medium wind sites in Washington State.

When modeling Clipper turbines with the wind data received from the three meteorological towers, the Clipper Liberty C-99 turbine produced insufficient net capacity factors for Bridgeport, Cody and Keller. Keller and Bridgeport (meteorological towers 4720 and 4721, respectively) performed well below industry standard, at 17.7% NCF and 14.2% NCF. Neither project would be a feasible wind energy project due to these low winds.

The Cody site has a slightly greater chance than Bridgeport and Keller of performing close to industry standard when modeled with the Clipper Liberty Advanced Composite Blade design ("ACB") with a 104 meter rotor diameter, as demonstrated in the table below. This design is not being released to public at this time, as more engineering studies and tests on a prototype turbine are necessary to determine the machine's feasibility. Better wind data capture is also expected to

improve the NCF at the Cody site. See Appendix F for the meteorological feasibility report for the three sites.

Tower	Tower Height (m)	Mean Speed at Tower Top (mps)	Turbine Type	Hub Height (m)	Mean Speed at Hub Height (mps)	Gross Capacity Factor (%)	Year 1 Net Capacity Factor (%)	Year 2+ Net Capacity Factor (%)
4720	60	5.4	C-99	80	5.7	20.3	16.7	17.7
4721	60	4.7	C-99	80	4.9	16.2	13.3	14.2
4722	60	6.5	C-99	80	6.8	28.9	23.8	25.3
4722	60	6.5	ACB-104	80	6.8	32.2	26.4	28.0

Section 4. Construction Feasibility Assessment

4.1 Construction Feasibility Assessment Summary

The four project sites' level of construction difficulty corresponds inversely to the challenges of their respective wind regimes. Bridgeport is the most construction friendly site of all, displaying relatively flat lands upon which to erect turbines, trench underground collection lines, and lay access roads. The most difficult component of Bridgeport construction is the route the turbine delivery trucks will need to traverse in accessing the site, which poses challenging bridges and sharp turns. However, this transportation route is not particular to only the Bridgeport project and would, ultimately, pose a challenge to any of the four Colville sites. A transportation survey will be necessary for all the projects before moving forward with any additional expenditure.

The Keller area will have above average capital costs for civil and foundation installation, as well as additional transportation costs for pull-assist vehicles necessary to get turbine components up and into the mountain turbine pads.

The Omak Project and the Cody Project will require a large capital expenditure for civil work, including foundation installation, collection system installation, and transmission line construction necessary to intertie to the local electrical infrastructure. An additional cost will be pull-assist vehicles, necessary to get turbine components up and onto the mountain turbine pads.

The Cody and Omak Projects will require a large laydown yard for off-loading components needing reloading onto and transportation by special off road haul vehicles. This area will need to be constructed and maintained during the delivery phase of the project. This area will optimally be located close to the project, either via build out from the hill side or at the start of the access point to the project site.

Although taller towers and larger rotors will help both Cody and Omak with the overall increase in NCF, they will also add to the civil and foundation construction cost of the project, due to both the increase in weight and length.

4.2 Omak

The Omak Project area was visited on Tuesday, June 2nd, 2010 by Fred Foster, Clipper's Construction Manager and Matt Kumpunen, Clipper's Meteorologist. They were accompanied by Ernie Clark from the Colville Tribes. They traveled to Omak Mountain Top, citing a geological soil makeup of solely rock, composed of Alaskite and Goethite granite. A few towers and communication equipment are sited on the mountain.

The main access road to the mountain top was in fair condition at the base of the mountain and during the initial escalation; the road decreased in accessibility closer to the ridge. Upon ascending the mountain, travel by vehicle became impossible. The last mile of the road was traversed on foot due to road conditions, fallen trees, and snow. An alternative road leads east down the mountain, ascending up onto another lower ridge line. Work on one to both of these roads will be required; the likelihood of the roads needing improvement from the point of splitting from the highway on is very high.

The main access road ascends the mountain for approximately 12 to 13 miles to an area Clipper had previously sited for a meteorological tower and the Colville Tribes had obtained a permit for the erection of a meteorological tower. The meteorological tower would sit on a narrow area of the ridge line, located next to the road and the beginning of an ascending mountain switchback. Due to the narrow ridge line, if installed, the meteorological tower's guy wires would likely need to be located across the road, although the final decision of best practices will be made by the installation contractor. Furthermore, the roads will likely need widening in order to provide access to traffic necessary to service the towers.

The construction assessment team was unable to access most of the site due to lack of accessibility on the date of the site visit, though it appeared that most of the ridge line was wide enough to allow for turbine installation. However, due to treacherous terrain of narrow mountain tops and steep climbs, some of Omak's current array of 200MW may not be economically feasible for construction. Two potential options for offsetting the turbines that cannot be sited in the current array are to: 1) develop a project with less than 80 turbines or 2) construct the displaced turbines at lower elevations. In the future, if the Clipper Liberty 2.5MW turbine allows for single blade installation, there may be greater potential to meet the current array design and thus maximize the NCF. The limited area to assemble the rotor along the ridgelines probably will not allow for the rotor to be assembled on the ground and raised in a single lift.

The Omak site is covered in rock ranging from four inches to very large boulders that protrude from the ground. The rock form appears to be granite within a very thin layer of top soil. There is a low likelihood for reusing the excavated subsoil to compose around the foundation base. Due to lack of soil, the fill may require the use engineered materials, which will add to the already high construction cost of the roads. The cut and fill process of creating the roads will include creating extremely wide switch backs to access the higher elevations. The foundation costs will be increased due to the amount of rock that will have to be removed, likely requiring blasting. Additionally, the project will require a 34.5kV collection system, which will consist of both underground and overhead lines, due to the project's rock and steep terrains.

Ascent up the mountain presents a 6% grade in most areas and an 8%-10% grade in some areas, which will lead to very high construction costs. The switchbacks up the mountain will also make access very difficult for the delivery trucks. Each oversized and overweight load will have to be pulled up the mountain from a very low elevation requiring many of the trucks to remain onsite for up to 8 to 10 hour durations at a time.

Omak has a tremendous amount of rock to deal with during the civil work, including the foundation installation and collection system installation. Trees in the area will need to be felled. Some areas appear to hold between 260 and 500 trees per acre, consisting of mostly Spruce and Ponderosa Pine, which range in size from six inches in diameter to twenty-four inches across.

Average road construction costs in the area approximate to $47.00 per foot, not including timbering. A safe estimate for road construction on Omak Mountain to allow for turbine delivery would average between $85.00 per foot in the lower elevations to $140.00 per foot in the higher elevations and between ridge lines. Each Wind Turbine Generator pad will cost approximately $15,000 to $20,000, not including the disposal of unearthed rock and sediment.

Foundation costs will be greatly increased due to both excavating through the granite in the area, which most likely will require blasting, as well as hauling in engineered fill material to compact the foundations due to the thin layer of top soil.

The access roads will be built and maintained to support axle weights of 30,000 pounds with adequate cutback of vegetation around the corners (25 feet) for tail swing and passing/turn around points. Road width should be 25 feet with no more than 1 foot of crown per 100 feet of length. Schnabel and blade trucks will require 75 feet of interior corner clearance if negotiating a 90 degree turn. Cornering requirements will need to meet a Grid Square area 25 feet by 25 feet, with turning radii of 135 to 150 feet. Transportation providers need switch backs hosting 25 feet wide roads with no less than 150 foot radii. To allow for adequate turning, these turns must not

have a rise or drop in elevation greater 4%. Any greater grade could require additional pull support vehicles. This roadway will also require a side to side slope of less than 2%. The lift crane will need to use the same roads to travel between the turbine pads; the width of which will have to be at least 38 feet wide to support their movement. Each turn and switch back will have to be engineered individually.

In conclusion, the Omak Project will require a very strong wind regime to achieve economic feasibility, due to the large capital cost for civil work, including foundation installation, collection system installation, and transmission line component of the electrical infrastructure. An additional cost will be transportation costs for pull assist vehicles to get the product up and onto the mountain turbine pads.

Although taller towers and larger rotors will help with the overall increase in NCF, they will also add to the civil and foundation construction cost of the project, due to both the increase in weight and length.

4.3 Cody

The Cody site is located atop mountains in the southeastern portion of the Colville Confederation land. The Cody site is densely covered with trees of the spruce and pine families. The area was cleared of trees around the meteorological tower to allow for its construction; the remaining trees in the meteorological tower's vicinity are less than 40 feet tall and are very thin; they should not have a significant impact on the tower readings.

The Cody site has several roads off of the main road, though assessment of the site during the site visit using these access roads was deterred by trees that had fallen across the road. Despite efforts to clear the roads, access up the mountain was deterred by more fallen trees obstructing the roadway on the date of the site visit.

The site appears to have less rock out cropping than Omak, though construction impediment due to rock will still be an issue. In addition, the site hosts a very thin layer of top soil, effectively eliminating the reuse of excavated subsoil for compacting around the foundation base. The lack of top soil will require the use of engineered materials. The roads will come at high construction costs, as current switch backs will need to be widened. Additionally, foundation costs will increase due to rock blasting necessary to lay foundations.

Transportation cost will be above average due to 6% to 10% grades during the mountain ascent. In addition, delivery trucks will have to negotiate sharp turns. Each oversized load will have to be pulled up the mountain; most all trucks will be required onsite for up to 8 to 10 hour durations at a time.

The steep terrain will add to the cost of the civil infrastructure and foundation installation. The collection system will require both underground and overhead collection lines. Transmission line installation will require large structures to support the lines' span across valleys to other ridges within the project area.

Average road construction costs in the area approximates to $47.00 per foot, not including timbering. Road construction in these mountains to allow for our turbine delivery would cost between $85.00 per foot in the lower elevations to $140.00 per foot in the higher elevations and between ridge lines of the project area. Each wind turbine generator pad will cost approximately $15,000 to $20,000 per pad. This estimate does not include haul off of over-burden or construction of wide switchbacks along the mountains edges.

Foundation costs will be greatly increased due to both excavating through the granite in the area, which most likely will require blasting, as well as hauling in engineering fill material to compact the foundations due to the thin layer of top soil.

The access roads will be built and maintained to support axle weights of 30,000 pounds with adequate cutback of vegetation around the corners (25 feet) for tail swing and passing/turn around points. Road width should be 25 feet with no more than 1 foot of crown per 100 feet of length. Schnabel and blade trucks will require 75 feet of interior corner clearance if negotiating a 90 degree turn. Cornering requirements will need to meet a Grid Square area 25 feet by 25 feet, with turning radii of 135 to 150 feet. This will require a great deal of effort and cost along the switch backs in these mountains. Switch backs will have to be engineered to allow for deliveries.

4.4 Keller

When visiting the Keller site, the construction assessment team traversed ten miles of BIA Route 63, a fair but narrow road to a point atop Keller Butte. BIA Route 63 is cut along the mountain sides and ridge tops. Along the mountain side the road base is approximately ten feet wide; the slope of the hill ranges from 45% to 65% grade. This road would be the main access road to the site, with other feeder roads branching off, providing access to the ridges where most of the turbines will be located. A great deal of cut and fill will be required to make BIA Route 63 traversable for turbine components. Approximately 85% of this road runs along the side of the mountain.

