# Kittitas County Planning Department Development Activities Application

## Draft

**Submitted by:**

**Zilkha Renewable Energy**
**222 East Fourth Ave.**
**Ellensburg, WA 98926**
**March 26, 2003**

Zilkha Renewable Energy

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

RECEIVED
MAR 27 2003
KITTITAS COUNTY
PLANNING DEPT.

March 26, 2003

Dear Clay,

Attached is an administrative review draft of our applications for a rezone and sub-area comprehensive plan amendment to Wind Resource Overlay for the Kittitas Valley Wind Power Project (Project), as well as a draft SEPA environmental checklist.

This request for a site-specific rezone and sub-area comprehensive plan amendment is being made in compliance with WAC 463-28. This project is subject to the jurisdiction and being sited by the Washington Energy Facility Site Evaluation Council (EFSEC) pursuant to Application for Site Certification No. 2003-1. EFSEC has accepted the SEPA "lead agency" role pursuant to RCW 43.21C.030 and has issued a determination of significance (DS) and has begun the process of drafting an Environmental Impact Statement (EIS.) Therefore, detailed information will be available in the EFSEC EIS. Kittitas County is exempt from preparing a "detailed statement" (SEPA EIS) required by RCW 43.21C.030 pursuant to RCW 80.50.180. We have provided Kittitas County with more information than would be necessary for a SEPA environmental checklist because it was readily available from the existing EFSEC Application, in the hopes that it would provide a clearer understanding of the project.

As part of the EFSEC review process, EFSEC requires the Applicant to seek a determination of land use consistency from the local jurisdiction. This re-zone and comprehensive plan sub-area amendment are requested to determine if the proposed land use is consistent with local land use regulations. We are not seeking a development permit or development agreement to construct and operate the Project from Kittitas County, thus this request does not include a request for a development agreement and development permit.

After you have had a chance to review these materials, I suggest we schedule a meeting to go over them and any comments or changes you wish to offer. As indicated in the attached documents, I will serve as the primary contact for this Project.

Thank you,

Chris Taylor
Project Development Manager
Sagebrush Power Partners

APPLICATION

FOR DOCKETING AMENDMENTS
TO THE
KITTITAS COUNTY COMPREHENSIVE PLAN

DEADLINE 5:00 PM, JUNE 30

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DATE: March 21, 2003

PROPOSED AMENDMENTS:
This comprehensive plan amendment accompanies a re-zone request filed concurrently with the Kittitas County Community Development Services for a Wind Resource Overlay for the proposed Kittitas Valley Wind Power Project, located approximately 12 miles northwest of Ellensburg, WA. We request that the County adopt a sub-area comprehensive plan amendment to designate the area as a Wind Resource Overlay. The area for which Wind Resource Overlay designation is requested is described by tax parcel number and legal description in the accompanying re-zone request and illustrated graphically in Exhibit 2, Project Site Layout.

Both of these actions are requested in the context of an Application for Site Certification for the Kittitas Valley Wind Power Project which is currently pending with the Washington Energy Facility Site Evaluation Council (EFSEC). As such, EFSEC is the lead agency under SEPA for this project. Kittitas County SEPA review of this project is governed by RCW 80.50.180, which exempts local governments and state agencies from the SEPA review requirements for actions which are taken in conjunction with EFSEC review of a project.

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NAME: Chris Taylor, Zilkha Renewable Energy

PHONE NUMBER: 509-899-4609

ADDRESS: 222 E. Fourth Street, Ellensburg, WA 98926

SIGNATURE: _____

# KITTITAS COUNTY PLANNING DEPARTMENT
## DEVELOPMENT ACTIVITIES APPLICATION

PLEASE TYPE OR PRINT CLEARLY IN INK. ATTACH ADDITIONAL SHEETS AS NECESSARY. THE FOLLOWING ITEMS MUST BE ATTACHED TO THIS APPLICATION PACKET:

☒ ADDRESS LIST OF ALL LANDOWNERS WITHIN 300' OF THE SITE'S TAX PARCEL. IF ADJOINING PARCELS ARE OWNED BY THE APPLICANT, THE 300' EXTENDS FROM THE FARTHEST PARCEL:

☐ *Exhibit 1, "Land Ownership"*

☒ SITE PLAN OF THE PROPERTY WITH ALL PROPOSED: BUILDINGS; POINTS OF ACCESS, ROADS, AND PARKING AREAS; SEPTIC TANK AND DRAINFIELD AND REPLACEMENT AREA; AREAS TO BE CUT AND/OR FILLED; AND, NATURAL FEATURES SUCH AS CONTOURS, STREAMS, GULLIES, CLIFFS, ETC. (PLAT APPLICATIONS EXCLUDED):

☐ *Exhibit 2, "Project Site Layout" and Exhibit 3 "Aerial Photo of Project Site Layout"*

THIS DEVELOPMENT ACTIVITIES APPLICATION IS USED TO APPLY FOR ONE OR MORE OF THE FOLLOWING APPROVALS. IF YOU ARE UNSURE WHICH OF THE FOLLOWING APPROVALS WILL BE NECESSARY FOR YOUR PROJECT, PLEASE CONTACT THE PLANNING DEPARTMENT FOR ASSISTANCE.

1. Check all that apply to your project and complete those sections of the application:

☐ SECTION I. — *Fee - $150*
Zoning Structural Setback Variance - to place a structure closer to the lot line than allowed:
*Residential front 15' side 5' rear 25'*
*Residential-2 front 15' side 5',10' rear 25'*
*Suburban, Sub.-II front 25' side 15' rear 25'*
*Agriculture, Liberty front 25' side 5' rear 25'*
*Rural-3 front 25' side 15' rear 15'*
*Forest&Range-20 front 25' side 10' rear 10'*
*Commercial Forest front 200' side 200' rear 200'*

☐ SECTION II. — *Fee - $350*
Zoning Conditional Use Permit - proposing a use such as a bed & breakfast or campground.

☒ SECTION III. — *Fee - $450*
Request to Rezone - to change from the existing zone to another zone.

☐ SECTION IV. — *Fee - $350*
Shorelines Substantial Development/Conditional Use Permit - proposing a project greater than $2,500 value w/in 200' of a water body listed in Section V.

☐ SECTION V. — *Fee - $350*
Shorelines Structural Setback Variance - to place a structure closer than 100' of (*denotes portion of shoreline requiring 200' setback):

| | | |
|---|---|---|
| *Kachess River* | *Lake Keechelus* | *Lake Kachess** |
| *Cabin Creek* | *Lake Cle Elum* | *Lake Easton* |
| *Log Creek* | *Cle Elum River* | |
| *Big Creek* | *Lost Lake** | |
| *Little Creek* | *Unnamed Lakes (T.21 R.12)** | |
| *Swauk Creek* | *Cooper Lake** | |
| *Taneum Creek* | *Tucquala Lake** | |
| *Teanaway River* | *Manastash Lake** | |
| *(incl. West, Middle, North forks)* | *Manastash Creek (incl. South fork)* | |
| *Yakima River** | *Naneum Creek* | |
| *Wilson Creek (so. of Eburg)* | *Columbia River** | |

☐ SECTION VI. — *Fee - $10.00*
Flood Development Permit - for any construction or placement of buildings, mining, dredging, filling, grading, paving, excavation or drilling in the FEMA 100-Year Floodplain.

☐ SECTION VII. Short Plat - to divide into 2-4 lots.
*Fee - $190 plus $10/lot Transportation; $125 plus $50/hr. over 2.5 hrs. Environmental Health; and, $175 Planning.*

☐ SECTION VIII. Long Plat - to divide into 5 or more lots.
*Fee - $200 plus $10/lot Transportation; $625 plus $50/hr. over 12.5 hrs. Environmental Health; and, $400 Planning.*

☒ Section IX. *Fee - $100 initial*

SEPA Environmental Checklist/Review - review required in conjunction with Sections II, III, IV, VIII. Or IX. Other development proposals may also require completion of this section.

2. Name, mailing address and day phone of land owner(s) of record:
*See Exhibit 1*

3. Name, mailing address and day phone of authorized agent, if different from land owner of record:
Chris Taylor
Project Development Manager
Zilkha Renewable Energy
222 E. Fourth Street
Ellensburg, WA 98926
Phone: 509-899-4609
Email: ctaylor@zilkha.com

4. Contact person for application (select one): ☐ Owner of record ☒ Authorized agent
All verbal and written contact regarding this application will be made only with the contact person.

5. Street address of property:
*The proposed project is located approximately 12 miles NW of Ellensburg. The proposed project covers numerous individual parcels; please see legal descriptions in Exhibit 1.*

6. Legal descriptions of property: *See Exhibit 1*

7. Tax parcel numbers: *See Exhibit 1*

8. Property size: *Approximately 5,900 acres.*

9. Narrative project description: describe project size, location, water supply, sewage disposal and all qualitative features of the proposal; include every element of the proposal in the description (be specific, attach additional sheets as necessary):

*Overview*
*Sagebrush Power Partners, a wholly owned subsidiary of Zilkha Renewable Energy ('Applicant') proposes to build and operate the Kittitas Valley Wind Power Project (the 'Project') on a site located approximately twelve miles northwest of the city of Ellensburg. The Project will feature a well documented wind resource, state-of-the-art, megawatt-class wind turbine generators and experienced development and operations teams. The Project will help supply the growing demand for electricity in Washington and the Northwest with clean, renewable energy at a stable, competitive price.*

*Location*
*The Project area is in the vicinity of Highway 97 and Bettas Road, as indicated in Exhibit 2, Project Site Layout. This area is traversed by six sets of high voltage electric transmission lines, five belonging to the Bonneville Power Administration (BPA) and one belonging to Puget Sound Energy ('PSE'). The Project will be built on land leased from private landowners and the Washington Department of Natural Resources ('DNR'). The dominant land use in the area currently is grazing and open space, with some scattered rural home sites. Approximately 90 acres of land (the Project footprint) will be permanently occupied by the Project and related support facilities, the rest of the land in the Project area will remain available for other uses.*

*Infrastructure*
*The Project will consist of up to 121 wind turbines for an expected installed nameplate capacity of 181.5 megawatts (MW) and a maximum nameplate capacity of 235 MW. The Applicant has not made a final selection of the specific turbine model to be used for this Project. Figure 1 below shows the minimum and maximum dimensions for the range of turbines being considered for this project. If a larger turbine model is selected (i.e. under 1.5 MW nameplate capacity), fewer turbines (i.e. less than 121) will be installed. For purposes of this application, the Applicant will reference the 181.5 MW expected nameplate capacity, as this is the most likely scenario. The Project will utilize proven, 3-bladed, upwind, megawatt-class wind turbines on tubular steel towers, as depicted in Figure 2. The wind turbine generators (WTGs) convert kinetic energy in the wind into useful electricity.*

*The Kittitas Valley Wind Power Project will also include other prime elements including roads, foundations, underground and overhead electrical lines, grid interconnection facilities, a substation, O&M center and associated supporting infrastructure and facilities. The Project turbines will be laid out in strings (also called rows), connected by a network of gravel access roads. A general site layout illustrating these key elements is contained in Exhibit 2, 'Project Site Layout'.*

*Wind Turbine Generators*

*Several wind turbine generators (WTGs) are under evaluation for the Project. Based on these evaluations, a number of wind turbine vendors have been pre-qualified to supply equipment for the Project including GE Wind Energy, NEG-Micon, Vestas, Nordex, Bonus, and Gamesa Eolica. The Project will consist of up to 121 wind turbines for an installed nameplate capacity of up to 181.5 megawatts (MW). The Project will implement 3-bladed wind turbines on tubular steel towers each ranging in size from 1.3 MW to 2.5 MW (generator nameplate capacity) and with dimensions as shown in Figure 1.*

*The pre-qualified wind turbines all have a minimum design life of 20 years under extreme high wind and high turbulence conditions. Based on the lower turbulence intensities and moderate wind speeds that have been measured on the Project site, it is likely that the original WTGs will operate well into their third decade before a retrofit or replacement program is implemented.*

***Figure 2 Typical Modern WTG***

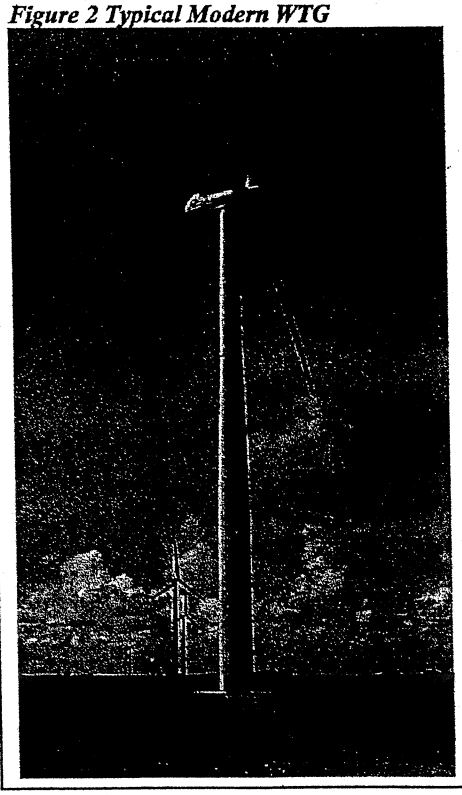
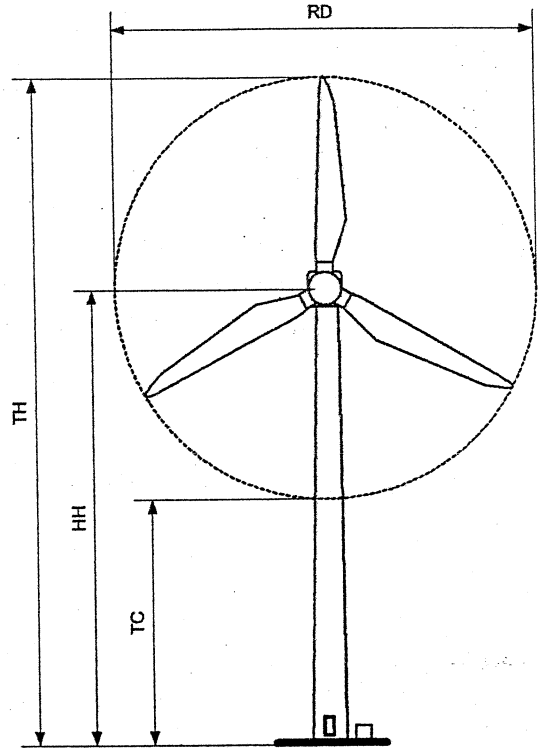


***Figure1 Wind Turbine Dimensions***




| | MAX | MIN | Dimension |
|---|---|---|---|
| HH | 80 m/262 ft. | 46 m/151 ft. | Hub Height |
| RD | 90 m/295 ft. | 60 m/197 ft. | Rotor Diameter |
| TC | 40 m/131 ft. | 15 m/49 ft. | Tip Clearance |
| TH | 125 m/410 ft. | 76 m/249 ft. | Tip Height |

*Wind Turbine Basic Configuration*

*Wind Turbines consist of 3 main physical components that are assembled and erected during construction: the tower, the nacelle (machine house) and the rotor (3-blades).*

*Tower*

*The WTG tower is a tubular conical steel structure that is manufactured in multiple sections depending on the tower height. Towers for the Project will be fabricated, delivered and erected in 2 to 3 sections. A service platform at the top of each section allows for access to the tower connecting bolts for routine inspection. An internal ladder runs to the top platform of the tower just below the nacelle. A nacelle ladder extends from the machine bed to the tower top platform allowing nacelle access independent of its orientation. The tower is equipped with interior lighting and a safety glide cable alongside the ladder.*