Keller is more construction-friendly than Omak due to the terrain's more forgiving wider ridge lines. In addition to having less rock, Keller has more timber, consisting of mainly Spruce and Ponderosa pine. The site's geologic composition consists of a sandy soil base for constructing roads. What rock is present consists of Alaskite and Geothite granite. Moving south from that point forward the constructability becomes more difficult and costly.

Average road construction costs in the area approximate to $47.00 per foot, not including timbering. Road construction in these mountains to allow for our turbine delivery would cost between $85.00 per foot in the lower elevations to $100.00 per foot in the higher elevations and between ridge lines of the project area. Each wind turbine generator pad will cost approximately $15,000 to $20,000 per pad. This estimate does not include haul off of over-burden or construction.

Foundation cost will be above average due to excavating granite in the area, which most likely will require blasting, as well as hauling in engineered fill material to compact the foundations due to the thin layer of top soil.

The access roads will be built and maintained to support axle weights of 30,000 pounds with adequate cutback of vegetation around the corners (25 feet) for tail swing and passing/turn around points. Road width should be 25 feet with no more than 1 foot of crown per 100 feet of length. Schnabel and blade trucks will require 75 feet of interior corner clearance if negotiating a 90 degree turn. Cornering requirements will need to meet a Grid Square of 25 feet by 25 feet, with turning radii of 135 feet to 150 feet. This will require a great deal of effort and cost along the switch backs in these mountains.

4.5 Bridgeport

Bridgeport is a construction-friendly site. Located atop mountains running east and south east of the city of Brewster, the project site sits upon open meadows along the ridge lines overlooking Lake Brewster. The ground conditions within the project consist of fairly flat areas; ideal for constructing access roads made by driving a road grader maintainer over them.

Three (3) issues to deal with in the construction of Bridgeport are:

1. Delivering turbine components up the mountain, a process made difficult by switch backs as they exist on site at present;
2. Large out cropping of rock boulders, signifying underground boulders which will complicate constructing foundations and collection systems; and
3. Delivering turbine components to the site via a route across local bridges and curves along the highway.

Section 5. Economic Assessment

A preliminary economic assessment was conducted solely for the Omak site and not the Cody, Bridgeport, or Keller sites, given a consensus arrived at by Clipper's meteorologists,

construction assessment team, project developers, and executive management that the other sites are not feasible from a wind regime perspective. The Cody site may prove to be economically feasible in the future once sufficient wind data has been collected.

Although a minimum of an additional year of anemometer readings for Omak are necessary to determine with accuracy the area's net capacity factor (NCF), the assumption of a 28% NCF was the base assumption used to arrive at the Power Purchase Price detailed below.

Assuming the Production Tax Credit[3] is still in full force at the time of commercial operation, a 199.2 MW project size, an all-inclusive construction estimate of approximately $142,000,000, turbine costs between $2.8 million and $3 million per turbine, a 9-mile 230kV intertie line to connect the project to East Omak substation, a December 2013 commercial operation date, and other less volatile assumptions show a Power Purchase rate of $100.00-$105.00 per megawatt hour generated. This estimate does not include the costs of any potential upgrades needed at the point of interconnection to the grid, nor does it include other project specific operation costs that may arise in a co-development agreement.

This power price is slightly out of market; the current rate for energy coming out of the Washington area is estimated to be $75.00-$85.00. That said, an adequate wind resource reading is necessary to determine the project's actual economic feasibility.

Section 6. Conclusion and Recommendations

The information that Clipper has gathered presents a definitive picture of which of the four sites are not developable and which remain feasible. It is of no benefit to survey the Bridgeport and Keller sites further for development potential, but development at the Omak and Cody sites is warranted in order to determine whether one or both of these sites will produce an NCF high enough to support the construction costs anticipated.

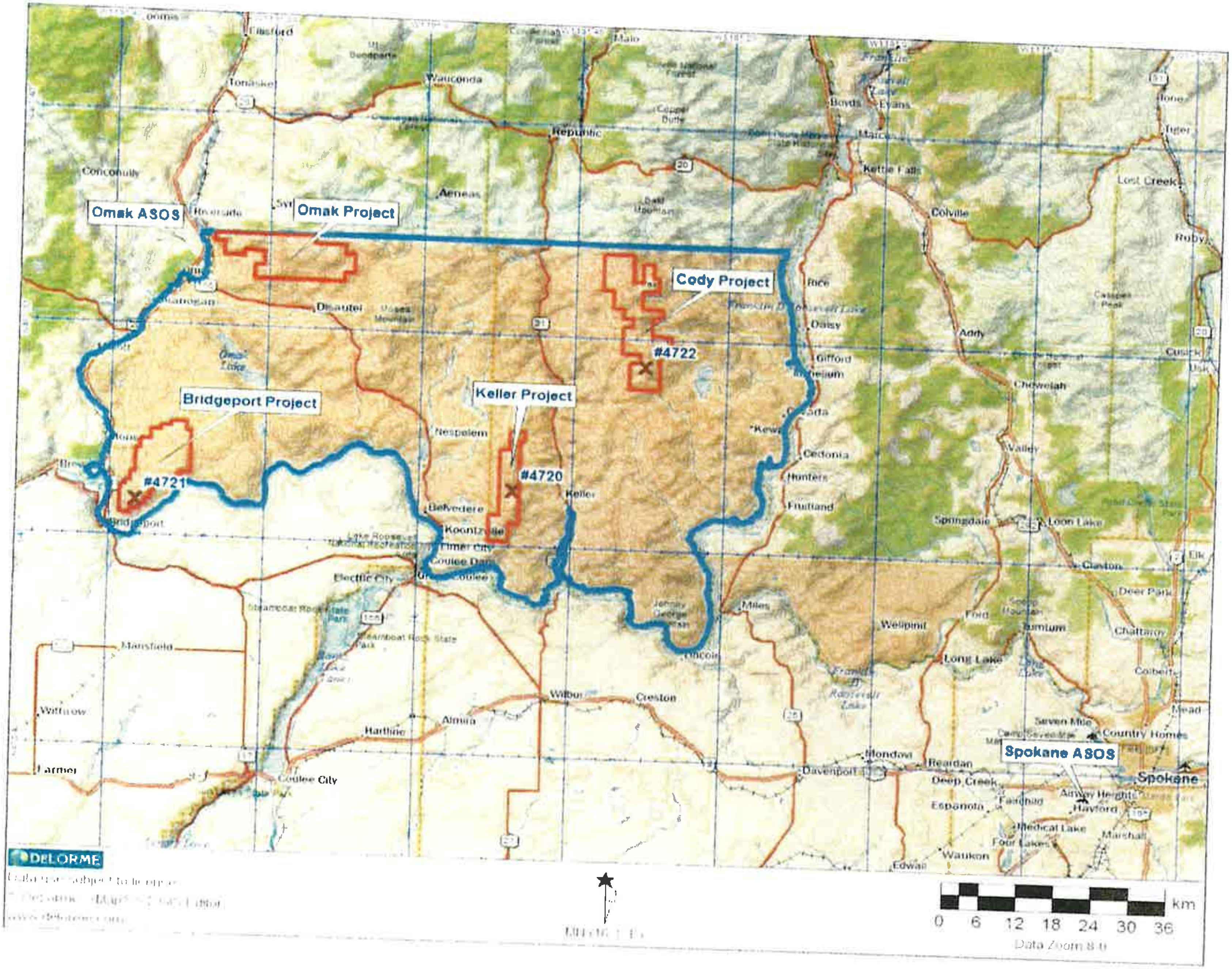
Therefore, it is the recommendation of Clipper that the Colville Tribes and Clipper negotiate and execute a joint venture agreement, wherein each party defines it responsibilities and rights in the development of the Omak and Cody wind farms, contingent upon attractive wind analyses. In the interim, it is recommended Clipper and Colville Tribes use the next twelve (12) months of the Memorandum of Understanding, set to expire on June 2, 2011, for the parties to negotiate the

[3] The Production Tax Credit (also known by the acronym "PTC") is a $.021 per kilowatt-hour tax credit administered by the U. S. Internal Revenue Service for electricity generated by qualified energy resources and sold by the taxpayer to an unrelated person during the taxable year. The most recent legislation, H.R. 1 (Div. B, Section 1101 & 1102), extended the in-service deadline by three years to 2012. A renewal of the Production Tax Credit would have to occur in order for the Omak project to partake in its benefits.

terms of a joint venture agreement. Research into the availability of sources of public funding is advisable to offset the anticipated development costs.

During the remainder of time under the Memorandum of Understanding, Clipper hopes to relocate one to two meteorological towers to the Omak site to begin collecting wind data. Once a sufficient amount of data is collected and a hopeful determination is made, Clipper and Colville Tribes should jointly take the next steps in the development process.

Appendix A: Site Map



Omak ASOS
Omak Project
Cody Project
#4722
Keller Project
#4720
Bridgeport Project
#4721
Spokane ASOS
Conconully
Riverside
Tonasket
Wauconda
Republic
Aeneas
Disautel
Nespelem
Belvedere
Koontzville
Elmer City
Coulee Dam
Electric City
Keller
Rice
Daisy
Gifford
Cedonia
Hunters
Fruitland
Colville
Kettle Falls
Boyds
Evans
Marcus
Addy
Chewelah
Valley
Springdale
Loon Lake
Clayton
Deer Park
Chattaroy
Colbert
Mead
Lost Creek
Ruby
Cusick
Usk
Ione
Tiger
Elk
Miles
Wellpinit
Ford
Tumtum
Long Lake
Lincoln
Creston
Wilbur
Almira
Hartline
Coulee City
Mansfield
Withrow
Farmer
Mondovi
Davenport
Reardan
Deep Creek
Espanola
Fairchild
Airway Heights
Hayford
Medical Lake
Four Lakes
Marshall
Waukon
Edwall
Seven Mile
Country Homes
Spokane
Malo
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Bridgeport
DELORME
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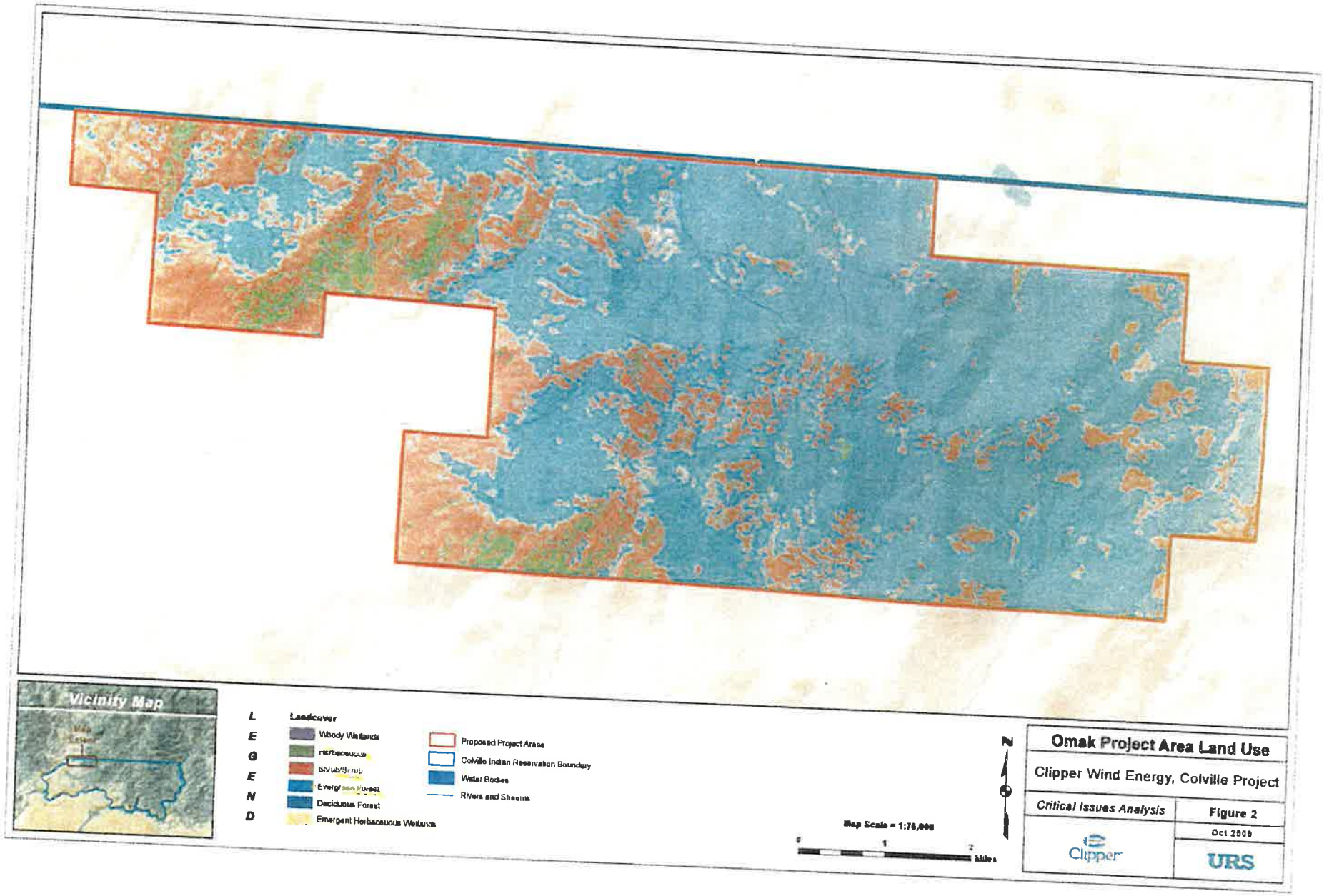
Appendix B: Land Cover


Vicinity Map
LEGEND
Landcover
Woody Wetlands
Herbaceous
Shrub/Scrub
Evergreen Forest
Deciduous Forest
Emergent Herbaceous Wetlands
Proposed Project Areas
Colville Indian Reservation Boundary
Water Bodies
Rivers and Streams
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Map Scale = 1:75,000
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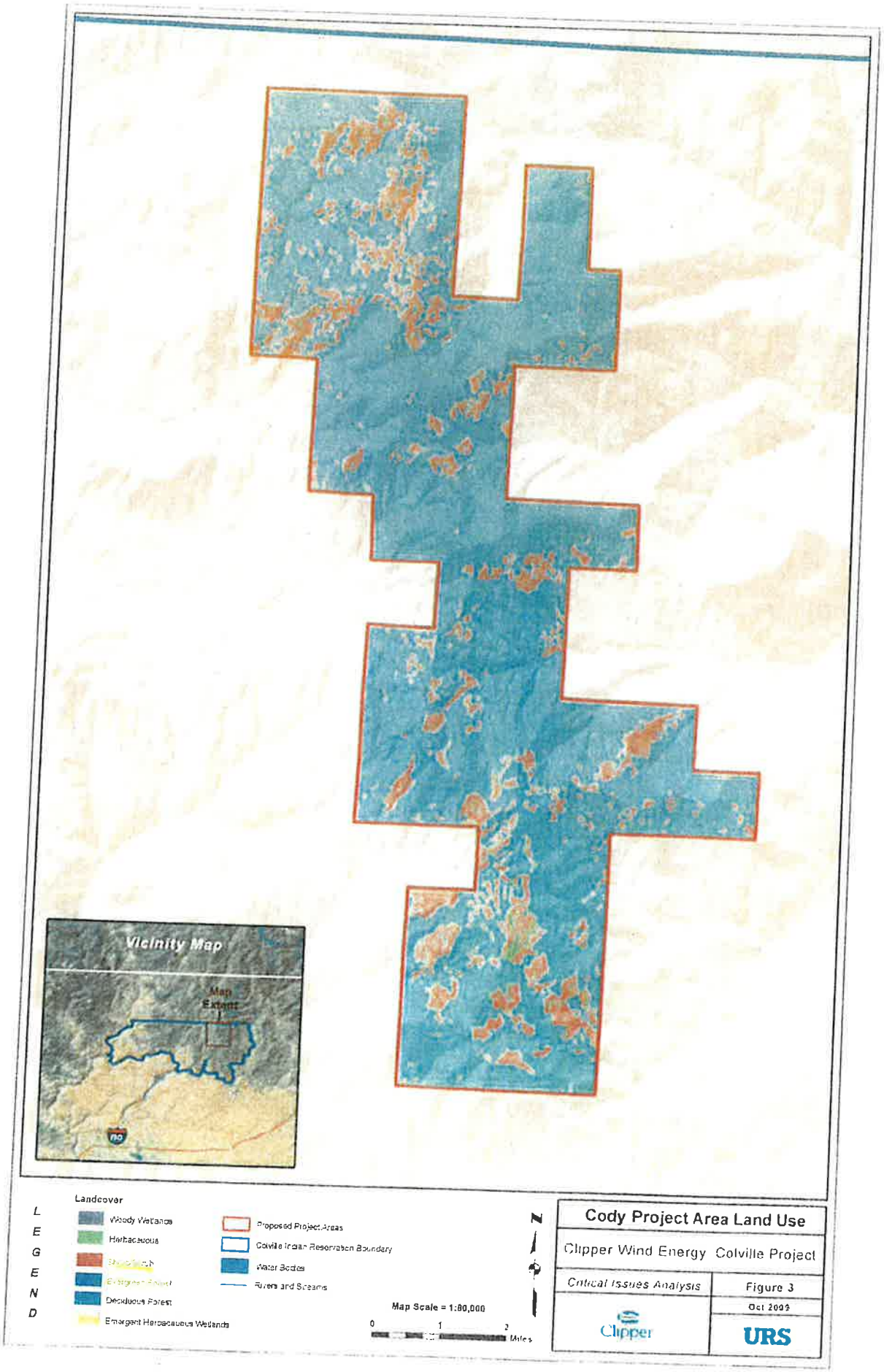
Miles
Omak Project Area Land Use
Clipper Wind Energy, Colville Project
Critical Issues Analysis
Figure 2
Oct 2009
Clipper
URS