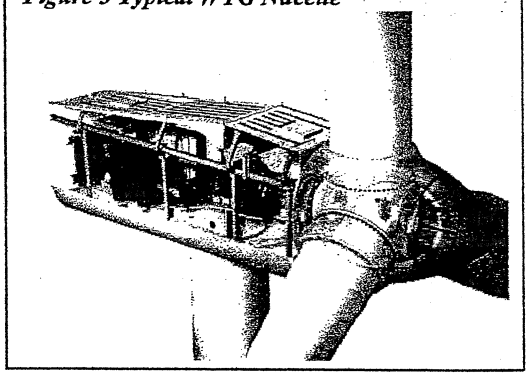
*The tower design is certified by experienced and qualified structural engineers who have designed several generations of turbine towers that have proven themselves well in some of the most aggressive wind regions of the world. The towers and*

*foundations are designed for a survival gust wind speed of 90+ mph with the blades pitched in their most vulnerable position. For the cold-weather winter conditions on the Project site, special material specifications are set to ensure that materials do not go below the brittle transition temperature.*

*Nacelle*

*Figure 3 shows the general arrangement of a typical nacelle that houses the main mechanical components of the WTG. The nacelle consists of a robust machine platform mounted on a roller bearing sliding yaw ring that allows it to rotate (yaw) to keep the turbine pointed into the wind to maximize energy capture. A wind vane and anemometer are mounted at the rear of the nacelle to signal the controller with wind speed and direction information.*

***Figure 3 Typical WTG Nacelle***



*The main components inside the nacelle are the drive train, a gearbox and the generator. On some turbines, the step-up transformer is situated at the rear of the nacelle that eliminates the need for a pad-mounted transformer at the base of the tower.*

*The nacelle is housed by a fully enclosed steel reinforced fiberglass shell that protects internal machinery from the environment and dampens noise emissions. The shroud is designed to allow for adequate ventilation to cool internal machinery such as the gearbox and generator.*

*Drive Train*

*The rotor blades are all bolted to a central hub. The hub is bolted to the main shaft on a large flange at the front of the nacelle. The main shaft is independently supported by the main bearing at the front of the nacelle. The rotor transmits torque to the main shaft that is coupled to the gearbox. The gearbox increases the rotational speed of the high speed shaft that drives the generator at 1200-1800 RPM to provide electrical power at 60 Hertz (Hz).*

*Rotor Blades*

*Modern WTGs have 3-bladed rotors that range in span from 200 to 300 feet in diameter. The rotor blades turn quite slowly at about 20-25 RPM resulting in a graceful appearance during operation. The rotor blades are typically made from a glass-reinforced polyester composite similar to that used in the marine industry for sophisticated racing hulls. Much of the design and materials experience comes from both the marine and aerospace industries and has been developed and tuned for wind turbines over the past 25 years. The blades are non-metallic, but are equipped with a sophisticated lightning suppression system that is defined in detail in part a.2 of Section IX B 7, "Environmental Health."*

*Turbine Control Systems*

*Wind turbines are equipped with sophisticated computer control systems which are constantly monitoring variables such as wind speed and direction, air and machine temperatures, electrical voltages, currents, vibrations, blade pitch and yaw angles, etc. The main functions of the control system include nacelle operations as well as power operations. Generally, nacelle functions include yawing the nacelle into the wind, pitching the blades, and applying the brakes if necessary. Power operations controlled at the bus cabinet inside the base of the tower include operations of the main breakers to engage the generator with the grid as well as control of ancillary breakers and systems. The control system is always running and ensures that the machines are operating efficiently and safely.*

*Central SCADA System*

*Each turbine is connected to a central Supervisory Control and Data Acquisition (SCADA) System as shown schematically in Figure 4. The SCADA system allows for remote control and monitoring of individual turbines and the wind plant as a whole from both the central host computer or from a remote PC. In the event of faults, the SCADA system can also send signals to a fax, pager or cell phone to alert operations staff.*

*Safety Systems*

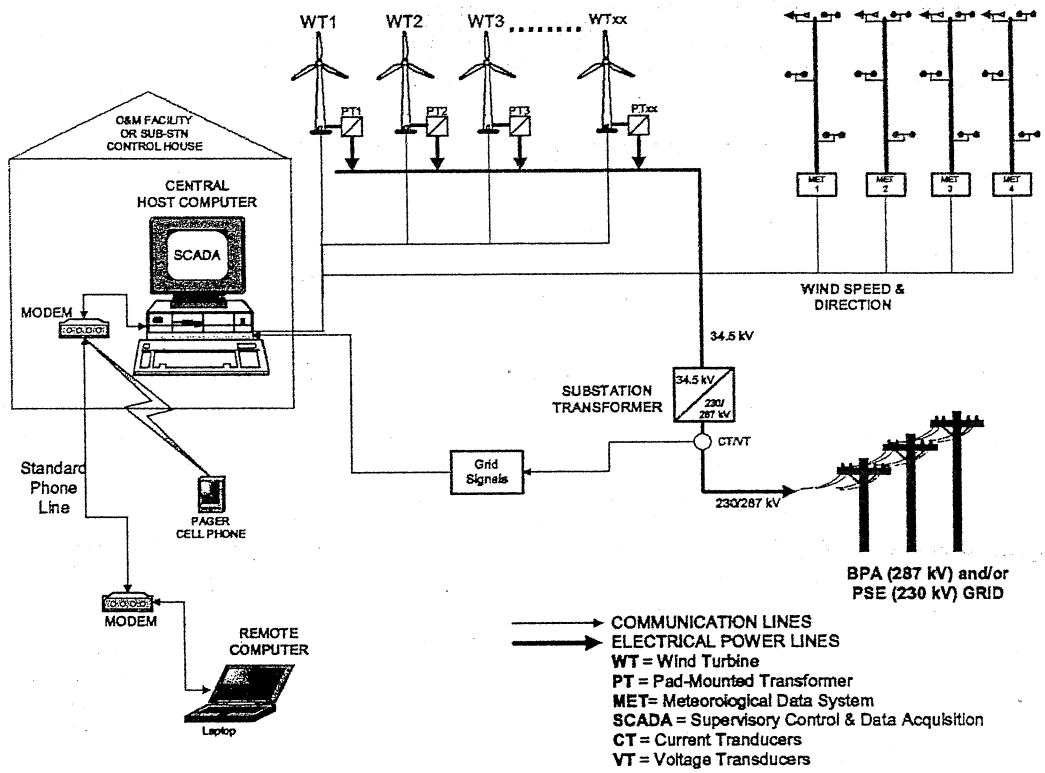
*All turbines are designed with several levels of built-in safety and comply with the codes set-forth by European standards as well as those of OSHA and ANSI.*

*Braking Systems*

*The turbines are equipped with two fully independent braking systems that can stop the rotor either acting together or independently. The braking system is designed to be fail-safe, allowing the rotor to be brought to a halt under all foreseeable conditions. The system consists of aerodynamic braking by the rotor blades and by a separate hydraulic disc*

*brake system. Both braking systems operate independently such that if there is a fault with one, the other can still bring the turbine to a halt. Brake pads on the disc brake system are spring loaded against the disc and power is required keep the pads away from the disc. If power is lost, the brakes will be mechanically activated immediately. The aerodynamic braking system is also configured such that if power is lost it will be activated immediately using back-up battery power or the nitrogen accumulators on the hydraulic system, depending on the turbine's design.*

***Figure 4 Electrical and Communication Collection System***




*After an emergency stop is executed, remote restarting is not possible. The turbine must be inspected in-person and the stop-fault must be reset manually before automatic operation will be re-activated.*

*The turbines are also equipped with a parking brake that is generally used to "park" the rotor while maintenance routines or inspections that require a stationary rotor are performed.*

*Electrical Collection and Communication System*

*The electrical output of the WTGs is collected and transmitted to the Project substation via underground and overhead electric cables. Underground cables are proposed wherever feasible to minimize visual and avian impacts. At the substation, the voltage will be increased to be compatible with the transmission lines to which the Project will be interconnected. Along with the electric collector cables, fiber optic or copper communication wires also link the individual turbines to a central operations and maintenance (O&M) center allowing around-the-clock remote monitoring and control of the turbines. This electrical collection and communication system is depicted schematically in Figure 4.*

*Substation and O&M Center*

*The proposed locations for the O&M center and substation are off of Bettas Road near its southern junction with Highway 97. The main function of the substation and interconnection facilities will be to step up the voltage from the collection lines (at 34.5 kV) to the transmission level (230 kV for PSE and 287 kV for BPA), to interconnect to the utility grid and provide fault protection. The basic elements of the substation and interconnection facilities are a control house, a bank of main transformers, outdoor breakers, relaying equipment, high voltage bus work, steel support structures, and overhead lightning suppression conductors. All of these main elements will be installed on concrete foundations that are designed for the soil conditions at the substations sites. The substations and interconnection facilities each consist of a graveled*

*footprint area of approximately 2-3, acres a chain link perimeter fence, and an outdoor lighting system (see Figure 5 - Typical Substation).*

***Figure 5 Typical Substation***

*An O&M facility is planned to be located near the corner of state Highway 97 and Bettas Road as indicated on the Project Site Layout in Exhibit 2. The O&M Facility will include a main building with offices, spare parts storage, restrooms, a shop area, outdoor parking facilities, a turn around area for larger vehicles, outdoor lighting and a gated access with partial or full perimeter fencing. The O&M building will have a foundation footprint of approximately 50 ft. by 100 ft. The O&M facility area will be leveled and graded and will serve as a central base of construction and operations with up to 8 temporary office trailers and portable toilets parked in place during the construction phase of approximately one year.*

*Water Supply and Sewage Disposal*

*Water needs for operation of the Project are minimal (estimated to be under 1,000 gallons per day) and are limited to bathroom and kitchen use for the O&M facility. A new domestic well, to be inspected and approved by Kittitas County and/or Department of Ecology, will be drilled on site to serve the O&M facility. Water for construction of the Project (for road compaction, dust control, etc.) will be hauled in by the construction contractor from a permitted source.*

*During construction, sewage disposal will be via portable toilets which will be regularly serviced by a licensed firm. For Project operations, a septic system will be installed, in accordance with Kittitas County requirements, near the O&M center for sewage disposal.*

10. Application is hereby made for permit(s) to authorize the activities described herein. I certify that I am familiar with the information contained in this application, and that to the best of my knowledge and belief such information is true, complete, and accurate. I further certify that I possess the authority to undertake the proposed activities. I hereby grant to the agencies to which this application is made, the right to enter the above-described location to inspect the proposed and or completed work.

Signature of Authorized Agent Date

Signature of Land Owner of Record (required for application submittal) Date

**SECTION I. ZONING STRUCTURAL SETBACK VARIANCE.**

ADDITIONAL ITEMS TO COMPLETE: NONE.

1. Provision of zoning code for which this variance is requested and the way in which you wish to vary:

2. A variance may be granted when the following criteria are met. Please describe how each criteria is met for this particular request (attach additional sheets as necessary):
   a. Unusual circumstances or conditions applying to the property and/or the intended use that do not apply generally to other property in the same vicinity or district, such as topography.

   b. Such variance is necessary for the preservation and enjoyment of a substantial property right of the applicant possessed by the owners of other properties in the same vicinity.

   c. That authorization of such variance will not be materially detrimental to the public welfare or injurious to property in the vicinity.

d. That the granting of such variance will not adversely affect the realization of the comprehensive development pattern.

☐ **SECTION II. ZONING CONDITIONAL USE PERMIT.**

ADDITIONAL ITEMS TO COMPLETE: SECTION IX SEPA ENVIRONMENTAL CHECKLIST.

1. Provision of the zoning code applicable:

2. A conditional use permit may be granted when the following criteria are met. Please describe how each criteria is met for this particular project (attach additional sheets as necessary):

   A. 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.

   B. 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.

☒ **SECTION III. REQUEST FOR REZONE.**

ADDITIONAL ITEMS TO COMPLETE: SECTION IX SEPA ENVIRONMENTAL CHECKLIST.

1. Present zoning district

   *Agriculture 20 (AG-20) and Forest and Range (FR) – See Exhibit 4, "Zoning Map."*

2. Zoning district requested:

   *Wind Resource Overlay*

3. Applicant for rezone must demonstrate that the following criteria are met (attach additional sheets as necessary):

   a. The proposed amendment is compatible with the comprehensive plan.

   *The Kittitas County Comprehensive Plan was reviewed to assess the Project's consistency with county policies. Only the policies listed below were determined to be potentially relevant to the proposed wind Project. The policy number is provided, followed by the policy itself in quotation marks. The analysis of the Project's consistency is indented below the policy statement.*

   *Chapter 2 Land Use*

   ***"GPO 2.114B.** Economically productive farming should be promoted and protected. Commercial agricultural lands includes those lands that have the high probability of an adequate and dependable water supply, are economically productive, and meet the definition of "Prime Farmland" as defined under 7CFR Chapter VI Part 657.5...."*

   The proposed Project would be developed on non-irrigated land, most of which is used for cattle grazing. This land does not meet the definition of Prime Farmland. Removal of minor amounts of rangeland would not affect the productivity of cattle grazing operations. Therefore, the Project would be consistent with this land use policy.

   ***"GPO 2.118.** Encourage development projects whose outcome will be the significant conservation of farmlands."*

   The permanent footprint of the Project will remove approximately 90 acres from open space and cattle grazing uses. This reduction poses a negligible impact to cattle operations. The steady source of income to property owners would increase and diversify overall farm income, creating a beneficial impact and helping to ensure continued agricultural viability. Therefore, development of the Project would not conflict with the above policy.

   ***"GPO 2.140.** Land use activities within or adjacent to commercial forest land should be sited and designed to minimize conflicts with forest management and other activities on commercial forest lands."*

   Although forest cover exists to the north of the Project area, there is no commercial forest land or activities immediately adjacent to the Project and there would be no effects on any forest management or other activities on

commercial forest lands.

Chapter 5 Capital Facilities Plan

*"GPO 5.110A. Capital facilities and utilities may be sited, constructed, and operated by outside public service providers (or sited, constructed, and/or operated jointly with a Master Planned Resort (MRP) or Fully Contained Community to the extent elsewhere permitted), on property located outside of an urban growth area or an urban growth node if such facilities and utilities are located within the boundaries of such resort or community which is approved pursuant to County Comprehensive Plan policies and development regulations."*

The Project is located outside any urban growth area or urban growth node, but the policy does not apply to the Project because the policy relates to utility facilities associated with MRPs or Fully Contained Communities, rather than to utility facilities for general public service.

*"GPO 5.110B. 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, UGAs, UGNs, Master Planned Resorts, and Fully Contained Communities, including to and through rural areas of Kittitas County."*

To the extent that the underground collector lines associated with the Project are considered electric transmission and/or distribution facilities, this Policy allows their placement in rural areas of the County.

*"GPO 5.120. To recognize the Swiftwater Corridor Vision Plan as a planning tool that provides recommendations for specific strategies to improve, enhance, and sustain the corridor's unique intrinsic qualities and the many enjoyable experiences it offers. Selected projects within the vision plan shall not place additional management policies or regulations on private property or adjacent landowners beyond those that already exist under federal, state, regional, and local plans and regulations."*

The Swiftwater Corridor Vision Plan applies to the area along Highway 10 that runs along the southern edge of the Project area. However, as noted in the policy language for GPO 5.120, the Vision Plan does not have regulatory power but instead provides strategies for corridor enhancement. The policy specifically notes that the Vision Plan does not place additional management policies or regulations on private property or adjacent landowners.

Chapter 6 Utilities

*"GPO 6.7. Decisions made by Kittitas County regarding utility facilities will be made in a manner consistent with and complementary to regional demands and resources."*

The proposed Project would draw upon a county resource (wind) to provide energy to meet the regional power demands. Therefore, development of the Project would be consistent with, and complementary to, regional utility demands and local resources.

*"GPO 6.9. Process permits and approvals for all utility facilities in a fair and timely manner, and in accordance with development regulations that ensure predictability and project concurrency."*

The proposed Project would be developed in accordance with all local, regional, and state wind power development regulations and would therefore be consistent with this policy.

*"GPO 6.10. Community input should be solicited prior to county approval of utility facilities which may significantly impact the surrounding community."*

The county, EFSEC and the Project developer have solicited community input on the proposed wind farm.