Vicinity Map
Map Extent
LEGEND
Landcover
Woody Wetlands
Herbaceous
Deciduous Forest
Emergent Herbaceous Wetlands
Proposed Project Areas
Colville Indian Reservation Boundary
Water Bodies
Rivers and Streams
Map Scale = 1:80,000
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Cody Project Area Land Use
Clipper Wind Energy Colville Project
Critical Issues Analysis
Figure 3
Oct 2008
Clipper
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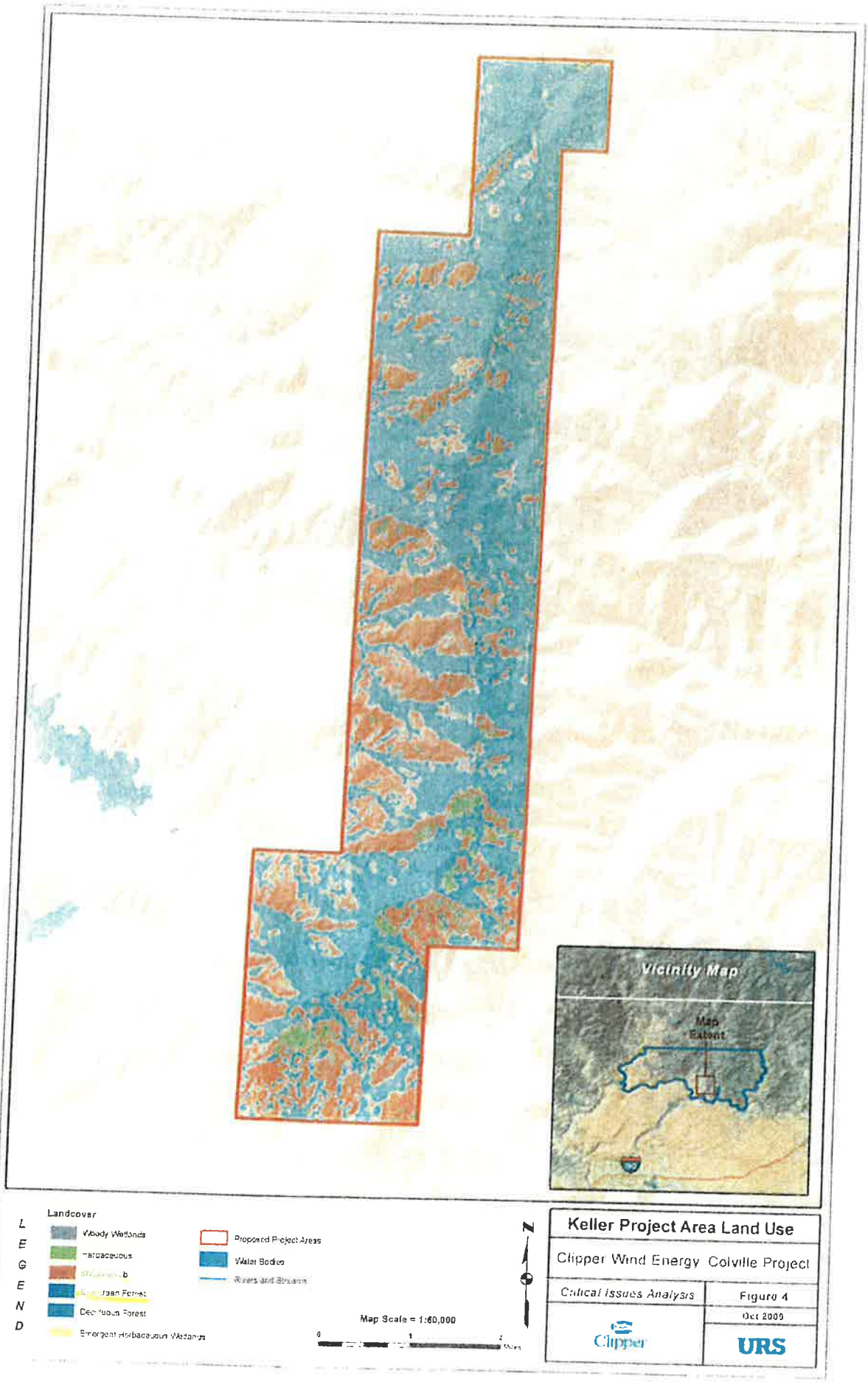
Vicinity Map
Map Extent
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Landcover
Woody Wetlands
Herbaceous
Deciduous Forest
Emergent Herbaceous Wetlands
Proposed Project Areas
Water Bodies
Rivers and Streams
Map Scale = 1:60,000
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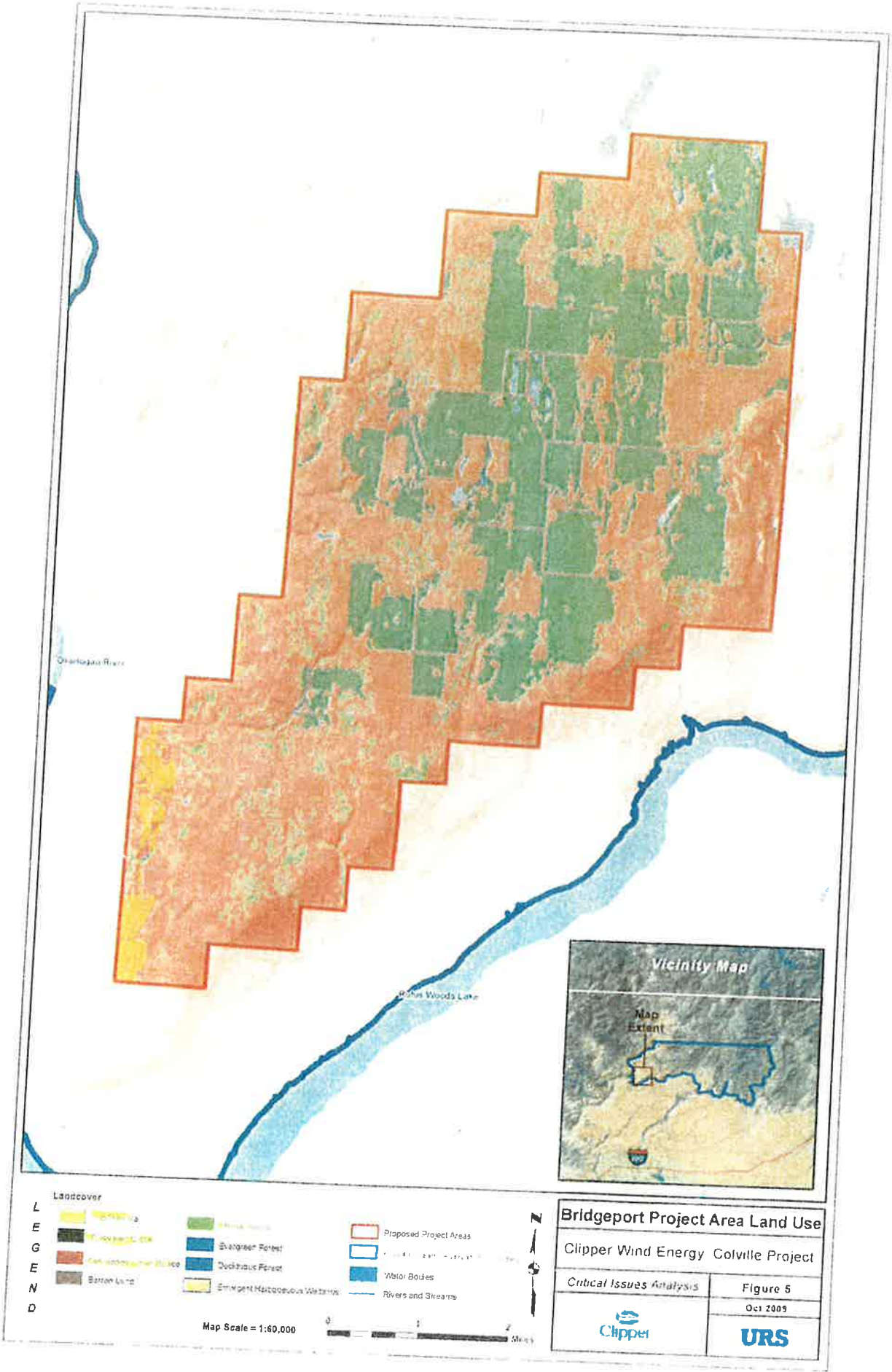
Keller Project Area Land Use
Clipper Wind Energy Colville Project
Critical Issues Analysis
Figure 4
Oct 2009
Clipper
URS


Vicinity Map
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Evergreen Forest
Deciduous Forest
Emergent Herbaceous Wetlands
Water Bodies
Rivers and Streams
Proposed Project Areas
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Bridgeport Project Area Land Use
Clipper Wind Energy Colville Project
Critical Issues Analysis
Figure 5
Oct 2009
Clipper
URS

Appendix C: Permitting and Regulatory Requirements

Table 1. Permits that May Be Required for the Clipper Colville Project, Washington.

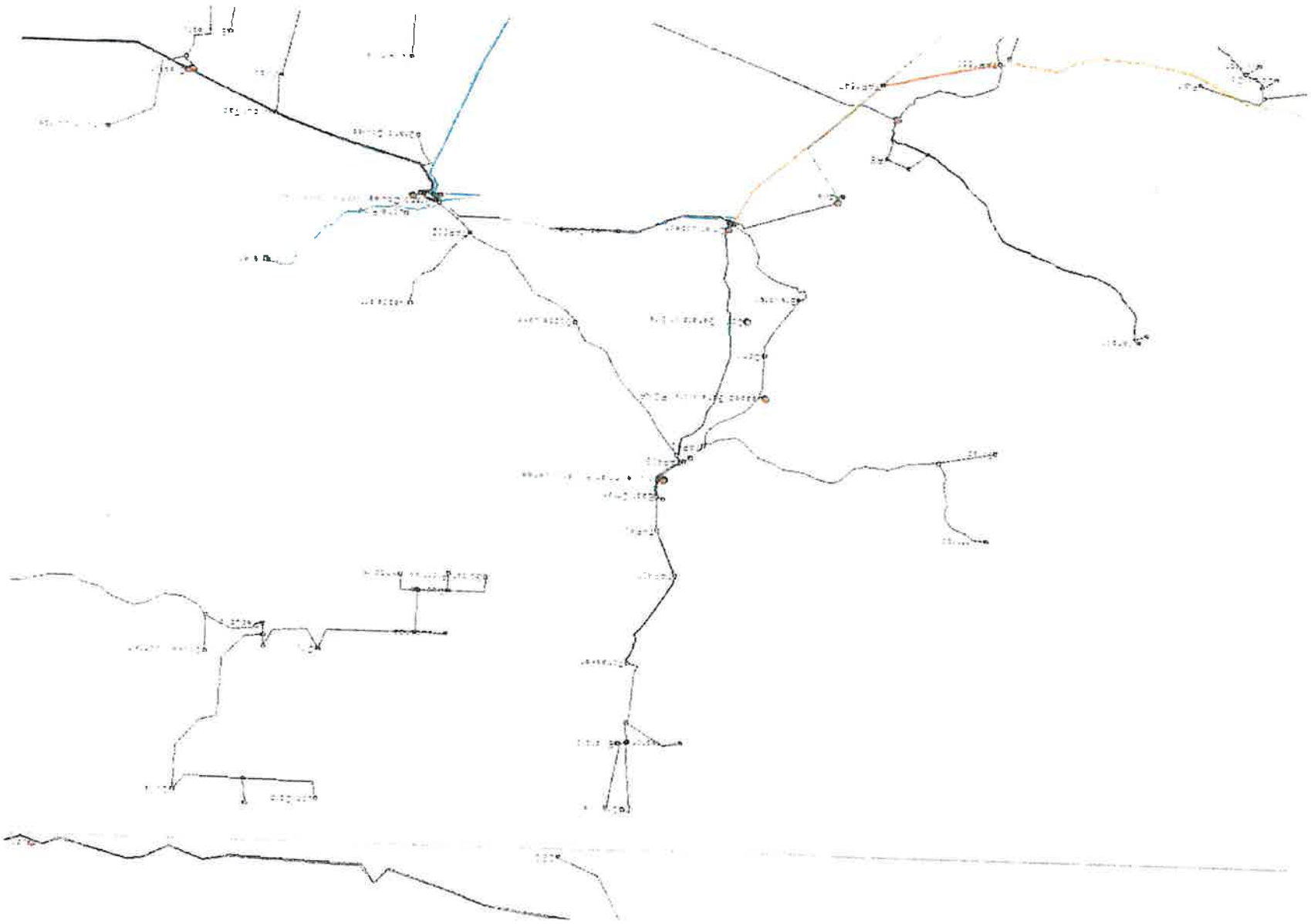
Agency/Regulation/ Permit(s)	Purpose	Applicable Project Component	Regulations	Processing Time	Potential Issues
Federal					
National Environmental Policy Act (NEPA)	The purpose of NEPA is to establish a process for analyzing project impacts to Federal lands, or to analyze impacts from projects receiving Federal funding. The process also helps with the coordination between agencies and identifies a Lead Federal Agency in charge of drafting an Environmental Impact Statement (EIS).	If project has a Federal nexus (occurs on public land, is Federally funded, or affects waters of the United States (U.S.) an Environmental Assessment (EA) or EIS would need to be prepared addressing natural resource conditions, impacts, and mitigation. It is likely that BIA would require an amendment to the Colville Indian Reservation Record of Decision and Plan for Integrated Resources Management 2000-2014	NEPA, Migratory Bird Treaty Act, the Bald and Golden Eagle Protection Act, the ESA, including designated Critical Habitat, the Clean Water Act, and the Clean Air Act.	Depends on complexity of and public focus on project (possibly 2 to 5 years).	Special Status Species, Cultural Resources, Visual Resources
U.S. Forest Service (USFS) Special Use Permit (right-of-way)	Authorizes placements of linear features (e.g., transmission line, pipeline, access road) on Forest Service-administered public lands.	If transmission line utilities and/or access roads are necessary on Forest Service Lands, outside of Colville Indian Reservation.	Federal Land Policy and Management Act	30 Days	Requires NEPA Analysis
Federal Aviation Administration Notification of Proposed Construction	Authorizes the construction of structures taller than 200 feet that may affect navigable air space.	Facility structures, turbines and cranes during construction.	14 Code of Federal Regulations (CFR) Part 77 and Advisory Circular 70/7460-2J	60 Days	Aeronautical study required.
U.S. Army Corps of Engineers (USACE) Clean Water Act Section 404 Individual Permit; Section 10 (Rivers and Harbors Act)	Authorizes placement of fill or dredged material in waters of the U.S., including adjacent wetlands.	All surface-disturbing activities affecting waters of the U.S., including wetlands, such as the dam, reservoir, diversion structure, roads and pipeline crossings. Alternatives analysis; wetland delineation study; wetland functional assessment and impact analysis; mitigation plan; and joint permit with Department of State Lands.	Section 404 Permit of the Clean Water Act	60 to 120 days unless a public hearing or EIS is required.	Stream or wetland crossings
U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) Endangered Species Act (Section 7) Compliance, Migratory Bird Treaty Act; Bald and Golden Eagle Protection Act	Protects threatened and endangered species; protects migratory birds; protect Bald and Golden Eagles.	Any activity potentially affecting listed or proposed threatened or endangered species or anadromous fish. All ground disturbing activities affecting migratory birds such as burrowing owls and raptors and Endangered Species Act listed fish species or anadromous fish. Prepare Biological Assessment (and potentially a Biological Evaluation) for the USFS if activities occur on USFS land. Obtain a Biological Opinion and if necessary obtain a take permit.	Endangered Species Act; Migratory Bird Treaty Act; Bald and Golden Eagle Protection Act.	Depends on size and complexity of project and if an EIS is required.	Would be tied into NEPA analysis.
National Historic Preservation Act	The affected Tribes must be consulted when projects are subject to review under Section 106 of the National Historic Preservation Act of 1966. This act requires that all Federal agencies take into account the affect of its actions on historic properties. Requirements of Section 106 review apply to any Federal undertaking, funding, license, or permit.	Any project with the potential for Excavating, altering, defacing, or removing archaeological objects or resources or Native Indian graves, cairns or glyptic records.	National Historic Preservation Act of 1966.		

Table 1. Permits that May Be Required for the Clipper Colville Project, Washington.

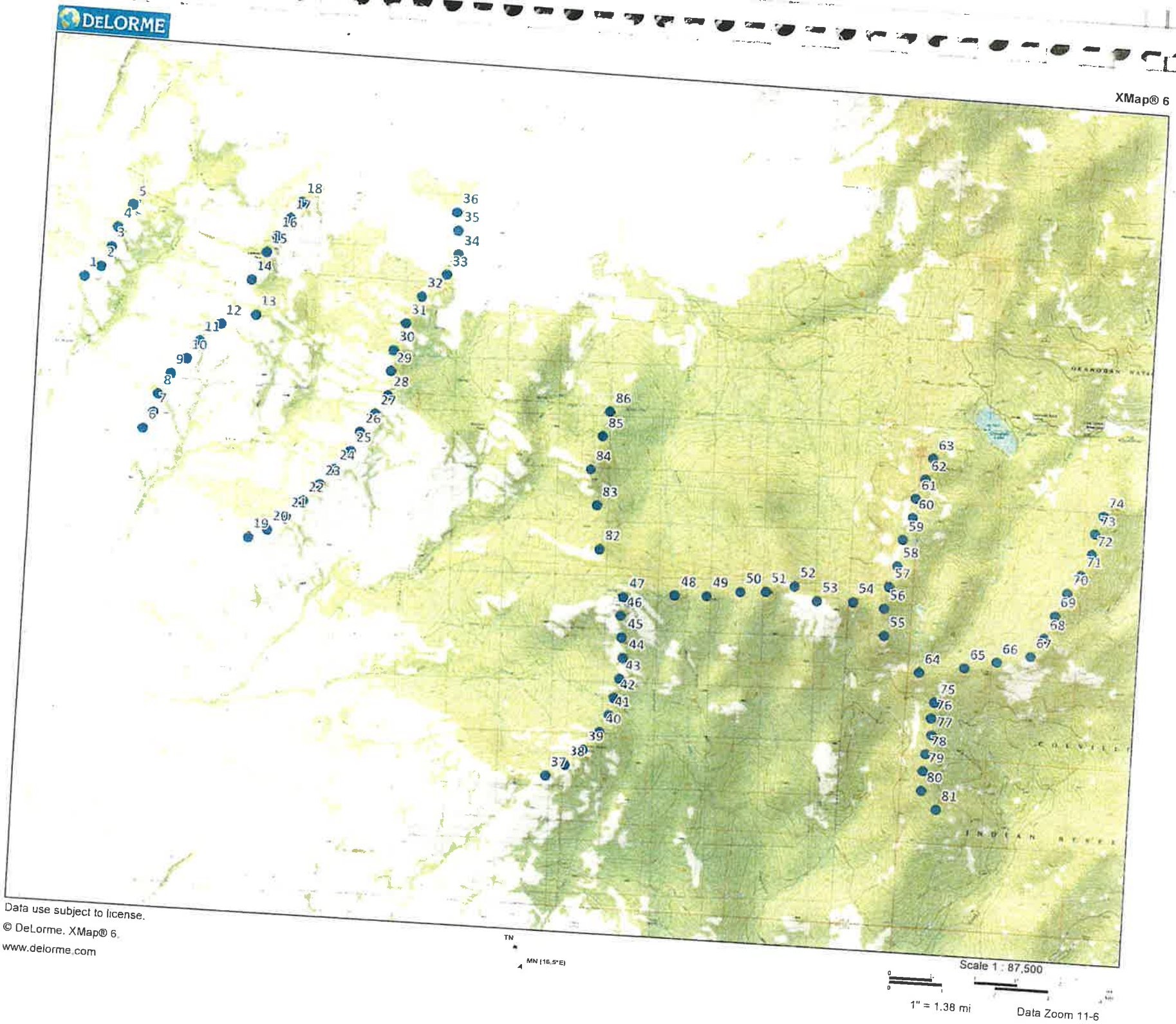
Agency/Regulation/ Permit(s)	Purpose	Applicable Project Component	Regulations	Processing Time	Potential Issues
State of Washington					
Energy Facility Site Evaluation Council (EFSEC)	Provides a "one-stop" siting process for major energy facilities in the State of Washington. EFSEC coordinates all evaluation and licensing steps for siting certain energy facilities in Washington. EFSEC specifies the conditions of construction and operation. If approved, a Site Certification Agreement is issued in lieu of any other individual state or local agency permits. EFSEC also manages an environmental and safety oversight program of facility and site operations.	If the project is solely on Tribal lands then EFSEC would not be applicable since no state or local jurisdictions have permit or regulatory power. If any of the projects go off Tribal lands for transmission etc. EFSEC may be useful for expediting those permits required where the state and local jurisdictions may have control or permitting oversight.	All State Regulations.	Depends on complexity of and public focus on project (possibly 2 to 5 years).	None Identified
Washington Department of Ecology State Environmental Policy Act (SEPA)	Any proposal that requires a state or local agency decision to license, fund, or undertake a project, or the proposed adoption of a policy, plan, or program can trigger environmental review under SEPA.	The Tribes are not obligated to go through the SEPA process. However, if NEPA compliance is completed for the project, it would cover the aspects of SEPA.	Chapter 197-11-704 WAC.	N/A	Special Status Species, Cultural Resources, Visual Resources.
County					
County Building/Planning Offices Building Permits; County Road Access Permit	Zoning and building permitting. Access to county roads.	Each of the Project Areas are on Tribal land and would be permitted by the CCT. If any of the projects go off Tribal lands for transmission, etc. Permits may be required from the counties. CCT and Okanogan County (Cody and Keller Sites) have an intergovernmental agreement, where both have jurisdiction and both can issue permits, however the county generally defers to the Tribes. When and application to Okanogan County is received, it is reviewed by the CCT and when an application to the CCT is received, it is reviewed by the county. This allows the county to review and comment on applications, but does not allow them discretionary authority on Tribal land. For Ferry County (Onak and Bridgeport Sites) if the facilities are built on Tribal property, the appropriate permits would be issued by the CCT.	County Zoning Ordinances Uniform Fire and Building Code		None Identified
Other					

Environmental Groups	**Web Site**
Nature Conservancy	http://nature.org/
Washington Wildlife Federation	http://www.washingtonwildlife.org/
Wilderness Society	http://wilderness.org
Sierra Club	http://www.sierraclub.org
National Audubon Society	http://www audubon.org/

Appendix D: Local Transmission Map



Appendix E: Omak's 200MW Array


DeLORME
XMap® 6
Data use subject to license.
© DeLorme. XMap® 6.
www.delorme.com
TN
MN (16.5°E)
Scale 1 : 87,500
1" = 1.38 mi
Data Zoom 11-6

Appendix F: Meteorological Report

V-BAR

Wind Resource Assessment
Colville Projects, Washington

Submitted to Matthew Kumpunen, David Hazel and Krista Gordor
Clipper Windpower Development Company, Inc.

Prepared by Allen Becker, Matthew Bullard, Greg Poulos, and Richard Simon
V-Bar, LLC, 21 June 2010
Revised 25 June 2010 to include the C-104 turbine and 12x24 for the Cody projec

This report is our updated assessment of three of four planned projects located on the Confederated Tribes of the Colville Reservation northwest of Spokane, Washington.

Tower Info. Detailed documentation about the first three meteorological towers is provided. Each tower, located in a separate study area of the reservation, measures winds at 9.5, 31.5, 50, and 60 meters or north-facing booms. There are redundant south-facing sensors at 31.5 and 60 meters.

Site 4722 collapsed in December 2008 after collecting only about a month of data. It was rebuilt in June 2009. After reinstallation, we noted incorrect logger time stamps, and we have adjusted the data since June 2009 to account for the apparent 126-hour time offset.

Both wind vanes at Site 4720 and the 58-m wind vane at Site 4722 appear to be broken following several icing events during the winter of 2009-2010

Maps. A regional map shows the location of the Colville projects and the Spokane and Omak Airport ASOS stations. Detailed topographic maps show the Omak, Keller, Bridgeport, and Cody projects and their respective meteorological towers and preliminary turbine layouts.

Coords. Preliminary turbine coordinates for each of the four projects are provided.

Ref V. The monthly mean wind speed histories are shown for the Spokane and Omak ASOS stations, two potential long-term reference anemometers chosen for these projects. Both stations measure winds at 10 m and have 12-13 years of history. Spokane is about 70 km southeast of the Colville Reservation; Omak, adjacent to the northwest corner of the Reservation, is about 50 km north of the Bridgeport tower

Spokane and Omak were converted from cup to sonic anemometry in June 2007. Due to different response characteristics of these two types of sensors, one cannot combine their observed data sets for purposes of determining long-term mean annual wind speeds, without adjustment

We believe that the sonic anemometers at Spokane and Omak record wind an average of 4% less than with the cups, based on a major study performed by V-Bar in 2008. We present the observed monthly mean wind speed histories on the left and the sonic-equivalent mean wind speed tables on the right of the "Ref V" tab.