*"GPO 6.18. Decisions made regarding utility facilities should be consistent with and complementary to regional demand and resources and should reinforce an interconnected regional distribution network."*

This policy is similar to GPO 6.7. The proposed Project would significantly reinforce an interconnected regional power transmission and distribution network by connecting to Puget Sound Energy's (PSE) and/or Bonneville Power Administration's (BPA) electric power grid. Therefore, the Project is consistent with this policy.

*"GPO 6.21. Avoid, where possible, routing major electric transmission lines above 55 kV through urban areas."*

The Project does not propose any new major electric transmission lines but will connect to existing BPA and/or

PSE high voltage transmission lines. The collector cables that connect each wind turbine and strings of turbines will be located underground. In addition, the Project will not be developed in an urban area; therefore, it is consistent with this policy.

*"GPO 6.32. 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, UGAs, UGNs, Master Planned Resorts, and Fully Contained Communities, including to and through rural areas of Kittitas County."*

This policy is identical to Policy GPO 5.11B and has been addressed previously.

Chapter 8 Rural Lands

*"GPO 8.7. Private owners should not be expected to provide public benefits without just compensation. If the citizens desire open space, or habitat, or scenic vistas that would require a sacrifice by the landowner or homeowner, all citizens should be prepared to shoulder their share in the sacrifice."*

The proposed wind Project would be constructed on privately owned and DNR land through lease agreements with willing landowners. This comprehensive plan policy suggests that landowners should not be expected to forgo the opportunity to develop wind generation on their properties simply because of potential visual effects, unless the public at large compensates them for their lost opportunity.

*"GPO 8.24. Resource activities performed in accordance with county, state and federal laws should not be subject to legal actions as public nuisances."*

The proposed Project, to the extent it is a "resource activity" because it uses the area's wind resource, would be constructed and operated in accordance with all county, state, and federal laws, and thus is consistent with this policy.

*"GPO 8.42. The development of resource based industries and processing should be encouraged."*

Wind energy production is a type of resource-based industry in that it uses a natural renewable resource, the wind. The proposed Project could thus be considered to be consistent with this policy encouraging such industries.

*"GPO 8.62. Habitat and scenic areas are public benefits that must be provided and financed by the public at large, not at the expense of individual landowners and homeowners.*

This policy is similar to GPO 8.7, and implies that landowners should not be expected to forgo the opportunity to develop wind generation on their properties simply because of potential visual effects, unless they are compensated for their lost opportunity by the public at large.

b. The proposed amendment bears a substantial relation to the public health, safety or welfare.

*The Project bears a substantial relation to the public health, safety, and welfare. The Project will develop one of Kittitas County's renewable resources, wind. It will provide a clean source of power while helping to reduce the region's dependence on polluting, non-renewable and often volatile energy sources. Additionally, the Project will provide significant added tax revenue while not increasing the demand for local public services, such as public safety, schools and infrastructure. An analysis of these economic impacts is presented in the November 2002 report: "Economic Impacts of Wind Power in Kittitas County- A Report for the Phoenix Economic Development Group" by ECONorthwest (Exhibit 5, 'Phoenix Study'.) Tax revenues generated by the Project can be used to finance public services that improve public, health, safety and welfare and/or to reduce the current tax burden on existing taxpayers. New jobs will be created during both construction and operation of the Project and local purchases of supplies and services will provide a further boost to the local economy.*

c. The proposed amendment has merit and value for Kittitas County or a sub-area of the county.

*The Project has merit and value for Kittitas County. As stated in (b) above, the Project will provide a significant long term increase in local tax revenues without increasing demand on local services and will create new jobs in the county. The Project will also help diversify the regional energy portfolio and reduce the region's dependence on non-renewable energy sources that are subject to price volatility and generate significant pollution. In the immediate Project area, participating landowners will realize substantial increases in income in the form of royalty payments for wind turbines on their land. This additional income will help promote the conservation of*

*the area's rural character by reducing pressure on landowners to subdivide their land and convert from open space and grazing to residential development. Development of wind energy facilities in the Project area will result in far less demand for public services than would be the case for residential development.*

d. The proposed amendment is appropriate because of changed circumstances or because of a need for additional property in the proposed zone or because the proposed zone is appropriate for reasonable development of the subject property.

*In enacting Ordinance 2002-20 (establishing new wind farm development rules), the County established that wind farms "are a permitted use in a Wind Farm Resource Overlay Zoning District." (Section 17.61A.030). However, under Ch. 17.61A, sub-area plan and zoning amendments are required. Consequently, under the relevant code provisions, the "changed circumstances" test is not readily applicable to the proposed plan and zoning amendments. There is a "need for additional property" in Kittitas County having the Wind Farm Resource overlay designation, in that while the County has determined that wind farm uses are a permitted use within the overlay district, no properties having this designation currently exist in Kittitas County. Additionally, and in the alternative, for the reasons described below, the proposed sub-area district and zoning overlay designations are "appropriate for reasonable development of the subject property."*

*Fundamentally, setting aside site-specific issues addressed in the site-specific permitting process, properties are suitable for wind energy facility development (and consequently are generally suitable for the sub-area plan and zoning overlay designations) if they have the appropriate underlying zoning (Ag-20, Forest &Range, Commercial Agriculture, and Commercial Forest), AND because they have substantial, steady, reliable, commercially-viable winds, AND because they are situated in close proximity to electric transmission facilities. Therefore, only a limited number of properties could be eligible for such development. Because of the very limited range of properties suitable in Kittitas County for this property use, the proposed project site is an appropriate property to be assigned the sub-area plan and zoning overlay designation due to need for additional property, and because wind energy facility use is appropriate for the reasonable development of the property.*

*The proposed sub-area plan designation and rezone are is appropriate because the Project area is suitable for Wind Farm development. The Project area is appropriate for Wind Farm development for several key reasons.*

- *The wind resource in the Project area is vigorous, well-documented and commercially viable;*
- *The Project area is already crossed by 6 different sets of high voltage electric transmission lines, therefore, no new above ground transmission lines are needed;*
- *The Project area has a good network of existing public and private roads, thus minimizing the amount of new road construction necessary for building and operating the Project;*
- *The development of a Wind Farm in the Project area is consistent with current land uses in the area (grazing, open space, scattered rural homesites);*
- *Extensive environmental, cultural resource, noise and visual studies have shown the impacts from the Project will be minimal and can be mitigated successfully through the site-specific permits.*

e. The subject property is suitable for development in general conformance with zoning standards for the proposed zone.

*The Wind Farm Resource overlay district, as defined in Ch. 17.61A, does not contain zoning standards, but instead relies upon the site-specific development permit to implement appropriate development standards. The subject property will be developed in compliance with a Wind Resource Overlay zone and in conformance with the zoning standards contained in that zone, as well as any additional standards or conditions imposed by EFSEC as part of a Site Certification Certificate.*

f. The proposed amendment will not be materially detrimental to the use of properties in the immediate vicinity of the subject property.

*The project will not be materially detrimental to the use of properties in the immediate vicinity of the Project Area because all existing land uses within the Project Area - including grazing, open space, and rural residential, would continue, with no limitations or restrictions on the use of properties in the immediate vicinity as a consequence of the proposed property use.*

g. The proposed changes in use of the subject property shall not adversely impact irrigation water deliveries to other properties.

*There will be no impact to irrigation water deliveries. The area requested for rezoning is not currently irrigated. The Kittitas Reclamation District (KRD) canal runs south of one portion of the proposed Project, but will not be affected by the construction or operation of the Project.*

☐ **SECTION IV. SHORELINES SUBSTANTIAL DEVELOPMENT/CONDITIONAL USE.**

ADDITIONAL ITEMS TO COMPLETE: SECTION VI FLOOD DEVELOPMENT APPLICATION (IF LOCATED WITHIN 100-YEAR FLOODPLAIN); SECTION IX SEPA ENVIRONMENTAL CHECKLIST; AND, THE FOLLOWING ITEMS:

- o PROJECT DIAGRAMS WITH SCALE
- o SITE PLAN(S):
  - o VICINITY MAP, SITE LOCATION USING NATURAL POINTS OF REFERENCE (INCLUDE NAME OF WATER BODY)
  - o SITE BOUNDARY
  - o PROPERTY DIMENSIONS IN VICINITY OF PROJECT
  - o ORDINARY HIGH WATER MARK (OHWM)
  - o TYPICAL CROSS SECTION(S) SHOWING:
    - o EXISTING GROUND ELEVATIONS
    - o PROPOSED GROUND ELEVATIONS
    - o HEIGHT OF EXISTING STRUCTURES
    - o HEIGHT OF PROPOSED STRUCTURES
  - o PROPOSED LAND CONTOURS, 5' INTERVALS IN WATER, 10' LANDWARD OF OHWM
  - o DIMENSIONS AND LOCATIONS OF EXISTING STRUCTURES TO BE MAINTAINED
  - o DIMENSIONS AND LOCATIONS OF PROPOSED STRUCTURES
  - o SOURCE, COMPOSITION, AND VOLUME OF FILL MATERIAL
  - o COMPOSITION, VOLUME OF EXTRACTED MATERIALS AND PROPOSED DISPOSAL AREA
  - o LOCATION OF PROPOSED UTILITIES
  - o SEPTIC TANK COMPLIANCE WITH LOCAL AND STATE REGULATIONS

☐ **SECTION IV. SHORELINES 100' STRUCTURAL SETBACK VARIANCE.**

ADDITIONAL ITEMS TO COMPLETE: SECTION VI FLOOD DEVELOPMENT APPLICATION (IF LOCATED WITHIN 100-YEAR FLOODPLAIN); AND, THE FOLLOWING ITEMS MUST BE INCLUDED:

- o PROJECT DIAGRAMS WITH SCALE
- o SITE PLAN(S):
  - o VICINITY MAP, SITE LOCATION USING NATURAL POINTS OF REFERENCE
  - o SITE BOUNDARY
  - o PROPERTY DIMENSIONS IN VICINITY OF PROJECT
  - o ORDINARY HIGH WATER MARK OHWM)
  - o TYPICAL CROSS SECTION(S) SHOWING:
    - o EXISTING GROUND ELEVATIONS
    - o PROPOSED GROUND ELEVATIONS
    - o HEIGHT OF EXISTING STRUCTURES
    - o HEIGHT OF PROPOSED STRUCTURES
  - o PROPOSED LAND CONTOURS, 5' INTERVALS IN WATER, 10' LANDWARD OF OHWM
  - o DIMENSIONS AND LOCATIONS OF EXISTING STRUCTURES TO BE MAINTAINED
  - o DIMENSIONS AND LOCATIONS OF PROPOSED STRUCTURES
  - o SOURCE, COMPOSITION, AND VOLUME OF FILL MATERIAL
  - o COMPOSITION, VOLUME OF EXTRACTED MATERIALS AND PROPOSED DISPOSAL AREA
  - o LOCATION OF PROPOSED UTILITIES
  - o SEPTIC TANK COMPLIANCE WITH LOCAL AND STATE REGULATIONS

1. Name of adjoining water body:

2. Proposed structural setback from the water body (in feet):

3. A variance may be granted when the following criteria are met. Please describe how each criteria is met for this particular request (attach additional sheets as necessary):

a. The hardship which serves as basis for granting of a variance is specifically related to the property?

b. The hardship results from the application of the requirements of the Act and not from deed restrictions or the applicant's own actions?

c. The variance granted will be in harmony with the general purpose and intent of the Master Program?

d. The public welfare and interest will be preserved?

☐ **SECTION VI. FLOOD DEVELOPMENT PERMIT.**

FOR STRUCTURAL PROJECTS (SUCH AS HOME OR GARAGE), ADDITIONAL ITEMS TO COMPLETE:

- o PROJECT DIAGRAMS WITH SCALE
- o SITE PLAN(S):
  - o VICINITY MAP, SITE LOCATION USING NATURAL POINTS OF REFERENCE
  - o SITE BOUNDARY
  - o DIMENSIONS AND LOCATIONS OF EXISTING STRUCTURES TO BE MAINTAINED
  - o DIMENSIONS AND LOCATIONS OF PROPOSED STRUCTURES
  - o SOURCE, COMPOSITION, AND VOLUME OF FILL MATERIAL
  - o COMPOSITION, VOLUME OF EXTRACTED MATERIALS AND PROPOSED DISPOSAL AREA
  - o SEPTIC TANK COMPLIANCE WITH LOCAL AND STATE REGULATIONS

ONCE YOU HAVE SUBMITTED YOUR APPLICATION FOR FLOOD PERMIT, YOU MUST PROCEED TO HIRE A LICENSED SURVEYOR/ENGINEER. THE LICENSED SURVEYOR/ENGINEER WILL ESTABLISH THE GRADE ELEVATION AT THE BUILDING PAD AND SEND TO YOU AND KITTITAS COUNTY A LETTER CERTIFYING THAT ELEVATION. THE DIFFERENCE BETWEEN THE GRADE ELEVATION AND THE ELEVATION OF THE 100-YEAR BASE FLOOD ELEVATION (BFE), PLUS 1 FOOT, IS THE ELEVATION AT WHICH THE FIRST FLOOR OF THE HOME MUST BE BUILT. IF YOUR LOT IS PARTIALLY IN THE FLOODWAY, A SURVEY OF YOUR PROPERTY MAY BE NECESSARY TO ESTABLISH THAT THE BUILDING IS NOT ENCROACHING ON THE FLOODWAY. ONCE BUILT, THE SURVEYOR "SHOOTS" THE ELEVATION OF THE FIRST FLOOR OF THE STRUCTURE AND SUBMITS AN ELEVATION CERTIFICATE TO KITTITAS COUNTY.

FOR NON-STRUCTURAL PROJECTS (SUCH AS RIP-RAP PLACEMENT), ADDITIONAL ITEMS TO COMPLETE:

- o PROJECT DIAGRAMS WITH SCALE

- o SITE PLAN(S):
  - o VICINITY MAP, SITE LOCATION USING NATURAL POINTS OF REFERENCE
  - o SITE BOUNDARY
  - o ORDINARY HIGH WATER MARK (OHWM)
  - o DIMENSIONS AND LOCATIONS OF EXISTING STRUCTURES
  - o SOURCE, COMPOSITION, AND VOLUME OF FILL MATERIAL
  - o COMPOSITION, VOLUME OF EXTRACTED MATERIALS AND PROPOSED DISPOSAL AREA

☐ **SECTION VII. SHORT PLAT.**

ITEMS TO COMPLETE: SEE SUBDIVISION CODE FOR PLAT REQUIREMENTS, AND THE FOLLOWING ITEMS:

- o SHORT PLAT MAP - MIN. 5 PAPER COPIES
- o CERTIFICATE OF TITLE
- o COMPUTER CLOSURES
- o PUBLIC WORKS APPROVAL OF ACCESS REQUIREMENTS
- o PUBLIC HEALTH APPROVAL OF SOIL AND DRINKING WATER REQUIREMENTS
- o IRRIGATION DISTRICT (KRD, CASCADE ONLY) APPROVAL OF IRRIGATION SYSTEM

☐ **SECTION VIII. LONG PLAT.**

ITEMS TO COMPLETE: SEE SUBDIVISION CODE FOR PLAT REQUIREMENTS; SECTION X SEPA ENVIRONMENTAL CHECKLIST; AND THE FOLLOWING ITEMS:

- o LONG PLAT MAP- MIN. 10 PAPER COPIES
- o COMPUTER CLOSURES
- o PUBLIC WORKS APPROVAL OF ACCESS REQUIREMENTS
- o PUBLIC HEALTH APPROVAL OF SOIL AND DRINKING WATER REQUIREMENTS
- o IRRIGATION DISTRICT (KRD, CASCADE ONLY) APPROVAL OF IRRIGATION SYSTEM

**Section IX. Public Facilities Permit:**

ADDITIONAL ITEMS TO COMPLETE: SECTION IX SEPA ENVIRONMENTAL CHECKLIST.

A. Will the granting of the proposed Public Facilities Permit:

(1) be detrimental to the public health, safety, and general welfare.

_____

(2) be injurious to the property or improvements adjacent to, and in the vicinity of, the site upon which the proposed use is to be located.

_____

(3) adversely affect the established character of the surrounding vicinity.