Daily V. The daily mean wind speed histories for Spokane, Omak, and the three Colville sites are presented Daily correlation between the ASOS stations and the Colville sites differ widely. Sites 4720 (Keller) and 4722 (Cody) correlate best with Spokane, while Site 4721 (Bridgeport) correlates best with Omak. It should be noted that none of the reference sites correlate particularly well to the Colville met towers This factor introduces significant uncertainty into the estimation of long-term mean wind speeds

Mo Vbar. Monthly mean wind speeds are presented for the three Colville sites, Spokane, and Omak. Winter icing has affected data recovery at all towers.

Means speeds for Site 4722 in November and December 2008 are highly suspect given that site's margina correlation to off-site reference stations used to derive the full month estimates. They have been ignorec in the long-term calculations. Composite monthly and annual mean wind speed tables for each site are found at the bottom of the tab.

LT Vbar. Long-term mean annual wind speed estimates for Site 4720 and Site 4721 are based on composite mean wind speed ratios to Spokane and Omak, respectively. Site 4722's long-term speeds are based on its composite mean wind speed ratios to Site 4720 and Spokane. Here is the summary of long-term speeds in meters per second, with extrapolations to an 80-m hub height

Level (m)	4720 Keller	4721 Bridgeport	4722 Cody
9.5	4.12	3.76	4.18
31.5	5.00	4.37	5.91
50	5.38	4.60	6.20
60	5.44	4.71	6.49
80	5.68	4.88	6.76

The 80-m speed for Site 4720 is virtually unchanged from, that of Site 4721 is 0.5% higher, and that of Site 472 is 1.4% higher than our previous report. These long-term estimates are uncertain due to the generally low correlations to the reference stations.

En Sims. We compiled on-site data from each of the three projects into wind speed frequency distributions These distribution were scaled to integer annual mean wind speeds of 4-8 mps (bracketing the wind resource and normalized to a single, 8760 hour year. We used the Clipper C-99 and C-104 power curves at an air density of 1.09 kg/m³ for Keller, 1.14 kg/m³ for Bridgeport, and 1.05 kg/m³ for Cody to simulate gross annual energy potential. Here are the resulting gross annual capacity factors in percent as a function of annual mean wind speed

Tower	Turbine	4 mps	5 mps	6 mps	7 mps	8 mps
4720	C-99	7.74	14.76	22.88	30.97	38.75
4721	C-99	9.39	17.10	25.55	33.69	40.94
4722	C-99	6.29	12.98	21.73	31.24	40.56
4720	C-104	8.97	16.69	25.36	33.83	41.83
4721	C-104	10.78	19.15	28.05	36.40	43.62
4722	C-104	7.42	15.04	24.65	34.68	44.12

Losses. Preliminary loss factors to convert the gross projection to a net projection are summarized below. The values are preliminary and are intended as placeholders until array-specific values are calculated. The capacity factor values used below are based on the meteorological towers in lieu of an array aggregate:

For the C-99:

	Keller		Bridgeport		Cody	
	Year 1	Year 2+	Year 1	Year 2+	Year 1	Year 2+
Gross Capacity Factor (%)	20.29	20.29	16.18	16.18	28.93	28.93
Efficiency	0.823	0.874	0.823	0.874	0.823	0.874
Loss deduction (%)	17.69	12.56	17.69	12.56	17.69	12.56
Net Capacity Factor (%)	16.70	17.74	13.32	14.15	23.81	25.29

For the C-104:

	Keller		Bridgeport		Cody	
	Year 1	Year 2+	Year 1	Year 2+	Year 1	Year 2+
Gross Capacity Factor (%)	22.59	22.59	18.15	18.15	32.24	32.24
Efficiency	0.818	0.869	0.818	0.869	0.818	0.869
Loss deduction (%)	18.20	13.09	18.20	13.09	18.20	13.09
Net Capacity Factor (%)	18.48	19.64	14.85	15.78	26.37	28.02

The long-term mean annual wind speeds are summarized below along with the corresponding gross and ne capacity factors:

Tower	Tower Height (m)	Mean Speed at Tower Top (mps)	Turbine Type	Hub Height (m)	Mean Speed at Hub Height (mps)	Gross Capacity Factor (%)	Year 1 Net Capacity Factor (%)	Year 2+ Net Capacity Factor (%)
4720	60	5.44	C-99	80	5.68	20.29	16.70	17.74
4721	60	4.71	C-99	80	4.88	16.18	13.32	14.15
4722	60	6.49	C-99	80	6.76	28.93	23.81	25.29
4720	60	5.44	C-104	80	5.68	22.59	18.48	19.64
4721	60	4.71	C-104	80	4.88	18.15	14.85	15.78
4722	60	6.49	C-104	80	6.76	32.24	26.37	28.02

Rose. Wind power roses for the three projects show the widely differing wind regimes across the Colville reservation. At the Keller site, winds from the southwest dominate, with a smaller component from the east. At the Bridgeport site, northwest through north winds dominate. At Cody, southwest through west winds dominate with smaller components from the northwest and east.

Off-Axis. Off-axis wake losses between adjacent turbines in a row as a function of their azimuth orientation and spacing are summarized.

Max V. Maximum hourly mean wind speeds and peak gusts by month for each site on the Colville Reservation are summarized. So far, the maximum hourly mean wind speed was 23.1 mps and the peak gust was 32 mps

TI. Turbulence intensity statistics for the 60-m levels of Sites 4720, 4721, and 4722 are presented. Turbulence at the Keller site is moderate, around 0.12 in the power producing range of speeds. Turbulence at Bridgeport is low, generally less than 0.10 in the power producing range of speeds. Turbulence at Cody is moderate, 0.12 or less in the power producing range of speeds.

12x24. Mean monthly net energy simulations for the Cody project were performed using the C-104 turbine The values reflect the actual simulation for the data period, and have not been adjusted to reflect the long-term mean monthly pattern.

P-Values. In this tab we show calculations to reflect the uncertainty in the long-term mean annual net projections for the C-99 and ACB-104 turbines for each of the three Colville Projects. Here are the results:

For the C-99:

P-Value	Keller Long-Term NCF (%)	Bridgeport Long-Term NCF (%)	Cody Long-Term NCF (%)	
P99	13.24	10.14	17.64	
P95	14.54	11.30	19.85	
P90	15.26	11.94	21.07	
P84	15.80	12.42	22.00	one standard deviation below the mean (P50) value
P75	16.42	12.98	23.05	
P50	17.74	14.15	25.29	
P25	19.06	15.41	27.51	
P16	19.68	16.00	28.55	one standard deviation above the mean (P50) value
P10	20.22	16.51	29.46	
P05	20.94	17.20	30.66	
P01	22.23	18.43	32.84	

For the C-104:

P-Value	Keller Long-Term NCF (%)	Bridgeport Long-Term NCF (%)	Cody Long-Term NCF (%)	
P99	14.85	11.45	19.99	
P95	16.23	12.70	22.31	
P90	17.00	13.39	23.59	
P84	17.57	13.91	24.56	one standard deviation below the mean (P50) value
P75	18.23	14.51	25.66	
P50	19.64	15.78	28.02	
P25	21.03	17.10	30.28	
P16	21.68	17.73	31.35	one standard deviation above the mean (P50) value
P10	22.25	18.27	32.28	
P05	23.01	19.00	33.51	
P01	24.38	20.31	35.74	

This concludes the report.

Meteorological Tower Information
Colville Projects, Washington
Clipper Windpower Development Company, Inc.

Time Zone: Pacific Standard Time
Magnetic Declination: 16° East (344° magnetic = true north)

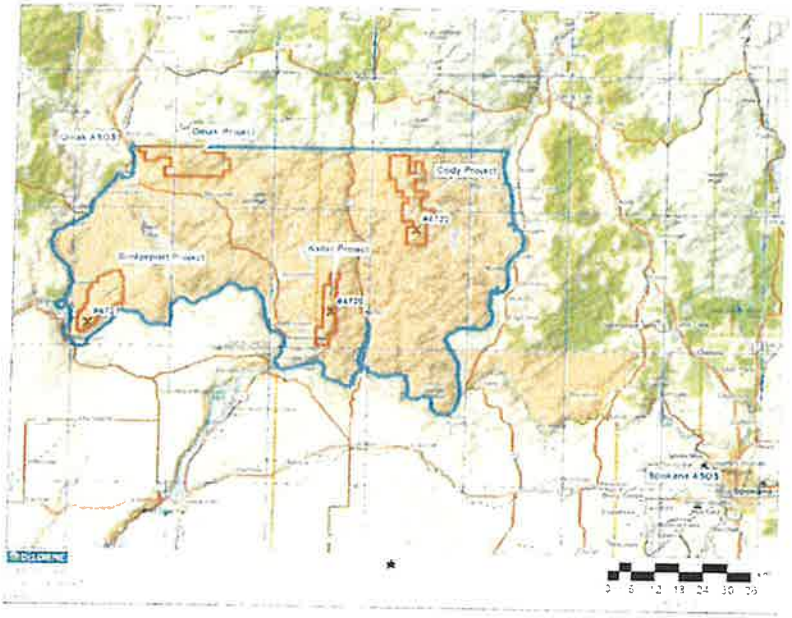
									Calibration Constants*		
Site Number	4720	Sensor Type	Model	Serial #	Channel	Sensor Height (m)	Boom Length (m)	Boom Orientation Relative to True North	Slope	Offset	Units
Project Name	Keller	Anemometer	NRG #40C	83375	1	60	2.4	0°	0.760	0.40	mps
Installation Date	22 November 2008	Anemometer	NRG #40C	83378	2	60	2.4	180°	0.758	0.37	mps
Logger Type	Symphonie	Anemometer	NRG #40C	83394	3	50	2.4	0°	0.759	0.36	mps
Logger Serial Number	9822	Anemometer	NRG #40C	83395	4	31.5	2.4	0°	0.760	0.34	mps
Property Owner	Colville Confederate Tribes	Anemometer	NRG #40C	83399	5	31.5	2.4	180°	0.759	0.45	mps
Tower Height (m)	60	Anemometer	NRG #40C	83622	6	9.5	2.4	0°	0.700	0.34	mps
Tower Diameter (in)	10" to 30 m, 8" above										
Closest Town	Keller, WA	Wind Vane	NRG #200P	N/A	7	58	2.4	0°	0.351	0	degrees
Latitude (WGS84)	48° 05.157'N	Wind Vane	NRG #200P	N/A	8	34	2.4	0°	0.351	0	degrees
Longitude (WGS84)	118° 47.844'W										
Elevation (m)	1214	Thermometer	NRG #110S	N/A	9	3	N/A	N/A	0.136	-86.38	°C
Site Exposure	north/south ridge near saddle between two high points; previously forested clearing, trees 100 m east and below tower										