_____

## SECTION IX. SEPA ENVIRONMENTAL CHECKLIST.

A. Background

1. Proposed timing or schedule (including phasing, if applicable):

*The Applicant anticipates receiving regulatory approval (site certification agreement from EFSEC) by late 2003 and to complete construction by late 2004. The Project will take approximately 12 months to build. For wind power projects, the longest lead-time items are typically the substation transformers. These long lead time items will be ordered immediately following obtaining site certification from EFSEC.*

*The proposed Project construction schedule summary showing the major tasks and key milestones is included below in Table 1. Also shown in Table 1 is the number of expected on-site personnel to perform each of the key tasks.*

**Table 1**
**Proposed Project Construction Schedule Summary**

| | *TASK / MILESTONE* | *START* | *FINISH* |
|---|---|---|---|
| 1 | Obtain EFSEC Site Certification | *TARGET* | 10/1/03 |
| 2 | Engineering/Design/Specifications/Surveys | 8/6/03 | 9/30/03 |
| 3 | Order/Fabricate Wind Turbines | 10/1/03 | 3/16/04 |
| 4 | Order/Fabricate Substation Transformer | 10/1/03 | 6/1/04 |
| 5 | Road Construction | 10/1/03 | 1/20/04 |
| 6 | Foundations Construction | 10/22/03 | 4/6/04 |
| 7 | Electrical Collection System Construction | 11/19/03 | 5/4/04 |
| 8 | Substation Construction | 1/14/04 | 6/1/04 |
| 9 | Wind Turbine Assembly and Erection | 3/17/04 | 9/21/04 |
| 10 | Plant Energization and Commissioning | 5/12/04 | 9/28/04 |
| 11 | Plant Substantial Completion | *TARGET* | 9/28/04 |
| 12 | Construction Punchlist Clean-Up | 8/25/04 | 11/16/04 |

3. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

*No.*

4. List any environmental information you know about that had been prepared, or will be prepared, directly related to this proposal.

*Extensive environmental studies have been conducted for this project over a 14 month period. All of the relevant information gathered and prepared for these studies has been submitted to EFSEC, and to Kittitas County, in the form of an Application for Site Certification for the Project. These studies include: Habitat mapping, rare plant surveys, avian and wildlife baseline studies, raptor nest surveys, bald eagle surveys, geotechnical investigation, cultural resource surveys, visual simulations and visual resource analysis, noise analysis and modeling, and telecommunications interference analysis.*

5. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.

*Yes. This project is being reviewed by the Washington Energy Facility Site Evaluation Council (EFSEC). EFSEC has accepted the "lead agency" role under SEPA and has issued a determination of significance (DS) and has begun the process of drafting an Environmental Impact Statement (EIS.) Pursuant to RCW 80.50.180, Kittitas County is exempt from SEPA review requirements for this project. As part of the EFSEC review process, EFSEC requires the Applicant to seek a determination of land use consistency from the local jurisdiction. This re-zone and comprehensive plan sub-area amendment are requested to determine if the proposed land use is consistent with local land use regulations. Applicant is NOT seeking a development permit or development agreement to construct and operate the Project from Kittitas County. Siting and permitting are being addressed by EFSEC.*

6. List any government approvals or permits that will be needed for your proposal, if known.

*Please see #4 above.*

B. Environmental Elements

1. EARTH

a. General description of the site (circle one): flat, rolling, hilly, steep slopes, mountainous, other.

b. What is the steepest slope on the site (approximate percent slope)?

*The Project area extends across a 3.5- by 5 mile portion of land that consists primarily of long north-south trending ridges. Between the ridges are ephemeral and perennial creeks that flow into the Yakima River, which is located just south of the Project area. The wind turbine generators will not be placed on slopes exceeding 20 percent. Slopes within the Project area generally range from 9 percent to 34 percent, but can reach 64 percent or more in some of the stream canyons. Exhibit 2, 'Project Site Layout' presents a topographic map of the Project site.*

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any prime farmland.

*Soils in the Project area along the ridgetops primarily consist of complexes of shallow to moderately deep mineral soils (known as durixerolls) that formed in alluvium and glacial drift over a duripan (a silica-cemented subsurface horizon). Loess mixed with volcanic ash is typically present at the surface. Ridgetop soils in this portion of the Project area (which includes the turbine areas) include the following series (USDA, 2002a):*

*Lablue Series*
*The Lablue series consists of shallow, well-drained soils that formed in alluvium and glacial drift over a duripan with an influence of loess mixed with volcanic ash in the surface. Lablue soils are on old uplifted fan remnants, old terraces, and old till plains and are 7 to 10 inches to a duripan. Slopes are 3 to 15 percent.*

*Reelow Series*
*The Reelow series consists of shallow, well-drained soils that formed in alluvium and glacial drift over a duripan with an influence of loess mixed with volcanic ash in the surface. They are on old uplifted fan remnants, old terraces, and old till plains and are 10 to 20 inches to a duripan.*

*Sketter Series*
*The Sketter series consists of moderately deep, well-drained soils formed in alluvium and glacial drift over a duripan with an influence of loess mixed with volcanic ash in the surface. They are on old uplifted fan remnants, old terraces, and old till plains. Slopes are 2 to 15 percent.*

*Reeser Series*
*The Reeser series consists of moderately deep, well-drained soils that formed in alluvium and glacial drift over a duripan with an influence of loess mixed with volcanic ash in the surface. They are on old uplifted fan remnants, old terraces, and old till plains. Slopes are 2 to 15 percent.*

d. Are there surface indications or history of unstable soils in the immediate vicinity?

*The predominant subsurface conditions for the project consist of dry to moist, weak to moderately cemented gravels and cobbles overlying basalt bedrock. The results of the Geotech Data Report (Exhibit 6) do not indicate unstable soils in the immediate vicinity.*

e. Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate source of fill.

*Based on preliminary calculations and depending on the type of foundation design used, approximately 125 cubic yards of excavated soil will remain from each turbine foundation excavation. The excess soils not used as backfill for the foundations will be used to level out low spots on the crane pads and roads consistent with the surrounding grade. The edges of the disturbed areas will be reseeded with a designated mix of grasses and/or seeds around. Larger cobbles will be used a road edge perimeter boundaries, disposed of off- site, or crushed into smaller rock for use as backfill or road material. All excavation and foundation construction work will be done in accordance to a formal Storm Water*

*Pollution Prevention Plan (SWPPP) for the Project as outlined in part "h" below.*

*Most surplus materials generated during Project construction will be earthen materials that originate from road cuts, cable trenching and excavations of pits for turbine foundations. Excavation and foundation construction will be conducted in a manner that will minimize the size and duration of excavated areas required to install foundations. Portions of the work may require excavation and/or shoring. Foundation work for a given excavation will commence after excavation of the area is complete. Backfill for the foundations will be installed immediately after approval by the engineer's field inspectors. The Applicant plans on using on-site excavated materials for backfill.*

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

*Impacts to the geologic formations during construction would be moderate to low. The Project would alter the landscape with minor cuts-and-fills for roadways and leveling for turbine foundations. These alterations would result in minimal impact to existing topography and surface drainage and not cause any significant change.*

*Because the construction of roads, turbine foundations and other Project facilities would be engineered, these facilities would be subject to the requirements of a National Pollutant Discharge Elimination System (NPDES) storm water construction permit and other pertinent construction and project operation permits and pollution control regulations as described in Exhibit 7, "National Pollutant Discharge Elimination System Permit Application" and part "h" below. These regulations would require the development of an erosion control plan and implementation of erosion control best management practices (BMPs) during Project construction and operation. As a result, it is likely that Project facilities would be constructed with more protection against erosion than existing private roads in the Project area.*

g. About what percentage of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

*The proposed Kittitas Valley Wind Power Project (Project) is located in the Kittitas Valley area of Kittitas County in south central Washington comprising a geographic area of approximately 5,900 acres.*

*The Project consists of several prime elements which will be constructed in phases including roads, foundations, underground and overhead electrical lines, grid interconnection facilities, one or two substations, an operations and maintenance (O&M) center and associated supporting infrastructure and facilities. The Project's impervious surfaces after construction will be less than 1/10 of 1 percent.*

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

*The Kittitas Valley Wind Power Project (the "Project") wind turbines, site roads, underground cables, and other supporting infrastructure are located on ridge tops with good wind exposure and not in wetlands or watercourses. The site construction plans will include detailed provisions and specifications to help minimize erosion and storm water pollution. Existing roads are being upgraded where feasible to avoid the need for new road construction.*

*<u>Storm Water Pollution Prevention Plan</u>*
*A detailed construction Storm Water Pollution Prevention Plan (SWPPP) will be developed for the Project to help minimize the potential for discharge of pollutants from the site during construction activities. The SWPPP will be designed to meet the requirements of the Washington State Department of Ecology General Permit to Discharge Storm Water through its storm water pollution control program (Chapter 173-220 WAC) associated with construction activities.*

*The SWPPP will include both structural and non-structural best management practices (BMPs). Examples of structural BMPs could include the installation of silt curtains and/or other physical controls to divert flows from exposed soils, or otherwise limit runoff and pollutants from exposed areas of the site. Examples of non-structural BMPs include management practices such implementation of materials handling, disposal requirements and spill prevention methods.*

*<u>Storm Water Pollution Prevention Plan Design</u>*
*The SWPPP will be prepared along with detailed Project grading plan design by the Engineering, Procurement and Construction (EPC) Contractor when design level topographic surveying and mapping is prepared for the Project site. The final configuration of proposed improvements will be overlaid onto the detailed topographic maps and the Project civil design engineer will establish the locations and types of construction BMPs to be required of the EPC Contractor. These details will be included on an overall map of the Project site.*

*A narrative section of the SWPPP will describe the intended installation sequence and function of the selected BMPs, and present the sizing calculations. The plan also will identify the selected minimum standards to which each of the BMPs are to be constructed or installed. When prepared at this level of detail, the document will meet the requirements of the Storm Water Construction Activity NPDES permit system, and will accurately describe to the EPC Contractor, and the Project site construction management team, the improvements and actions required during construction. When complete and submitted to EFSEC, the SWPPP will then be included in the construction bid and contract documents. Implementation of the construction BMPs will be carried out by the EPC contractor, with enforcement supervised by the Project's environmental monitor who will be responsible for implementing the SWPPP.*

**Site Construction: General Storm Water Pollution Prevention Measures**

*Site-specific BMPs will be identified on the construction plans for the site slopes, construction activities, weather conditions, and vegetative buffers. The sequence and methods of construction activities will be controlled to limit erosion. Clearing, excavation, and grading will be limited to the minimum areas necessary for construction of the Project. Surface protection measures, such as erosion control blankets or straw matting, also may be required prior to final disturbance and restoration if potential for erosion is high.*

*All construction practices will emphasize erosion control over sediment control through such non-quantitative activities as:*

- *Straw mulching and vegetating disturbed surfaces;*
- *Retaining original vegetation wherever possible;*
- *Directing surface runoff away from denuded areas;*
- *Keeping runoff velocities low through minimization of slope steepness and length; and*
- *Providing and maintaining stabilized construction entrances.*

*A more detailed description of the materials, methods and approaches used as part of the BMPs for effective storm water pollution prevention and erosion control are as follows:*

*Rain Level Monitoring*
*The environmental monitor shall be responsible for checking and recording precipitation levels at the Project site using a rain gauge. This benchmark will be used to determine the performance of the SWPPP measures that have been implemented during construction. After construction, the O&M group will also continue to monitor rainfall amounts and monitor the in-place erosion control systems while re-seeded areas become more established. Modifications and additional landscaping will be performed where needed by the O&M group after Project construction is completed.*

*Mulching*
*Loose straw shall be spread and punched into the ground in all areas where vegetation has been cleared.*

*Temporary Straw Bale and Silt Fence Sediment Barriers*
*Temporary straw bale barriers and sediment fences shall be inspected by the Contractor immediately after each rainfall and at least daily during prolonged rainfall. Any required repairs, relocations, or additions shall be made promptly. No more than one foot of sediment shall be allowed to accumulate behind straw bales or silt fence sediment barriers. Sediment will be removed and re-graded into slopes. New lines of barriers installed uphill of sediment-laden barriers will be considered based on the rate at which the one foot of sediment accumulates (See Figure 6).*

***Figure 6: Erosion Control Blankets and Silt Fencing used for Exposed Slope Stabilization as part of a SWPPP***

*Silt fences and straw bale sediment barriers will be maintained throughout the construction period, and beyond, until disturbed surfaces have been stabilized with vegetation. Silt fence construction specifications including fabric type, support spacing, and total length will be determined by local construction conditions during final design of the facilities.*

*Check Structures And Sediment Traps*
*Check structures, such as rock dams, hay bale check dams, dikes and swales will be used, where appropriate, to reduce runoff velocity as well as to direct surface runoff around and away from cut-and-fill slopes. Swales and dikes will also be used to direct surface water toward sediment traps.*

*Matting And Erosion Control Blankets*
*Depending upon weather conditions during the construction period, straw or jute matting or other suitable erosion control blankets will be used on the pad slopes and the drainage channel slopes if direct rainfall on the slopes will result in erosion prior to stabilization.*

*Control of Excavation De-Watering*
*All excavation work requiring de-watering will be discharged to the surrounding surface areas through a hose which will be moved as the water is pumped out to distribute the ground water over a large surface area to avoid causing increased erosion or storm water pollution.*

**Road Construction Storm Water Pollution Control Measures**

*Work on the access roads will include grading and re-graveling existing roads and construction of new roads. The site will have gravel roadways which will be generally a low profile design allowing water to flow over them in most areas. Erosion control measures to be installed during the work on the access roads includes:*

- *The maintenance of vegetative buffer strips between the impacted areas and any nearby receiving waterways;*
- *Installation of sediment fence/straw bale barriers on disturbed slopes and other locations shown on the SWPPP;*
- *Straw mulching at locations adjacent to the road that have been impacted;*
- *Providing temporary sediment traps and sediment type mats downstream of seasonal stream crossings;*
- *Installation of silt fencing on steeper exposed slopes;*
- *Planting of designated seed mixes at impacted areas.*

*At each turbine location, a crane pad area of approximately 3,000 square feet will be graded in place and covered with road rock. During construction, silt fences, hay bails, or matting will be placed on the down slope side of the crane pad areas. Wind turbine equipment such as the blades, tower sections and nacelles will be transported and off-loaded at each turbine location near the foundation and crane pad. After construction, disturbed areas around all crane pad staging areas will re-seeded as necessary to restore the area to its original condition.*

*The environmental monitor will be responsible for locating any necessary clean fill disposal sites for excess excavation spoils. To control the release of sediment from the disposal sites, silt fence with a straw bale barrier shall be installed on the down slope side of all disposal areas. If additional sediment or erosion control measures are determined to be necessary to control the release of sediment from the disposal sites, the environmental monitor shall be responsible for implementing these measures.*

*All areas that are impacted by the construction will be seeded when there is adequate soil moisture. They will be re-seeded if healthy cover vegetations do not grow. The sediment fence and check dams will remain in place until the impacted areas are well vegetated and the risk of erosion has been eliminated. The Project operations group will remove the sediment fence at this time.*

**Foundation Construction Storm Water Pollution Control Measures**

*Foundation construction will require significant excavation at each wind turbine location. Excavation materials will be stored adjacent to the foundation holes as the forms, rebar and bolts are assembled and as the concrete cures after it is cast in place. Sediment fences, hay bails or matting will be installed on steeper down slopes near the storage piles. Once the concrete cures, excavated materials will be used for back filling. In impacted areas adjacent to pads, mulch will be spread and the area will be re-seeded. Cobbles and rocks too large for backfilling will be disposed of off-site, used in rock check-dams or to support other on-site erosion control measures.*

**Underground Cable Trenching Storm Water Pollution Control Measures**

*Underground electrical and communications cables will be placed in 3 to 5 foot-wide trenches along the length of each wind turbine string corridor. In some cases trenches will run from the end of one turbine string to the end of an adjacent turbine string to link turbines via the underground network. Trenches will be excavated from 1.5 to 4 feet deep varying depending on the underlying soil/rock conditions. Excavated materials will be piled alongside the cable trenches for back filling after cable installation. Sediment fences, hay bails or matting will be installed on steeper down slopes near the storage piles. After backfilling, excess excavated soils will be spread around the surrounding area and contoured to the natural grade. Cobbles and rocks too large for backfilling will be disposed of off-site, used in rock check-dams or to support other on-site erosion control measures. Finally, the area will be re-seeded with a designated seed mix, as appropriate to the location.*

**Overhead Collector Line Construction Storm Water Pollution Control Measures**

*Construction of the overhead pole line alongside Bettas Road will also require excavation for setting of the poles. Excavated materials will be piled alongside the excavations for back filling after pole installation. Sediment fences, hay bails or matting will be installed on any steep down slopes near the storage piles. After backfilling, excess excavated soils will be spread around the surrounding area and contoured to the natural grade. Cobbles and rocks too large for backfilling will be disposed of off-site, used in rock check-dams or to support other on-site erosion control measures. Finally, the area will be re-seeded with a designated seed mix, as appropriate to the location.*

**Substation Construction Storm Water Pollution Prevention Measures**

*The substation is generally flat and the base area will be graded and covered with a sub-base rock and a graveled surface on top. Foundation and underground trenching excavation spoils will be handled in the same manners as described in the above sections regarding foundations and underground cable trenches. Disturbed areas surrounding the substation perimeter shall be contoured to the natural grade covered in straw mulch, protected for erosion control and re-seeded as appropriate to the adjacent slopes. The main substation transformers, which are filled with mineral oil, are equipped with an oil level meter and float switch. The transformers will be surrounded by oil containment catch trenches around the outer perimeter of their foundations.*

**Final Road Grading and Site Cleanup**

*The Project will have dumpsters from a local sanitation company to collect recyclable materials and dispose of waste materials that could not be reused. A final site cleanup will be made before turning the Project over to the O&M group. In accordance with the Erosion & Sediment Control Plan for access road improvement and construction, county roads will be restored to at least their pre-Project condition and to the satisfaction of the Kittitas County public works department.*

**Storm Water Management During Project Operations**

*As described above, the Project will prepare and define a Storm water Pollution Prevention Plan as part of the final design. The Project operations group will be responsible for monitoring the SWPPP measures that were implemnted during construction to ensure they continue to function properly. Final designs for the permanent BMPs will be incorporated into the final construction plans and specifications prepared by the engineering team's civil design engineer. An operations manual for the permanent BMPs will be prepared by the EPC contractor civil design engineer and the Project's enginering team.*

*The permanent storm water BMPs will include permanent erosion and sedimentation control through site landscaping, grass, and other vegetative cover. The final designs for these permanent BMPs will conform to the Washington Department of Ecology Storm water Management Manual.*

*The Project operations group will periodically review the SWPPP against actual practice. The Operations Manager will ascertain that the controls identified in the plan are adequate, and that employees are following them. A summary of these in-house compliance inspections will be kept with the SWPPP, along with any notifications and reports of non-compliance items or areas. If the SWPPP has been followed but still proves to be inadequate to prevent storm water pollution, the SWPPP will be adjusted and/or amended and resubmitted to the Washington Department of Ecology for concurrence.*

2. AIR

a. What types of emissions to the air would result from the proposal (i.e. dust, automobiles, odors, industrial wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities if known.

*Emissions*

*The fuel source for the Project is wind that is transformed from kinetic energy into electrical energy by wind turbine generators. No air emissions will be generated from operation of the wind turbine generators at the Project. The operation of the Project will have no effect on the climate (visible plumes, fogging, misting, icing, impairment of visibility, or changes in ambient levels caused by emitted pollutants). There are no emissions from the operation of the project, and thus none to be regulated.*

*Construction of the Project will result in air emissions from the following sources:*

- *Exhaust from the diesel construction equipment used for project site preparation, grading, excavation, and construction of onsite structures;*
- *Exhaust from water trucks used to control construction dust emissions;*
- *Exhaust from diesel trucks used to deliver equipment, concrete, fuel, and construction supplies to the construction site;*
- *Exhaust from pickup trucks and diesel trucks used to transport workers and materials around the construction site and from vehicles used by workers to commute to the construction site;*
- *Exhaust from diesel-powered welding machines, electric generators, air compressors, etc.*

*These emissions will be similar in nature to those produced by any large construction project that involves heavy equipment and transportation of materials to the project site.*

*The vast majority of new power plants proposed and constructed in the Pacific Northwest in recent years have been fossil fuel fired plants, primarily using natural gas as fuel. Fossil fuel fired plants, in contrast to wind power projects, emit significant quantities of carbon dioxide that is the primary cause of anthropogenic climate change. Natural gas fired plants also emit sulfur oxides and nitrogen oxides, which contribute to both ground-level air quality problems and acid rain. By producing electricity without generating air emissions, which would otherwise be produced by fossil fuel fired plants, the Project will have a significant beneficial impact on overall air quality and climate See Exhibit 8, "Fossil Fuel Emissions," for a further description of emissions of fossil fuel energy projects.*

*Dust*

*Construction of the Project will create fugitive dust emissions from construction-related traffic and additional wind-blown dust as a result of ground disturbance. The Applicant will implement an effective dust control program to minimize any potential disturbance from construction-related dust. Dust suppression will be accomplished through application of either water or a water-based, environmentally safe dust palliative such as lignin, in accordance with the Proposed Dust Abatement Policy developed by Kittitas County Public Works Department (this draft policy has not been formally adopted by the Board of County Commissioners.) The use of a dust palliative such as lignin (a non-toxic, non-hazardous compound derived from trees) would result in the use of substantially less water for dust suppression (see part a4 of Section IX B3, 'Water") and therefore less traffic from water trucks to the construction site. The final decision regarding dust suppression techniques will be made by the Engineering Procurement and Construction ("EPC") contractor in consultation with local authorities.*

*Operation of the Project will result in minimal or no increase in dust levels. Project related-traffic increases on gravel access roads will generate small amounts of additional fugitive dust. This increased traffic is expected to consist largely of weekly or less frequent trips to turbines in service vehicles for maintenance and repair activities. Upgrading existing roads from dirt to gravel surfaces will, however, result in some reduction in dust levels from current traffic on existing dirt roads.*

*Odors*

*Construction of the Project will produce limited odors associated with exhaust from diesel equipment and vehicles. Mitigation efforts are described in part 'c' below. Operation of the Project will create no odors as no combustion is involved and no odor-producing materials are used in Project operations.*

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

*No.*

c. Proposed measures to reduce or control emissions or other impacts to air, if any:

*The following mitigation measures for construction-related air emissions and dust are proposed:*

- *All vehicles used during construction will comply with applicable Federal and state air quality regulations;*
- *Operational measures such as limiting engine idling time and shutting down equipment when not in use will be implemented;*
- *Active dust suppression will be implemented on unpaved construction access roads, parking areas and staging areas, using water-based dust suppression materials in compliance with state and local regulations;*
- *Traffic speeds on unpaved access roads will be kept to 25 mph to minimize generation of dust;*
- *Carpooling among construction workers will be encouraged to minimize construction-related traffic and associated emissions;*
- *Disturbed areas will be replanted or graveled to reduce wind-blown dust;*
- *Erosion control measures will be implemented to limit deposition of silt to roadways.*

*No mitigation is proposed for Project operations as there will be no air or odor emissions.*

3. 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, wetlands)? If yes, describe type and provide names. If appropriate, state what streams or river it flows into.

*The southern portion Strings A and B, are within approximately one half mile of the Yakima River, and other portions of the Project are located within one half mile of Dry Creek (an ephemeral creek), other unnamed ephemeral creeks, the North Branch Canal of the Kittitas Reclamation District, and livestock watering ponds. However, the Project will not generate process water and there will be no point source discharge to nearby surface waters.*

*No wetland areas have been identified on or near the Project site in areas designated for project facilities or construction impacts. As no wetlands exist within the project footprint, no construction or operation impacts are expected, and no wetlands mitigation measures have been proposed.*

2) Will the project require any work over, in or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

*The project will not require any work within 200 feet of the surface water on or near the site. See part "4" below for further explanation of water usage during construction and operations.*

3) Estimate the 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 fill material.

*No fill or dredge material would be placed in or removed from surface water or wetlands.*

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

*The proposal will not require surface water withdrawals or diversions.*

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

*No. Project facilities will be located significantly outside the floodplain of the Yakima River and other water bodies, (the closest road or turbine location to the Yakima River is more than 500 feet in elevation above the level of river). The risk of flood impacts is insignificant.*

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.

*No.*

b. Ground

1) Will ground water be withdrawn, or will water be discharged to surface waters? If so, give general description, purpose, and approximate quantities if known.

*Construction*
*Excavation, drilling, and blasting to construct foundations for the wind turbine generators (WTGs) could penetrate to depths of 35 feet into the overburden and basalt units below the Project site. In the event of a significant rainfall, the foundation excavations could provide a temporary conduit for surface seepage, thus resulting in accelerated recharge to the overburden and basalt aquifers in the immediate vicinity of the foundation site. This in turn could cause a temporary rise in turbidity in groundwater in the vicinity of the foundation excavations. Construction of the WTG foundations, however, is expected to occur during the dry season (late May to late July) and potential impacts to groundwater are considered low because of the short duration of the construction period.*

*Perched or shallow groundwater zones could be encountered at various places along the turbine strings. In this case, dewatering activities could result in a temporary impact to groundwater resources in the overburden and upper units of the basalt aquifer. However, groundwater was not observed in test pits excavated to depths ranging from 5 to 10 feet at the site during a geotechnical investigation at the Project site (see Exhibit 6, Geotech Data Report). In addition, descriptions of local water wells show that even though there are a number of shallow wells in the Project area (i.e., some wells have been drilled to depths ranging from 57 to 116 feet), most of the wells in the area have been drilled deeper than 150 feet and in some cases are as deep as 720 feet, thus, indicating a correspondingly deep water table for most of the Project area. If dewatering were to occur, the impact to groundwater would be temporary and it is unlikely to affect water wells in the Project area.*

*Operations*
*Operation of the Project will have minimal impacts to groundwater. For operations, a domestic well will be installed by a licensed installer to serve the operations and maintenance facility. A well using less than five thousand gallons of water a day exempt pursuant to RCW 90.44.040 will be installed to provide water for domestic type use to the operation and maintenance building. The well will be installed by a licensed well contractor, licensed pursuant to Chapter 173-162 WAC, and in compliance with the requirements and standards of Chapter 173-160 WAC. The well will be installed consistent with Kittitas County Environmental Health Department and Washington Department of Ecology requirements for the new domestic wells. This well will provide water for bathroom and kitchen use and is expected to consume less than 1,000 gallons per day. It is unlikely that the Project water use, therefore, would have a direct effect on groundwater quantity, quality, and flow direction in the immediate area below the proposed facilities.*

*The tower foundations and other facilities are sufficiently above the water table to avoid any significant impacts to subsurface hydrology.*

2) Describe waste materials that will be discharged into the ground from septic tanks or other sources, if any (for example: domestic sewage; industrial, containing the following chemicals...; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

*There will be no direct discharges to groundwater from Project operations. Wastewater from the O&M facility will be discharged to a domestic septic tank installed pursuant to the requirements of Kittitas County Environmental Health Department. This wastewater will contain domestic sewage only. No industrial waste materials will be discharged to this septic system.*

c. Water Runoff (including storm water):

1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

*Precipitation could result in surface runoff from Project facilities during Project construction and operation. However, the Project site grading plan and roadway design will incorporate measures in line with the storm water pollution prevention plan (SWPPP) and Best Management Practices (BMPs) to ensure that most surface runoff will infiltrate directly into the surface soils surrounding Project facilities. Potential surface water impacts resulting from runoff related to construction and operations of the Project and measures to control such runoff are described below,*

*and in greater detail in part 'h' of Section IX B 1, Earth, above. The Project will implement a formal SWPPP and BMPs as described in detail in part 'h' of Section IX B 1, Earth, above, to reduce and/or eliminate the discharge of suspended sediment and turbidity above the turbidity criteria stipulated in the Water Quality Standards for Surface Waters of the State of Washington (WAC 173-201A).*

2) Could waste materials enter ground or surface waters? If so, generally describe.

*See part a of Section IX B 7, "Environmental Health."*

d. Proposed measures to reduce or control surface, ground, and runoff water impacts, if any:

*See response to "Water Runoff" in part "c" of this section above and part a2 of Section IX B 7 "Environmental Health."*

4. PLANTS

a. Check or circle types of vegetation found on the site:

| | |
|---|---|
| deciduous tree: | alder, maple, aspen, other |
| evergreen tree: | fir, cedar, pine, other |
| shrubs | |
| grass | |
| pasture | |
| crop or grain | |
| wet soil plants: | cattails, buttercup, bullrush, skunk cabbage, other |
| water plants: | waterlily, eelgrass, milfoil, other |
| other types of vegetation: | *See response below* |

*The project area is at the western edge of the Central Arid Steppe zone defined by the Washington State Gap Analysis. The Central Arid Steppe zone typically contains plant communities dominated by big sagebrush (Artemisia tridentata), bluebunch wheatgrass (Pseudoroegnaria spicata), and Sandberg's bluegrass (Poa secunda). In many areas of the zone, the introduced species cheatgrass (Bromus tectorum) is common due to past and present disturbance factors. The higher portions of the Project area, border the Ponderosa Pine (Pinus ponderosa) zone.*

*Several riparian areas associated with springs, seeps, and creeks are also present in the Kittitas Valley project area. These habitats are typically degraded from heavy cattle use, and much of the riparian vegetation has been removed. Common native riparian associates include chokecherry (Prunus virginiana), golden current (Ribes aureum), various rush species (Juncus spp.), various speedwell species (Veronica spp.), and yellow monkeyflower (Mimulus guttatus). A cover type map for the entire Project area has been prepared and is shown in Exhibit 9, 'Project Habitat Map'. A complete list of all plant species found on the Project site during the habitat mapping and rare plant surveys is provided in Table 2 below:*

b. What kind and amount of vegetation will be removed or altered?