Site Number	4721	Anemometer	NRG #40C	83381	1	60	2.4	0°	0.762	0.33	mps
Project Name	Bridgeport	Anemometer	NRG #40C	83382	2	60	2.4	180°	0.760	0.37	mps
Installation Date	19 November 2008	Anemometer	NRG #40C	83383	3	50	2.4	0°	0.760	0.38	mps
Logger Type	Symphonie	Anemometer	NRG #40C	83385	4	31.5	2.4	0°	0.758	0.38	mps
Logger Serial Number	9824	Anemometer	NRG #40C	83386	5	31.5	2.4	180°	0.761	0.37	mps
Property Owner	Colville Confederate Tribes	Anemometer	NRG #40C	83387	6	9.5	2.4	0°	0.761	0.37	mps
Tower Height (m)	60										
Tower Diameter (in)	10" to 30 m, 8" above										
Closest Town	Bridgeport, WA	Wind Vane	NRG #200P	N/A	7	58	2.4	0°	0.351	0	degrees
Latitude (WGS84)	48° 03.259'N	Wind Vane	NRG #200P	N/A	8	34	2.4	0°	0.351	0	degrees
Longitude (WGS84)	119° 36.749'W										
Elevation (m)	741	Thermometer	NRG #110S	N/A	9	3	N/A	N/A	0.136	-86.38	°C
Site Exposure	near center of broad, NNE/SSW plateau; wheat field										

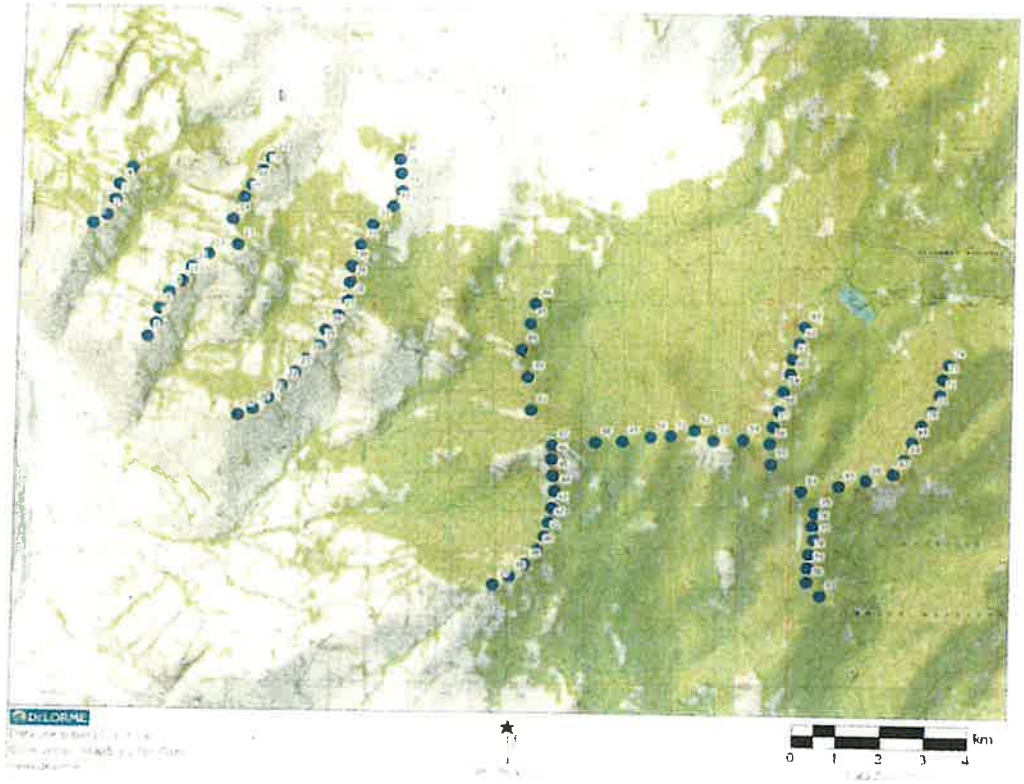
Site Number	4722	Anemometer	NRG #40C	83380	1	60	2.4	0°	0.760	0.35	mps
Project Name	Cody	Anemometer	NRG #40C	83384	2	60	2.4	180°	0.757	0.45	mps
Installation Date	24 November 2008	Anemometer	NRG #40C	83638	3	50	2.4	0°	0.760	0.32	mps
Logger Type	Symphonie	Anemometer	NRG #40C	83639	4	31.5	2.4	0°	0.761	0.36	mps
Logger Serial Number	9823	Anemometer	NRG #40C	83640	5	31.5	2.4	180°	0.759	0.34	mps
Property Owner	Colville Confederate Tribes	Anemometer	NRG #40C	83641	6	9.5	2.4	0°	0.759	0.36	mps
Tower Height (m)	60										
Tower Diameter (in)	10" to 30 m, 8" above										
Closest Town	Inchelium, WA	Wind Vane	NRG #200P	N/A	7	58	2.4	0°	0.351	0	degrees
Latitude (WGS84)	48° 17.342'N	Wind Vane	NRG #200P	N/A	8	34	2.4	0°	0.351	0	degrees
Longitude (WGS84)	118° 30.809'W										
Elevation (m)	1640	Thermometer	NRG #110S	N/A	9	3	N/A	N/A	0.136	-86.38	°C
Notes	Tower collapsed in ice storm, December 2008, rebuilt June 2009										
Site Exposure	high point along short, north/south ridge in mountainous terrain; forested though cleared to 60m radius, tree-height 6-8 m										

* All NRG #40C data converted to NREL calibration constants: slope 0.765 mps/Hz, offset 0.35 mps.

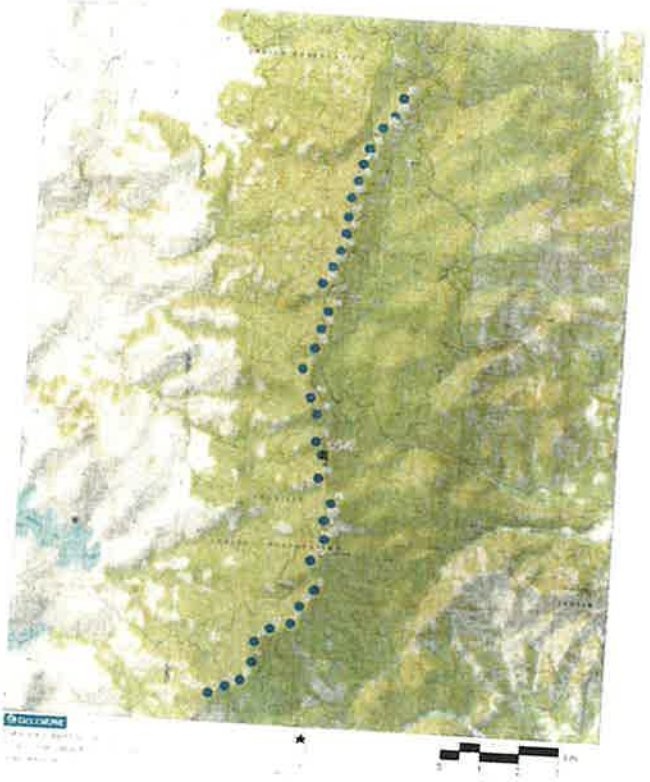
Colville Projects



Omak Project



Keller Project



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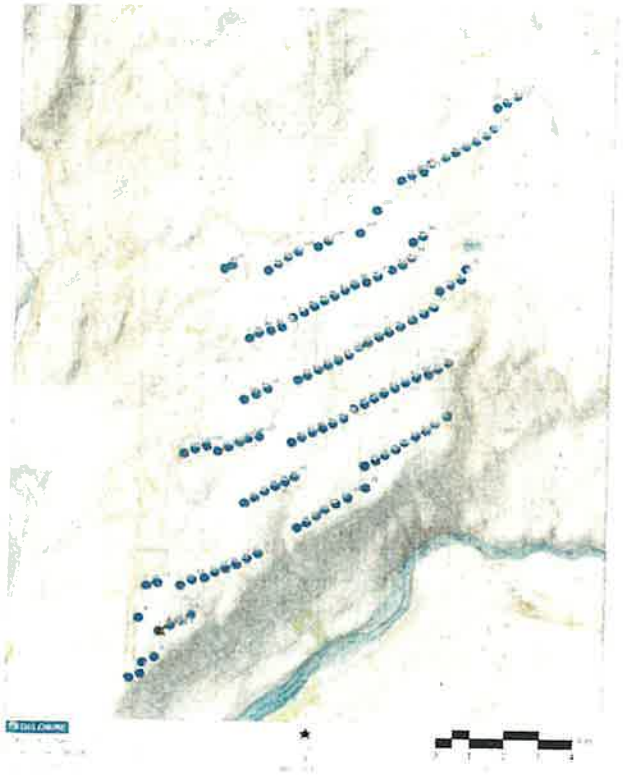

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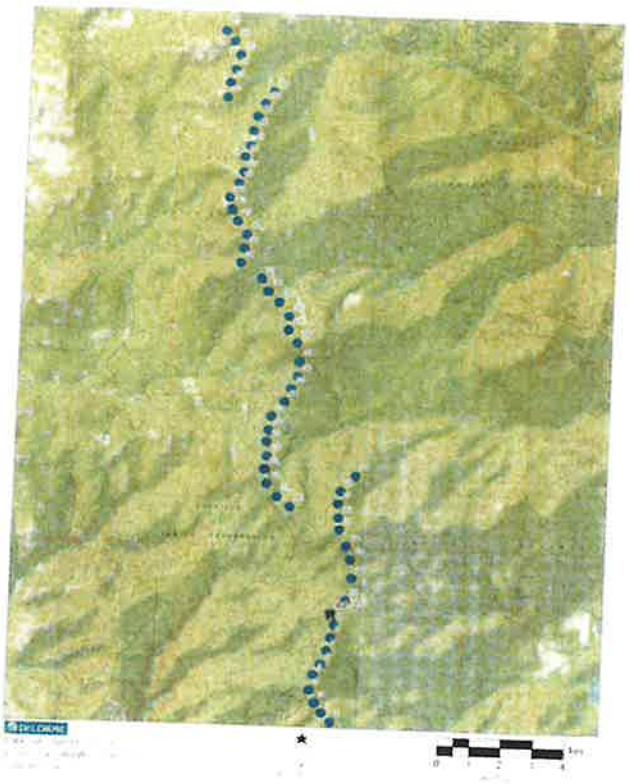

Monthly Mean Wind Speeds (mps)
Colville Projects, Washington
Clipper Windpower Development Company, Inc

YEAR: 2008

Site	Level (m)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
4720	9.5-n												4.4	
Keller	31.5-s												5.6	
	31.5-n												5.7	
	50-n												6.0	
	60-s												6.5	
	60-n												6.4	
4721	9.5-n											3.1	4.5	
Bridgeport	31.5-s											3.5	5.1	
	31.5-n											3.4	5.1	
	50-n											3.6	5.3	
	60-s											3.7	5.6	
	60-n											3.8	5.6	
4722	9.5-n												6.4	
Cody	31.5-s												9.4	
	31.5-n												9.3	
	50-n												10.5	
	60-s												11.1	
	60-n												11.5	
Spokane ASOS	10-m											3.1	3.2	
Omak ASOS	10-m											1.9	3.1	