*A total of approximately 90 acres of land area will be occupied by the Project and associated infrastructure (e.g. roads, turbine foundations, substation, O&M center, etc.) The descriptions below detail the specific habitat types found along each string of turbines.*

***Table 2***
***Summary of Habitats Associated with the Proposed Turbine Strings of the Project***

| *Facility* | *Habitat Description*[1] |
|---|---|
| *Turbine String 'A'* | *Shallow-soiled lithosol alternates with deeper-soiled shrub-steppe habitat. Habitat quality is generally good: native species dominate the shallow soils, and native shrubs and forbs combine with native and non-native grasses to dominate the deeper soils.* |

*Table 2*
***Summary of Habitats Associated with the Proposed Turbine Strings of the Project***

| *Facility* | *Habitat Description*[1] |
|---|---|
| *Turbine String 'B'* | *The north half of this string is located on a mosaic of shallow-soiled rocky areas and deeper-soiled shrub-steppe habitat. Habitat quality is generally good: native species dominate the shallow soils, and native shrubs and forbs combine with native and non-native grasses to dominate the deeper soils. Various limited ground and vegetation disturbance has occurred here from recreational activities (gun club). One noxious weed population was observed along a jeep trail which runs along this section of the proposed string.*<br>*The south half of this string contains the same mosaic of shallow and deeper soils, however, a fire within the last 10 years has removed most of the shrubs, and the habitat now consists of a mix of native and non-native grasses and forbs, with widely scattered small shrubs. Habitat quality is generally fair. Weedy species are more common in the deeper-soiled areas, and several populations of noxious weeds are present.* |
| *Turbine String 'C'* | *Shallow-soiled grassland and lithosol alternates with deeper-soiled shrub-steppe habitat. Habitat quality is generally good: native species dominate the shallow soils, and native shrubs and forbs combine with native and non-native grasses to dominate the deeper soils.* |
| *Turbine String 'D'* | *The north half of this string is similar to String C with alternating lithosols and deeper-soiled habitats in generally good condition. The south half of this string is a continuation of the same deeper-soiled shrub-steppe habitat.* |
| *Turbine String 'E'* | *This string consists mainly of deeper-soiled shrub-steppe habitat, with inclusions of shallow-soiled lithosol in the north half, and small patches of non-native species throughout. Much of the habitat in the string is in fair to good condition (i.e., dominated by native shrubs and forbs, and a mix of native and non-native grasses), although some areas have been burned recently, and one noxious weed population is present along the jeep trail, which runs the length of the ridgetop.* |
| *Turbine String 'F'* | *This string contains mainly shallow-soiled lithosol, with some areas of deeper-soiled shrub-steppe in the south half. Habitat quality is generally good: native species dominate the shallow soils, and native shrubs and forbs combine with native and non-native grasses to dominate the deeper soils. However, a large gravel pit operation at the north end of this string has completely displaced the lithosol habitat in that area. A rough jeep trail runs the length of this proposed string.* |
| *Turbine String 'G'* | *This string consists almost entirely of shallow-soiled lithosol habitat, with small areas of deeper-soiled shrub-steppe and deciduous thicket habitats in the north half and at the south end. Habitat quality is generally good: native species dominate the shallow soils, and native shrubs and forbs combine with native and non-native grasses to dominate the deeper soils. Two noxious weed populations were observed, one along a road at the north end of the string, and another in a small draw near the south end of the string. A well-developed jeep trail is present along the north half of the corridor.* |
| *Turbine String 'H"* | *This string also consists almost entirely of shallow-soiled lithosol habitat, with areas of deeper-soiled shrub-steppe habitat at the north end, midpoint, and the south end. Habitat quality is generally good: native species dominate the shallow soils, and native shrubs and forbs combine with native and non-native grasses to dominate the deeper soils. However, there are two areas of major soil disturbance (blading) near the midpoint of the string, where the lithosol species have been largely replaced by non-native forbs and grasses. In addition, three populations of noxious weeds were observed along this string, near roads. Finally, one portion of the lithosol in the south end shows signs of heavy livestock use, although native plants continue to dominate. A well-developed two-lane gravel access road runs the length of this ridgetop, providing access for local landowners.* |
| *Turbine String 'I'* | *This string consists primarily of shallow-soiled lithosol habitat, although portions of the middle section, and all of the southern tip, contain deeper-soiled shrub-steppe habitat, as well as small inclusions of grassland. Habitat quality is generally good: native species dominate the shallow soils, and native shrubs and forbs combine with native and non-native grasses to dominate the deeper soils. However, the areas of grassland are only fair quality, dominated by non-native grasses and forbs, and one noxious weed population was observed at the south end of the string.* |

*Table 2*
***Summary of Habitats Associated with the Proposed Turbine Strings of the Project***

| *Facility* | ***Habitat Description***[1] |
|---|---|
| *Turbine String 'J'* | *The south half of the string is located mainly on deeper-soiled shrub-steppe habitat, with one area of shallow-soiled lithosol. Habitat quality is generally good: native species dominate the shallow soils, and native shrubs and forbs combine with native and non-native grasses to dominate the deeper soils. However, the south tip of the string consists of fair quality, shallow-soiled grassland dominated by non-native grasses and forbs. Two populations of noxious weeds were observed in this half of the string.*<br>*The north half of this string contains the same general pattern of shallow and deeper soils, however, a fire within the last 5-10 years removed most of the shrubs, and the deeper-soiled habitat now consists of a mix of native and non-native grasses and forbs, with widely scattered small shrubs. Although overall habitat quality is fair, several small inclusions of generally good quality lithosol are present in this half of the string.* |
| *Intervening Facilities (access roads, electric lines, O&M facilities, etc., located between turbine strings)* | *Over 40% of the potential project impact corridor is located off of the ridgetops, between the turbine strings. Primarily, these are connecting facilities such as access roads and electrical lines, but include O&M areas also. These non-ridgetop habitats are typically deeper-soiled, and are generally more degraded from past disturbance than the ridgetop habitats. This is especially true in the valley bottoms, where cattle grazing and road impacts have created large areas dominated by non-native invader species.*<br>*Overall, the non-ridgetop habitats within the impact corridors are in fair condition. However, habitat quality ranges from poor in many of the valley bottoms, to good on some of the canyon slopes.* |

c. List threatened or endangered species known to be on or near the site.

*Field surveys by trained botanists did not identify any state or Federal threatened or endangered plant species on the site.*

*Due to the absence of known populations within the Project area as surveyed to date, no Project-related impacts are anticipated to any federally Endangered, Threatened, Proposed, or Candidate plant species. Likewise, no Project-related impacts are predicted for any Washington State Endangered, Threatened, or Sensitive plant species.*

d. Proposed landscaping use of native plants, or other measures to preserve or enhance vegetation on the site, if any.

*The loss of native vegetation associated with the Project can be broken down into "temporary" and "permanent" impacts. "Temporary" impacts are those arising from ground disturbance necessary for the construction of Project infrastructure but that will be not be permanently occupied once construction is complete. Examples include trenches for underground electrical collector cables, construction staging areas, etc. These areas will be disturbed during the construction period but will be replanted and restored after construction is finished. The vast majority (approximately 75%) of the total area impacted by construction of the Project will only be temporarily disturbed (i.e. for less than one year.) The remainder, (approximately 25%) will continue to be occupied by the Project, such as string roads, turbine foundation pads, Project substation and the O&M facility. These are considered "permanent" impacts for the purpose of this analysis.*

*A comprehensive mitigation package for plants and animals is proposed for this Project. It consists of several categories of actions, including:*

- *Thorough study and analysis to avoid impacts;*
- *Project design features to minimize impacts;*
- *Construction techniques and (Best Management Practices) BMPs to minimize impacts;*
- *Post-construction restoration of temporarily disturbed areas;*
- *Operational BMPs to minimize impacts;*
- *Monitoring and adaptive management to minimize impacts during operations; and*
- *Acquisition and enhancement of on-site habitat Acquisition and enhancement of a large, contiguous on-site area of good quality habitat that faces immediate threat of development.*

*Thorough study and analysis to avoid impacts*
*The Applicant has commissioned extensive studies by qualified biologists of plants and animals at the Project site to avoid impacts to sensitive populations. These studies were submitted to EFSEC along with the Application for Site*

*Certification. These studies include:*

- *Habitat mapping;*
- *Rare plant and animal surveys*
- *Avian use point count surveys;*
- *Aerial raptor nest surveys;*
- *Wintering bald eagle surveys;*
- *Non-avian wildlife surveys; and*
- *Biological assessment for threatened and endangered species.*

*Project design features to avoid and/or minimize impacts*

*The proposed design of the Project incorporates numerous features to avoid and/or minimize impacts to plants and wildlife. These features are based on site surveys, experience at other wind power projects, and recommendations from consultants performing studies at the site. Features of the Project that are designed to avoid or minimize impacts to plants and animals include the following:*

- *Avoidance of construction in sensitive areas such as riparian zones, wetlands, forests, etc.;*
- *Minimization of new road construction by improving and using existing roads and trails instead of construction new roads;*
- *Choice of underground (vs. overhead) electrical lines wherever feasible to minimize perching locations and electrocution hazards to birds;*
- *Choice of turbines with low RPM and use of tubular towers to minimize risk of bird collision with turbine blades and towers;*
- *Use of bird flight diverters on guyed permanent meteorological towers or use of unguyed permanent meteorological towers to minimize potential for avian collisions with guy wires;*
- *Equipping all overhead power lines with raptor perch guards to minimize risks to raptors; and*
- *Spacing of all overhead power line conductors to minimize potential for raptor electrocution.*

*Construction techniques and BMPs to minimize impacts*

*Construction of the Project has the potential to impact both habitat and wildlife in a variety of ways. The Applicant proposes the use of construction techniques and Best Management Practices (BMPs) to minimize these potential impacts. These include the following:*

- *Use of BMPs to minimize construction-related surface water runoff and soil erosion (these are described in detail in part 'h' of Section IX B 1, Earth, above;*
- *Use of certified "weed free" straw bales during construction to avoid introduction of noxious or invasive weeds;*
- *Flagging of any sensitive habitat areas (e.g. raptor nests, wetlands, etc.) near proposed areas of construction activity and designation of such areas as "off limits" to all construction personnel;*
- *Development and implementation of a fire control plan, in coordination with local fire districts, to minimize risk of accidental fire during construction and respond effectively to any fire that does occur;*
- *Establishment and enforcement of reasonable driving speed limits during construction to minimize potential for road kills;*
- *Proper storage and management of all wastes generated during construction;*
- *Require construction personnel to avoid driving over or otherwise disturbing areas outside the designated construction areas;*
- *Monitoring of raptor nests on site for activity prior to construction and modify construction timing and activities to avoid impacts to nesting raptors; and*
- *Designation of an environmental monitor during construction to monitor construction activities and ensure compliance with mitigation measures.*

*Post-Construction Restoration of Temporarily Disturbed Areas*

*All temporarily disturbed areas will be reseeded with an appropriate mix of native plant species as soon as possible after construction is completed to accelerate the revegetation of these areas and to the prevent spread of noxious weeds. The Applicant will consult with Washington Department of Fish and Wildlife regarding the appropriate seed mixes for the Project area.*

*Operational BMPs to Minimize Impacts*

*During Project operations, appropriate operational BMPs will be implemented to minimize impacts to plants and animals. These include the following:*

- *Implementation of a fire control plan, in coordination with local fire districts, to avoid accidental wildfires and respond effectively to any fire that might occur;*
- *Establishment and enforcement of reasonable driving speed limits during construction to minimize potential for road kills;*
- *Operational BMPs to minimize storm water runoff and soil erosion;*
- *Implementation of an effective noxious weed control program, in coordination with the Kittitas County Noxious Weed Control Board, to control the spread and prevent the introduction of noxious weeds;*
- *Identification and removal of all carcasses of livestock, big game, etc. from within the Project that may attract foraging bald eagles or other raptors.*

*Monitoring and Adaptive Management to Minimize Impacts During Operations*

*The Applicant plans to convene a Technical Advisory Committee (TAC) to evaluate the mitigation and monitoring program and determine the need for further studies or mitigation measures. The TAC will be composed of representatives from Washington Department of Fish and Wildlife, U.S. Fish and Wildlife Service, Kittitas County, local interest groups (e.g., Kittitas Audubon Society), Project landowners, and the Applicant. The role of the TAC will be to coordinate appropriate mitigation measures, monitor impacts to wildlife and habitat, and address issues that arise regarding wildlife impacts during construction and operation of the wind plant. The post-construction monitoring plan should be developed in coordination with the TAC.*

*The Applicant proposes to develop a post construction monitoring plan for the Project to quantify impacts to avian species and to assess the adequacy of mitigation measures implemented and the possible need for additional measures. The monitoring plan will include the following components: 1) fatality monitoring involving standardized carcass searches, scavenger removal trials, searcher efficiency trials, and reporting of incidental fatalities by maintenance personnel and others; and 2) a minimum of one breeding season raptor nest survey of the study area and a 1 mile buffer to locate and monitoring active raptor nests potentially affected by the construction and operation of the wind plant.*

*The protocol for the fatality monitoring study will be similar to protocols used at the Vansycle Wind Plant in northeastern Oregon and the Stateline Wind Plant in Washington and Oregon.*

*Acquisition and Enhancement of On-site Habitat*

*In addition to all of the mitigation measures described above, the Applicant proposes to purchase and protect, for the life of the Project, a large area of habitat on-site. This privately owned parcel, which is located in Sections 22 and 27, Township 19 North, Range 17 East, and is adjacent to land owned by the Washington DNR, is currently under immediate threat of development. The parcel had been on the market for at least one year prior to the Applicant negotiating a purchase option with the current owner. The current owner has had active negotiations with and has received offers from developers to purchase this land and convert it to rural residential development.*

*The Applicant proposes to purchase this parcel and implement measures to enhance its value as habitat. The Applicant proposes to protect and restore a minimum of 1.5 acres of replacement habitat for every acre of habitat permanently disturbed the Project and a minimum of 0.5 acres of replacement habitat for every acre of habitat temporarily disturbed by Project construction. These proposed replacement ratios are consistent with, or higher than, replacement ratios that have been implemented at other wind power projects in Washington State. A detailed description of the habitat types and quality present on the mitigation parcel in included in the Application for Site Certification submitted to EFSEC.*

*Proposed Habitat Enhancement Measures*

*Overall, the parcel is in fair to good condition. However, several opportunities for enhancement exist that would be expected to raise habitat quality further. Primary among these is management and control of cattle grazing within the entire parcel, and especially within the riparian zone. A grazing management plan could be developed that reduces or eliminates cattle pressure on the most sensitive portions, and allows for reestablishment of native vegetation in specific problem areas.*

*Although high concentrations of noxious weeds were not found within the parcel, scattered patches and individuals (primarily diffuse knapweed [Centaurea diffusa]) are present throughout. An overall noxious weed control effort for the parcel, developed in coordination with the Kittitas County Noxious Weed Control Board, would likely be effective*

*at reducing or eliminating noxious weeds from the site, increasing the habitat quality and effectiveness.*

5. ANIMALS

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: | hawk, heron, eagle, songbirds, other: *See Table 3 below.* |
| mammals: | deer, bear, elk, beavers, other: |
| fish: | bass, salmon, trout, herring, shellfish, other: |

**Wildlife Study Results**

*Avian Species Distribution*

*A total of 97 avian species were identified during the point count, in-transit, and/or bald eagle surveys and incidentally while conducting other field tasks at the Project (See Table 3). A total of 3,600 individual bird detections within 1,210 separate groups were recorded from during the fixed-point surveys.*

*Passerines were the most abundant avian group observed during all seasons. The next most abundant avian group varied by season, with corvids higher in spring and fall, and raptors more prevalent in summer. The most common raptor species observed were red-tailed hawks and American kestrels.*

**Table 3: List of avian species observed during fixed-point, in-transit and bald eagle surveys on the Kittitas Valley Project site.**

| Species/Group | Scientific Name | Species/Group | Scientific Name | Species/Group | Scientific Name |
|---|---|---|---|---|---|
| blue-winged teal | *Anas discors* | black-headed grosbeak | *Pheucticus melanocephalus* | Townsend's solitaire | *Myadestes townsendi* |
| Canada goose | *Branta canadensis* | Brewer's blackbird | *Euphagus cyanocephalus* | Townsend's warbler | *Dendroica townsendi* |
| greater white-fronted goose | *Anser Albifrons* | Brewer's sparrow | *Spizella breweri* | Vaux's swift | *Chaetura vauxi* |
| Mallard | *Anas platyrhynchos* | brown-headed cowbird | *Molothrus ater* | vesper sparrow | *Pooecetes gramineus* |
| great blue heron | *Ardea herodias* | Bullock's oriole | *Icterus bullockii* | violet-green swallow | *Tachycineta thalassina* |
| herring gull | *Larus argentatus* | Cassin's finch | *Carpodacus purpureus* | warbling vireo | *Vireo gilvus* |
| common snipe | *Gallinago Gallinago* | cedar waxwing | *Bombycilla cedrorum* | western kingbird | *Tyrannus verticalis* |
| greater yellowlegs | *Tringa melanoleuca* | chipping sparrow | *Spizella passerina* | western meadowlark | *Sturnella neglecta* |
| Killdeer | *Charadrius vociferus* | cliff swallow | *Petrochelidon pyrrhonota* | western tanager | *Piranga ludoviciana* |
| long-billed curlew | *Numenius americanus* | dark-eyed junco | *Junco hyemalis* | western wood-pewee | *Contopus virens* |
| spotted sandpiper | *Actitis macularia* | eastern kingbird | *Tyrannus tyrannus* | white-crowned nuthatch | *Sitta carolinenis* |
| Wilson's phalarope | *Phalaropus tricolor* | European starling | *Sturnus vulgaris* | white-crowned sparrow | *Zonotrichia leucophrys* |
| American kestrel | *Falco sparverius* | golden-crowned kinglet | *Regulus satrapa* | yellow-headed blackbird | *Xanthocephalus xanthocephalus* |
| bald eagle | *Haliaeetus leucocephalus* | golden-crowned sparrow | *Zonotrichia atricapilla* | yellow-rumped warbler | *Dendroica coronata* |
| Cooper's hawk | *Accipiter cooperii* | gray-crowned rosy finch | *Leucosticte arctoa* | common nighthawk | *Chordeiles minor* |
| Golden eagle | *Aquila chrysaetos* | horned lark | *Eremophila alpestris* | downy woodpecker | *Picoides pubescens* |
| great-horned owl | *Bubo virginianus* | house finch | *Carpodacus mexicanus* | Lewis's woodpecker | *Melanerpes lewis* |
| Gyrfalcon | *Falco rusticolus* | lazuli bunting | *Passerina amoena* | northern flicker | *Colaptes auratus* |
| Merlin | *Falco columbarius* | Lincoln's sparrow | *Melospiza lincolnii* | Rufous hummingbird | *Selasphorus rufus* |
| northern goshawk | *Accipiter gentilis* | loggerhead shrike | *Lanius ludovicianus* | blue grouse | *Dendragapus obscurus* |
| northern harrier | *Circus cyaneus* | Macgillivray's warbler | *Oporornis tolmiei* | California quail | *Callipepla californica* |
| Osprey | *Pandion haliaetus* | mountain bluebird | *Sialia currucoides* | gray partridge | *Perdix perdix* |
| Prairie falcon | *Falco mexicanus* | mountain chickadee | *Poecile gambeli* | ruffed grouse | *Bonasa umbellus* |
| red-tailed hawk | *Buteo jamaicensis* | northern shrike | *Lanius excubitor* | mourning dove | *Zenaida macroura* |
| rough-legged hawk | *Buteo lagopus* | orange-crowned warbler | *Vermivora celata* | | |
| sharp-shinned hawk | *Accipter striatus* | pine grosbeak | *Pinicola enucleator* | | |
| Turkey vulture | *Cathartes aura* | purple finch | *Carpodacus purpureus* | | |
| black-billed magpie | *Pica pica* | red crossbill | *Loxia curvirostra* | unidentified duck | |
| common raven | *Corvus corax* | red-breasted nuthatch | *Sitta canadensis* | unidentified accipiter | |
| Steller's jay | *Cyanocitta stelleri* | red-winged blackbird | *Agelaius phoeniceus* | unidentified buteo | |
| American goldfinch | *Carduelis tristis* | ruby-crowned kinglet | *Regulus calendula* | unidentified eagle | |
| American green-winged teal | *Anas crecca* | sage thrasher | *Oreoscoptes montanus* | unidentified falcon | |
| American pipit | *Anthus rubescens* | savannah sparrow | *Passerculus sandwichensis* | unidentified finch | |
| American redstart | *Setophaga ruticilla* | Say's phoebe | *Sayornis saya* | unidentified flycatcher | |
| American robin | *Turdus migratorius* | song sparrow | *Melospiza melodia* | unidentified passerine | |
| barn swallow | *Hirundo rustica* | spotted towhee | *Pipilo maculatus* | unidentified swallow | |
| black-capped chickadee | *Poecile atricapillus* | | | unidentified bluebird | |

**Non-Avian Wildlife Observations**

*Mammals*

*Mule deer (Odocoileus hemionus) were commonly observed throughout the Project area. Observations of 10-20 individuals were commonly observed in the spring, with 3-7 individuals observed throughout the summer. Observations in the fall were typically small groups of does. Elk (Cervis elaphus) were observed in some large groups (15-25) individuals near the northern points (A, E, F and G) during the spring surveys, with few observations made in the summer and fall periods. American pika (Ochotona princeps) has been heard regularly on the large talus slope.*

*Reptiles and Amphibians*

*Reptiles observed during the field studies included rubber boa (Charina bottae), Great Basin gopher snake (Pituophis catenifer deserticola), Northern Pacific rattlesnake (Crotalus viridis oreganus), and short-horned lizard (Phrynosoma douglassii). One amphibian chorus was heard during the spring at a distance of over 300 meters, and is likely one of the true frog species (e.g., Cascade frog, Rana cascadae). Spotted frogs (Rana pretiosa) and red-legged frogs (Rana aurora) have auditory calls that typically don't carry over 30 meters, and the northern leopard frog (Rana pipiens) is not known to occur in Kittitas county.*

b. List any threatened or endangered species known to be on or near the site.

*A total of 10 state and Federal sensitive, threatened, candidate and monitor species were observed during 2002 wildlife surveys at the Project site, these are listed in Table 4.*

**Table 4**

**A summary of State and Federal sensitive species and State Monitor species observed during 2002 wildlife surveys at the Project site.**

| | |
|---|---|
| Bald eagle | ***State and Federally Threatened*** – Average of 5.6 bald eagles per winter driving survey, with a maximum survey day count of 12 (3/11/02). Winter use relatively high compared to other wind projects, but mostly along Yakima river. No bald eagle fatalities documented at any U.S. wind project. |
| Golden eagle | ***State Candidate*** –Six observations during fixed-point surveys, six during in-transit surveys. Much lower use at KVP (0.02-0.05 per 20-minute survey) compared to Foote Creek Rim (WY) (0.2 – 0.3 per 20-minute survey) and Altamont Pass (CA) (0.2-0.3 per 20-minute survey). One golden eagle was killed during two years of monitoring at the Foote Creek Rim Phase I and II facility. |
| Merlin | ***State Candidate*** – Two observations during spring and summer surveys. Occasional merlin observations have been recorded at several wind projects. No fatalities have been reported at U.S. wind projects. |
| Lewis's woodpecker | ***State Candidate*** – One observation. Observed as a fatality at Vansycle in 1999. |
| Loggerhead shrike | ***State Candidate and Federal Species of Concern*** – Not observed during spring and summer avian use surveys. One observation during winter bald eagle surveys as well as two unidentified shrike observations. One fatality observed each at Altamont Pass and Tehachapi Pass (CA). |
| Long-billed curlew | ***State Monitor***[5] – One observation. Also observed occasionally at Stateline. No fatalities documented at any U.S. wind projects. |
| Turkey vulture | ***State Monitor*** – Twenty-five observations during fixed-point surveys, 31 during in-transit surveys. A few fatalities observed at U.S. wind projects, but apparently not very susceptible to collision due to foraging/scavenging behavior. |
| Prairie falcon | ***State Monitor*** – Five observations during the spring. Observed occasionally at most wind projects. One fatality documented at Foote Creek Rim (WY), two at Altamont Pass (CA), one at Montezuma Hills and one at Tehachapi Pass (CA). |
| Gyrfalcon | ***State Monitor*** – One observation during winter bald eagle surveys. No fatalities documented at U.S. wind projects. |
| Osprey | ***State Monitor*** – One observation during fixed-point surveys, one in-transit. No fatalities documented at U.S. wind projects. |

*According to the USFWS, there is no critical habitat as defined by the Endangered Species Act (ESA) for threatened or endangered species that may be affected by the Project. Therefore, construction, maintenance, and operation of the proposed Project will not adversely modify critical habitat for endangered or threatened species.*

*Potential Impacts to Threatened and Endangered Species*

*The Project area occurs within the potential range of 21 bird, 14 mammal, eight reptile and amphibian and six fish species which are of interest based on designations made under the State of Washington or Federal Endangered Species Act, or which are species of concern because of declining numbers. Several of these species are unlikely to occur within the Project area due to limited habitat or occurrence on the periphery of the known species distributions. These species are not likely to occur within the project area and the Project should have no effect on them.*

*NOTE: I am inclined to leave all of this highlighted material out, please comment as to whether you feel it should be included. Thanks, Chris.*

*No Effect*

*For most of the species identified, the Project should have no effect. Resource investigations indicated that*

*gray wolf, bull trout, northern spotted owl, and Ute ladies'-tresses orchid are not likely to occur or only accidentally occur in the Project area and that essential habitat for some of these species is lacking within the Project area.*

*Birds*

*Bald eagle and northern spotted owl are the only bird species listed under the Endangered Species Act that may potentially occur within the Project area.*

*Bald eagle is documented wintering, but not breeding, within the Project area. To date, there have been no bald eagle fatalities documented at other wind plants in the U.S. (see Erickson et al., 2001). Few bald eagles were observed within the Project area during surveys, rather most bald eagles were observed along the Yakima River and in areas where cattle are pastured. While use of the Project site by bald eagles does occur, it is relatively low compared to adjacent areas along the Yakima River and appears to be related to the presence of livestock or wildlife carcasses (carrion), which they utilize for forage.*

*During Project construction the possibility of mortality effects to bald eagles is considered negligible and very unlikely to occur. Bald eagles in the area during the construction period are unlikely to occur within the construction zones due to disturbances and therefore unlikely to be at risk of construction related mortality. In addition, the majority of construction is likely to take place during late spring, summer and fall months when bald eagles very rarely or do not occur in the area.*

*During Project operations, based on the available information about bald eagle use of the site, potential bald eagle mortality due to operation of the wind plant will confined to the winter and early spring seasons. Bald eagles will not be at risk from the wind plant in the summer or fall. Bald eagles are not expected to frequently occur within the wind plant and operation of the wind plant should have minimal disturbance on bald eagles. Additionally, proposed mitigation measures are intended to further reduce the possibility of disturbance or displacement.*

*Although the risk is low, the potential exists for bald eagle fatalities during operation of the Project. The status of bald eagle in the Project area and range wide is not expected to change due to the Project. Bald eagle populations appear to be generally increasing and the USFWS has proposed the species for delisting. The bald eagle populations in Washington and throughout North America will continue to increase during and after the Project is constructed. The Application for Site Certification submitted to EFSEC includes a 'Biological Assessment of Endangered, Threatened, Proposed and Candidate Species', which contains a detailed analysis of potential impacts to bald eagles.*

*Northern spotted owl site centers and associated territory buffers are mapped by the WDFW approximately ½ mile to the north of the Project area. Spotted owls occur almost exclusively within forested environments. The Project area is located within the transition zone between forest and grassland. No nesting habitat is present within the Project area. Although possible, it is unlikely that spotted owls will hunt within or disperse through the Project area. The Project is not expected to impact the northern spotted owl.*

*Northern goshawks are documented as breeding within the National Forest a few miles from the Project. Although the Project area does not contain suitable nesting habitat for northern goshawks, the species may occasionally occur within the Project area while hunting or migrating. This is expected to be a very rare occurrence, as no goshawks were observed during surveys within the Project area. The proposed Project is not expected to affect northern goshawks.*

*One historic record of a breeding merlin is present within the Project area, and two merlins were observed during avian use surveys. No merlin fatalities have been documented at other wind plants and considering the low use of the Project area by merlins, the proposed project is not expected to impact merlins in the area.*

*Mammals*

*The Project occurs within the potential range of several species of federally and state protected mammals, which are unlikely to occur within the Project area due to habitat constraints and/or uncertain population status in Washington. These species include gray wolf, grizzly bear, wolverine, fisher, western gray squirrel, Townsend's big-eared bat, long-legged myotis, and long-eared myotis. These species are not expected to occur within the Project area and no impacts to these species are likely to occur.*

*Both the white-tailed and black-tailed jackrabbits have been documented within Kittitas County and suitable*

*habitat for these species is present in the Project area. Assuming these species are present in the Project area, the potential exists for individuals to be killed by vehicles on roads, and some suitable habitat for these species will be lost to turbine pads and road construction. Limits on vehicle speeds within the Project will minimize the potential for road kills, and the permanent loss of suitable habitat is relatively small. Overall, impacts to these species should be minimal.*

*Suitable habitat for three bat species, which are listed as federal species of concern, is present within the Project area: fringed myotis, small-footed myotis and Yuma myotis. However, only general descriptions of habitat requirements and potential distribution are available for the three species. Very little is known concerning the ecology of the three species, making it even more difficult to accurately predict potential impacts to these species. To date, we are unaware of any documented fatalities of these species at wind projects within the U.S.*

*Merriam's shrew has been documented within Kittitas County, and suitable habitat for the species occurs within the Project area. Assuming the species is present within the Project area, the construction of turbine pads and roads, and vehicle traffic has the potential to crush individuals within burrows or moving about above ground. Overall, total impacts to habitat are small and no significant impacts to the species are expected to occur as a result of this Project.*

*Reptiles and Amphibians*

*Two species of amphibians have been documented in the study area by the WDFW, including tailed frog and Columbia spotted frog. Field surveys conducted for the Project did not specifically target reptiles or amphibians. Reptiles observed during the field studies included rubber boa, Great Basin gopher snake, Northern Pacific rattlesnake, and short-horned lizard. One amphibian chorus was heard during the spring at a distance of over 300 meters, and is likely one of the true frog species (e.g., Cascade frog). Spotted frogs and red-legged frogs have auditory calls that typically don't carry over 30 meters, and the northern leopard frog is not known to occur in Kittitas county. Up to 25 additional species of reptiles and amphibians occur in Kittitas county and could possibly be present in the Project area, including the striped whipsnake, sharptail snake, and western toad. There is very little suitable habitat for amphibians or aquatic reptiles (e.g., turtles) in the study area. Two Pygmy short-horned lizards were present in August.*

*Construction of the Project may affect reptiles on site through loss of habitat and direct mortality of individuals occurring in construction zones. The level of mortality associated with construction would be based on the abundance of the species on site. Some mortality may be expected as common reptiles such as short-horned lizards and yellow-bellied racers often retreat to burrows underground for cover or during periods of winter dormancy. Excavation for turbine pads, roads, or other wind project facilities could kill individuals in underground burrows. While above ground, yellow-bellied racers and other snakes are generally mobile enough to escape construction equipment, however, short-horned lizards do not move fast over long distances and rely heavily on camouflage for predator avoidance. Some individual lizard fatalities can be expected from vehicle activity.*

*Once operational, the wind Project is not expected to substantially impact reptiles. Operations and maintenance activities may occasionally result in a road killed snake or lizard; however, this is expected to be a rare occurrence due to the limited nature of traffic expected within the Project area.*

c. Is the site part of a migration route? If so, explain.