YEAR: 2009

Site	Level (m)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
4720	9.5-n	3.8	3.1	4.2	4.1	4.5	3.7	3.5	3.7	3.9	4.1	4.3	3.3	3.86
Keller	31.5-s	4.6	3.8	5.0	5.1	5.3	4.5	4.3	4.5	4.7	5.0	5.0	4.0	4.65
	31.5-n	4.6	3.8	5.0	5.1	5.3	4.6	4.3	4.5	4.7	5.0	5.1	4.2	4.69
	50-n	4.9	4.0	5.3	5.4	5.6	5.0	4.6	4.8	5.0	5.5	5.6	4.5	5.00
	60-s	5.2	4.2	5.5	5.5	5.7	5.1	4.7	4.9	5.1	5.6	5.7	4.6	5.13
	60-n	5.1	4.1	5.4	5.4	5.5	4.9	4.6	4.8	5.0	5.5	5.7	4.5	5.04
4721	9.5-n	2.7	3.3	4.7	4.1	4.1	4.1	3.7	4.0	3.7	3.6	3.7	3.2	3.74
Bridgeport	31.5-s	3.0	3.7	5.2	4.7	4.7	4.7	4.2	4.6	4.3	4.4	4.7	3.7	4.33
	31.5-n	3.0	3.8	5.3	4.7	4.7	4.8	4.4	4.7	4.4	4.5	4.6	3.7	4.38
	50-n	3.2	3.8	5.4	4.9	5.0	5.1	4.6	5.0	4.6	4.7	4.8	4.0	4.57
	60-s	3.3	3.8	5.5	5.0	5.0	5.1	4.6	5.0	4.6	4.8	5.0	4.0	4.66
	60-n	3.3	3.9	5.6	5.0	5.1	5.2	4.7	5.1	4.8	4.9	5.0	4.0	4.72
4722	9.5-n	x	x	x	x	x	3.6	3.2	3.5	3.8	4.3	4.8	4.2	
Cody	31.5-s	x	x	x	x	x	5.2	4.6	5.1	5.5	6.5	6.7	5.8	
	31.5-n	x	x	x	x	x	5.2	4.6	5.1	5.5	6.6	6.8	5.8	
	50-n	x	x	x	x	x	5.6	4.9	5.6	5.9	7.1	7.1	6.0	
	60-s	x	x	x	x	x	5.8	5.0	5.6	6.0	7.3	7.8	6.3	
	60-n	x	x	x	x	x	5.7	5.0	5.6	6.0	7.3	7.7	6.3	
Spokane ASOS	10-m	3.3	2.7	4.1	3.7	4.4	3.8	3.0	3.3	3.3	3.9	4.0	2.7	3.51
Omak ASOS	10-m	1.9	1.9	3.6	3.4	3.1	3.4	3.3	3.4	2.8	2.9	2.8	2.4	2.90

YEAR: 2010

Site	Level (m)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
4720	9.5-n	3.6	3.2	4.0	5.2	4.2								
Keller	31.5-s	4.5	3.7	4.7	6.1	4.8								
	31.5-n	4.7	3.9	4.7	6.2	5.0								
	50-n	5.1	4.2	5.1	6.7	5.2								
	60-s	5.0	3.9	5.1	6.5	5.1								
	60-n	5.0	4.0	5.1	6.7	5.3								
4721	9.5-n	2.5	2.3	3.7	4.9	4.1								
Bridgeport	31.5-s	2.9	2.7	4.2	5.6	4.5								
	31.5-n	3.0	2.8	4.3	5.8	4.6								
	50-n	3.3	2.8	4.4	6.1	4.8								
	60-s	3.2	2.9	4.5	5.9	4.7								
	60-n	3.2	2.9	4.5	6.1	4.9								
4722	9.5-n	3.6	3.4	4.2	4.9	3.8								
Cody	31.5-s	5.1	4.4	5.6	6.8	5.4								
	31.5-n	4.9	4.4	5.7	6.8	5.5								
	50-n	5.1	4.5	5.9	7.2	5.7								
	60-s		4.7	6.2	7.4	5.9								
	60-n		4.7	6.2	7.3	5.9								
Spokane ASOS	10-m	3.2	2.3	3.5	4.7	4.1								
Omak ASOS	10-m	1.6	1.8	2.8	3.4	2.9								

Data Recovery Key: black = 90-100%; green = 75-90%; blue = 50-75%; orange = 25-50%; purple = 10-25%; "x" = 0-10%.
All values represent the estimate for the full month when data recovery is less than 100%

NREL Calibration Constants (slope 0.765 mps/Hz; offset 0.35 mps)

Composite Mean Speeds, November 2008 - May 2010

Site	Level (m)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
4720	9.5-n	3.7	3.1	4.1	4.7	4.3	3.7	3.5	3.7	3.9	4.1	4.1	3.8	3.90
Keller	31.5-s	4.6	3.7	4.9	5.6	5.0	4.5	4.3	4.5	4.7	5.0	4.9	4.8	4.71
	31.5-n	4.6	3.8	4.9	5.7	5.1	4.6	4.3	4.5	4.7	5.0	5.0	4.9	4.76
	50-n	5.0	4.1	5.2	6.0	5.4	5.0	4.6	4.8	5.0	5.5	5.3	5.3	5.09
	60-s	5.1	4.0	5.3	6.0	5.4	5.1	4.7	4.9	5.1	5.6	5.5	5.5	5.17
	60-n	5.1	4.0	5.3	6.1	5.4	4.9	4.6	4.8	5.0	5.5	5.4	5.4	5.12
Spokane ASOS	10-m	3.2	2.5	3.8	4.2	4.2	3.8	3.0	3.3	3.3	3.9	3.5	3.0	3.48

Site	Level (m)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
4721	9.5-n	2.6	2.8	4.2	4.5	4.1	4.1	3.7	4.0	3.7	3.6	3.4	3.8	3.71
Bridgeport	31.5-s	3.0	3.2	4.7	5.1	4.6	4.7	4.2	4.6	4.3	4.4	4.1	4.4	4.28
	31.5-n	3.0	3.3	4.8	5.2	4.7	4.8	4.4	4.7	4.4	4.5	4.0	4.4	4.34
	50-n	3.2	3.3	4.9	5.5	4.9	5.1	4.6	5.0	4.6	4.7	4.2	4.6	4.54
	60-s	3.3	3.3	5.0	5.5	4.8	5.1	4.6	5.0	4.6	4.8	4.4	4.8	4.61
	60-n	3.3	3.4	5.0	5.6	5.0	5.2	4.7	5.1	4.8	4.9	4.4	4.8	4.68
Omak ASOS	10-m	1.7	1.9	3.2	3.4	3.0	3.4	3.3	3.4	2.8	2.9	2.3	2.8	2.83

Composite Mean Speeds, June 2009 - May 2010

Site	Level (m)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
4722	9.5-n	3.6	3.4	4.2	4.9	3.8	3.6	3.2	3.5	3.8	4.3	4.8	4.2	3.95
Cody	31.5-s	5.1	4.4	5.6	6.8	5.4	5.2	4.6	5.1	5.5	6.5	6.7	5.8	5.57
	31.5-n	4.9	4.4	5.7	6.8	5.5	5.2	4.6	5.1	5.5	6.6	6.8	5.8	5.56
	50-n	5.1	4.5	5.9	7.2	5.7	5.6	4.9	5.6	5.9	7.1	7.1	6.0	5.87
	60-s	5.6	4.7	6.2	7.4	5.9	5.8	5.0	5.6	6.0	7.3	7.8	6.3	6.14
	60-n	5.6	4.7	6.2	7.3	5.9	5.7	5.0	5.6	6.0	7.3	7.7	6.3	6.12
4720	9.5-n	3.6	3.2	4.0	5.2	4.2	3.7	3.5	3.7	3.9	4.1	4.3	3.3	3.89
Keller	31.5-s	4.5	3.7	4.7	6.1	4.8	4.5	4.3	4.5	4.7	5.0	5.0	4.0	4.66
	31.5-n	4.7	3.9	4.7	6.2	5.0	4.6	4.3	4.5	4.7	5.0	5.1	4.2	4.73
	50-n	5.1	4.2	5.1	6.7	5.2	5.0	4.6	4.8	5.0	5.5	5.6	4.5	5.10
	60-s	5.0	3.9	5.1	6.5	5.1	5.1	4.7	4.9	5.1	5.6	5.7	4.6	5.09
	60-n	5.0	4.0	5.1	6.7	5.3	4.9	4.6	4.8	5.0	5.5	5.7	4.5	5.09
Spokane ASOS	10-m	3.2	2.3	3.5	4.7	4.1	3.8	3.0	3.3	3.3	3.9	4.0	2.7	3.47

Long-Term Mean Annual Wind Speeds (mps)
Colville Projects, Washington
Clipper Windpower Development Company, Inc.

Site	Level (m)	Composite Mean Nov 2008 to May 2010	Long-Term Mean	Averaged by Level	Shears Levels (m)	Exponent	Extrapolated to 80 m
4720	9.5-n	3.90	4.12	4.12			
Keller	31.5-s	4.71	4.97		9.5-31.5	0.162	
	31.5-n	4.76	5.03	5.00	31.5-50	0.158	
	50-n	5.09	5.38	5.38	50-60	0.060	
	60-s	5.17	5.47		9.5-60	0.151	
	60-n	5.12	5.41	5.44			5.68
Spokane ASOS	10-m	3.48	3.67				

Site	Level (m)	Composite Mean Nov 2008 to May 2010	Long-Term Mean	Averaged by Level	Shears Levels (m)	Exponent	Extrapolated to 80 m
4721	9.5-n	3.71	3.76	3.76			
Bridgeport	31.5-s	4.28	4.34		9.5-31.5	0.125	
	31.5-n	4.34	4.41	4.37	31.5-50	0.111	
	50-n	4.54	4.60	4.60	50-60	0.127	
	60-s	4.61	4.68		9.5-60	0.122	
	60-n	4.68	4.75	4.71			4.88
Omak ASOS	10-m	2.83	2.87				

Site	Level (m)	Composite Mean, Jun 2008 to May 2010	Long-Term Mean based on ... Keller	Spokane	Averaged by Level*	Shears Levels (m)	Exponent	Extrapolated to 80 m
4722	9.5-n	3.95	4.19	4.18	4.18	9.5-31.5	0.288	
Cody	31.5-s	5.57	5.94	5.89		31.5-50	0.107	
	31.5-n	5.56	5.92	5.88	5.91	50-60	0.250	
	50-n	5.87	6.20	6.21	6.20	9.5-60	0.238	
	60-s	6.14	6.59	6.49		tree adjusted **		
	60-n	6.12	6.50	6.47	6.49	31.5 60	0.125	6.76
4720	9.5-n	3.89	4.12					
Keller	31.5-s	4.66	4.97					
	31.5-n	4.73	5.03					
	50-n	5.10	5.38					
	60-s	5.09	5.47					
	60-n	5.09	5.41					
Spokane ASOS	10-m	3.47		3.67				

* Estimates are weighted 2/3 to 4720, and 1/3 to Spokane

** based on 31.5 60 m shear and estimated 8 m tree height
Tree height verified by Matt Kumpunen