*The proposed Project site does not currently support large congregations of mule deer or elk but is within area considered by WDFW as winter range for these species. The Project falls within portions of the Lauderdale, Ellensburg, and Highway 10 Mule Deer Wintering Areas and the Lookout Mountain Elk Winter Area. During the winter months there is an influx of mule deer and elk moving from the surrounding mountains to the west and north to these winter areas. Based on the information in the WDFW PHS database, it is estimated that between 200 and 400 mule deer and 50 elk winter in these areas. No distinct migration routes have been identified within the Project area. The Quilomene Elk Migration Corridor is located north and east of the Project area. It is likely that wintering mule deer and elk simply move in from surrounding areas through undeveloped tracts of land.*

*Reptiles and amphibians are present in the Project area and may be concentrated in areas of suitable habitat (e.g., wetlands). No migration corridors for reptiles or amphibians are known to be present in the Project area. Many amphibians migrate short distances during spring or fall breeding periods to and from suitable*

*wetlands and during fall dispersal of juveniles.*

*The Project area is located within the Pacific Flyway, one of four principal north-south bird migration routes in North America. Bounded roughly by the Pacific Ocean and the Rocky Mountains, the Pacific Flyway extends from the arctic regions of Alaska and Canada to Central and South America. Within the flyway, certain groups of birds may travel along narrower migration corridors, with more well defined paths.*

*The Project's location along the east flank of the Cascades places it within possible migration corridors of several bird species and the Yakima River riparian corridor south of the project may also be used by migrating songbirds. The river provides a distinct geographic visual cue to migrating birds and provides resting habitat for waterfowl. Riparian habitat along the river provides resting and foraging habitat for songbirds and raptors.*

*Some species of bats may also migrate through the Project area. At least two species of bats, hoary bat (Lasiurus cinereus), silver-haired bat (Lasonycteris noctivagans), are known to migrate through Washington and other species such as little brown bat (Myotis lucifugus) and big brown bat (Eptesicus fuscus) may make localized short distance migrations to suitable hibernacula sites (e.g, caves, mines). Bats typically migrate at night, and are most frequently observed migrating during August and mid-September.*

*Predicted Migration Impacts*

*No impacts are expected from the Project to big game or reptile and amphibian movement or migration. The Quilomene Elk migration corridor is outside the Project area and no Project features or construction will occur within the area identified as this migration corridor. Additionally, no wetlands will be affected which could impede amphibian movements.*

*Migrant birds and bats may be at risk of collision with turbines in the Project. Passerines have been the most abundant avian fatality at some other wind projects studied (see Johnson et al., 2000; Young et al., 2001; Erickson et al., 2000), often comprising more than 80% of the avian fatalities. Both migrant and resident passerine fatalities have been observed. Given that passerines make up the vast majority of the avian observations on-site, passerines would likely make up the largest proportion of fatalities. Common species such as horned larks and western meadowlarks (confirmed casualties at other wind plants) would be most at risk. Nocturnal migrating species may also be affected, but would not be expected to be found in large numbers based on data collected at other projects (i.e., no large mortality events documented, see Erickson et al. 2001). Estimates of the percentage of bird fatalities that are migrants have ranged from approximately 30% at the Wisconsin wind plant to 60% at Buffalo Ridge, Minnesota (Erickson et al., 2001). Estimates of total bird mortality at other wind plants have ranged from approximately 0.6 birds per turbine per year at the Vansycle wind plant in Oregon to 2.8 birds per turbine per year at the Buffalo Ridge wind plant in Minnesota (Erickson et al., 2001). Provided 120 turbines are constructed at the proposed project, approximately 50-300 birds may be killed at the wind plant annually. The number of these that would be expected to be migrants would vary from approximately 30-180 birds.*

*Migrant bats, and in particular hoary bats and silver-haired bats, have been documented fatalities at other wind plants. Bat mortality at wind plants is highly seasonal, occurring primarily during the fall migration season (August – mid September). At the Buffalo Ridge Wind Plant, based on a 2-year study, bat mortality was estimated to be 2.05 bats per turbine per year (Johnson et al., 2000b). At the Foote Creek Rim Wind Plant, based on 2 years of study, bat mortality was estimated at 1.51 bats per turbine per year (Young et al., 2001). At the Vansycle Ridge Wind Plant in Oregon, bat mortality was estimated at 0.74 bats per turbine for the first year of operation (Erickson et al., 2000). Provided 121 turbines are constructed, approximately 80-250 bats may be killed at the wind plant annually. Based on the species composition of bats at the other wind plants studied, nearly all of these would be expected to be migrants.*

d. Proposed measures to preserve or enhance wildlife, if any.

*See response to part 4d in section IX B, Plants, above*

6. 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.

*Consumption of Energy and Natural Resources During Operations*
*Operation of the Project will consume very limited amounts of energy and non-renewable natural resources. Energy will be generated using the kinetic energy in wind, transformed by the wind turbine generators into useful electricity. Types and quantities of energy and natural resources consumed during operations will primarily consist of the following:*

- *Fuel for O&M vehicles-Annual consumption is expected to be about 8,500 gallons*
- *Minor quantities of lubricating oils, greases and hydraulic fluids for the wind turbine Electricity for Project operations- Estimated to be less than 600 kWh/WTG/month, or about 0.1% of Project energy generation*
- *Water for domestic use at the O&M facility and periodic maintenance of turbine blades- Estimated to be less than 1,000 gallons/day (see Section IX B 3 'Water')*

*Sources of Energy and Natural Resources Used During Operations*
*Fuel used for O&M vehicles will be purchased from local gas stations. Lubricating oils and hydraulic fluids used for wind turbine generator maintenance will be purchased from distributors of such materials. The final selection of these distributors will depend on the specific turbine model chosen for the Project. Electricity for Project operations will mostly be generated by the Project itself, during periods when the wind turbines are not generating power; it will be purchased from the regional utility.*

b. Would your project affect the potential use of solar energy by adjacent properties? If so, describe.
*The Project will not affect the potential use of solar energy in 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, if any.

*The Project will consume limited amounts of energy and natural resources primarily during construction. Operation of the Project will consume very limited amounts of natural resources, as the wind turbine generators will use wind, an abundant, naturally occurring renewable resource, to generate electricity. By using wind, rather than non-renewable fossil fuels, to generate electricity, operation of the Project will help reduce overall consumption of non-renewable natural resources.*

*Numerous independent life cycle analyses of wind power projects have shown that wind farms have a very high "energy payback" (ratio of energy produced compared to energy expended in construction and operation), and that wind's energy payback is higher than that of thermal power plants. Several studies have found that it generally takes less than six months of operation for a wind farm to produce the total amount of energy used to construct the equipment and build the project.*

7. 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? If so, describe.

*Compared to thermal power plants, wind power projects pose a much smaller risk of explosion or fire potential, as there is no need to transport, store or combust fuel to generate power. As with any major construction undertaking, construction of the Project does present some fire risks. Fire risk mitigation starts with project design, especially with electrical design which needs to comply with the National Electric Code (NEC) and the National Fire Protection Agency (NFPA). A strict fire prevention plan will be enforced both during construction and operations to mitigate fire risks. See mitigation procedures outlined in "Section IX B 7.a.2" below.*

*Construction*
*Diesel fuel is the only potentially hazardous material that will be used in any significant quantity during construction of the Project. Construction of the Project will require the use of diesel fuel for operating construction equipment and vehicles. Measures to prevent and contain any accidental spills resulting from this fuel storage and use are described in detail in part h of Section IX B1, 'earth'. Construction of the project will not result in the generation of any hazardous wastes in quantities regulated by state or federal law.*

*Operations*

*Operation of the Project will not result in the generation of regulated quantities of hazardous wastes. As no fuel is burned to power the wind turbine generators, there will be no spent fuel, ash, sludge or other process wastes generated. Periodic changing of lubricating oils and hydraulic fluids used in the individual wind turbine generators (WTGs) will result in the generation of small quantities of these materials. These waste fluids will be generated in small quantities because they need to be changed only infrequently and the changing of these fluids is not done all at once, but rather on an individual WTG by WTG basis. These waste fluids will be stored for short periods of time in appropriate containers at the O&M facility for collection by a licensed collection service for recycling or disposal. Procedures for collecting, storing and transporting these materials for recycling or disposal are described in detail in part h of Section IX B1, 'earth'.*

1) Describe special emergency services that might be required.

*In the unlikely event that an injury occurs while working in the nacelle, all staff will be trained in lowering injured colleagues from the nacelle. A rescue basket specially designed for this purpose will be kept at the operations and maintenance facility and will be available for use by local emergency medical services personnel. Training in its use will also be provided to local EMS personnel. See part 2 below, Fire and Explosion Sources and Mitigation Measures and part b of Section IX B 15, Public Service.*

2) Proposed measures to reduce or control environmental health hazards, if any.

*Construction of the Project will require the use of diesel fuel for operating construction equipment and vehicles. Measures to prevent and contain any accidental spills resulting from this fuel storage and use are described below in Spill Prevention Plan. Operation of the Project will not require the storage or use of significant quantities of fuel or other materials that could cause a spill or other accidental release.*

**Spill Prevention Plan**

**Construction Spill Prevention**

*Fuel and lubricating oils from construction vehicles and equipment and the mineral oil used to fill the substation transformer(s) are the only potential sources for a spill during construction activities. The EPC contractor will be responsible for training its personnel in spill prevention and control and, if an incident occurs, will be responsible for containment and cleanup.*

*During construction, the EPC contractor will utilize fuel trucks for refueling of construction vehicles and equipment on site. There will be no fuel storage tanks used at the Project site. The fuel trucks will be properly licensed and will incorporate features in equipment and operation, such as automatic shut off devices, to prevent accidental spills.*

*The Project will have a substation with one or two substations transformers which need to be filled with mineral oil on site as they are delivered without oil in the tank. As part of the commissioning process of the main transformers(s), they will be filled and tested. The oil truck will be properly licensed and will incorporate several in equipment and operation, such as automatic shut off devices, to prevent accidental spills.*

*Lubricating oils used during construction will mostly be contained in the vehicles and equipment for which they are used. Small quantities of lubricating oils may also be stored in appropriate containers at the construction staging area located at the site of the O&M facility.*

**Operations Spill Prevention**

*Project operations will not require the use of a storage tank, as fuel use during operations is limited to maintenance vehicle fueling which will be done at existing licensed gas stations in nearby communities (Ellensburg or Cle Elum.) The potential for accidental spills during Operations is minimal, as the only materials used during Project operations that present any potential for accidental spills are lubricating oils and hydraulic fluids used in the wind turbine generators and transformers.*

*All of the WTGs being considered for this Project are equipped with sensors to automatically detect loss in*

*fluid pressure and/or increases in temperature which enable them to be shut down in case of a fluid leak, as well as fluid catch basis and containment systems to prevent any accidental releases from leaving the nacelle. Based on the limited quantities of fluids contained in the WTGs and the leak detection and containment systems engineered into their design, the potential for an accidental spill from WTG malfunction is extremely limited. Furthermore, any accidental gear oil or other fluid leaks form the wind turbines will be contained inside the turbine towers which are sealed around the base.*

*Transformer Mineral Oil Coolant*

*Pad Mounted Transformers*

*Each wind turbine generator has a pad mounted transformer located at its base. These transformers contain mineral oil which acts as coolant. Each pad-mounted transformer contains up to 500 gallons of mineral oil. The transformer is designed to meet stringent electrical industry standards, including containment tank weldment and corrosion protection specifications.*

*Substation Transformer(s)*

*The entire Project will be electrically connected to the grid at the substation which will be equipped with either one or two transformers. Each substation transformer contains up to 12,000 gallons of mineral oil for cooling. Thee transformer is designed to meet stringent electrical industry standards, including containment tank weldment and corrosion protection specifications. The substation transformers are equipped with an oil level sensor that detects any sudden drop in the oil levels, and sends an alarm message to the central SCADA system. Finally, the substation transformers are surrounded by a concrete berm or trough to ensure that any accidental fluid leak does not result in any discharge to the environment.*

**Fire and Explosion Sources and Mitigation Measures**

*The risk of unintentional or accidental fire or explosion during both construction and operations is minimal. As the Project site is generally arid rangeland with a predominant groundcover of grasses and sagebrush the highest expected fire risks are grass fires during the hot, dry summer season. Fire risk potential is constantly tracked and reported during the summer fire season by the DNR and this will be actively posted at the construction job site during the high risk season. The Project site roads act as firebreaks and also allow for quick access of fire trucks and personnel in the event of a grass fire.*

*The Construction Manager will be responsible for staying abreast of fire conditions in the Project area by contacting Washington DNR and implementing any necessary fire precautions.*

*A Fire Protection and Prevention Plan will be developed and implemented, in coordination with the Kittitas County Fire Marshal and other appropriate agencies. Table 5 lists sources of potential fire and explosion along with measures to mitigate the risk of either occurring.*

*The Applicant has already held meetings with the Kittitas County Fire Marshal and other local fire officials to discuss preventive measures during construction and operation of the Project. As some portions of the Project area are currently outside of existing fire districts, it is anticipated that the Applicant will enter into contract(s) for fire protection with local service providers during Project construction.*

*Lightning induced fires are rare in the Project area and both the wind turbine generators and the substation are equipped with specially engineered lightning protection systems, as described below in this section. As is the case with almost any complex machines, there is some potential for fire inside the wind turbine generators. With the types of modern wind turbines proposed for the Project, however, turbine malfunctions leading to fires in the nacelle are extremely rare. The turbine control system detects overheating in turbine machinery and internal fires would be detected by these sensors causing the machine to shutdown immediately and send an alarm signal to the central SCADA system which would notify operators of the alarm by cell phone or pager.*

***Table 5***
***Fire and Explosion Risk Mitigation Plan***

| C / O * | Potential Fire or Explosion Source | Mitigation Measures |
|---|---|---|
| C & O | General Fire Protection | • All on-site service vehicles fitted with fire extinguishers |

| *Table 5*<br>***Fire and Explosion Risk Mitigation Plan*** | | |
|---|---|---|
| | | • *Fire station boxes with shovels, water tank sprayers, etc. installed at multiple locations on-site along roadways during summer fire season*<br>• *Minimum of 1 water truck with sprayers must be present on each turbine string road with construction activities during fire season* |
| *C & O* | *Dry vegetation in contact with hot exhaust catalytic converters under vehicles* | • *No gas powered vehicles allowed outside of graveled areas*<br>• *Mainly diesel vehicles (i.e. w/o catalytic converters) used on site*<br>• *Use of high clearance vehicles on site if used off-road* |
| *C & O* | *Smoking* | • *Restricted to designated areas (outdoor gravel covered areas)* |
| *C & O* | *Explosives used during blasting for excavation work* | • *Only state licensed explosive specialist contractors are allowed to perform this work – explosives require special detonation equipment with safety lockouts*<br>• *Clear vegetation from the general footprint area surrounding the excavation zone to be blasted*<br>• *Standby water spray trucks and fire suppression equipment to be present during blasting activities* |
| *C & O* | *Electrical fires* | • *Use of generally high clearance vehicles on site*<br>• *No gas powered vehicles allowed outside of graveled areas*<br>• *All major construction equipment is diesel powered (i.e. w/o catalytic converters) used* |
| *C & O* | *Lightning* | • *Specially engineered lightning protection and grounding systems used at wind turbines and at substation*<br>• *Footprint areas around turbines and substation are graveled with no vegetation* |
| *C* | *Portable Generators – hot exhaust* | • *Generators not allowed to operate on open grass areas*<br>• *All portable generators to be fitted with spark arrestors on exhaust system* |
| *C* | *Torches or field welding on-site* | • *Immediate surrounding area will be wetted with water sprayer*<br>• *Fire suppression equipment to be present at location of welder/torch activity* |
| *C & O* | *Electrical arcing* | • *Electrical designs and construction specifications meet or exceed requirements of NEC and NFPA* |
| ** Indicates risk during construction (C) and/or operations (O)* | | |

*<u>Lightning Protection System</u>*
*The WTGs are equipped with an engineered lightning protection system that connects the blades, nacelle, and tower to the earthing system at the base of the tower. As the rotor blades are nonmetallic, they*

*normally do not act well as a discharge path for lightning, however, as the highest point of the turbine, the blades sometimes provide the path of least resistance for a lightning strike. In order to protect the blades, they are constructed with an internal copper conductor extending from the blade tip down to the rotor hub which is connected to the main shaft and establishes a path through the gearbox, nacelle bed frame etc. to the tower base right down to the grounding system embedded underground. An additional lightning rod extends above the wind vane and anemometer at the rear of the nacelle. Both the rear lightning rod and blades have conductive paths to the nacelle bed frame that in turn connects to the tower. The tower base is connected to the earthing system at diametrically opposed points.*

***Figure 7 Turbine Earthing System at Tower Base***

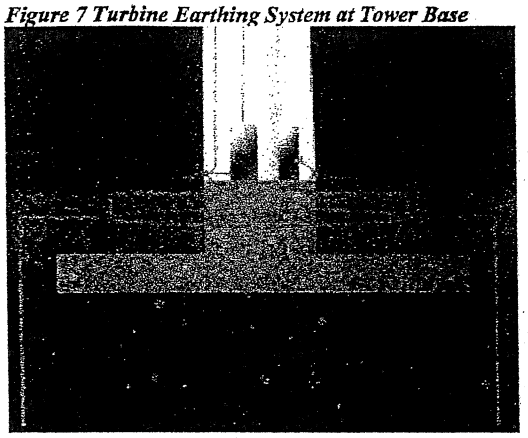


*Figure 7 shows the general arrangement of the earthing system with respect to the tower and foundation. The earthing system consists of a copper ring conductor connected to earthing rods driven down into the ground at diametrically opposed points outside of the foundation. The earthing system, with a resistance of less than 2 Ohms, provides a firm grounding path to divert harmful stray surge voltages away from the turbine.*

*The controllers and communication interfaces to the wind farm central control system are through fiber optic cables and optical signal conversion systems protecting these systems from stray surges (See Figure 8, WTG Lightning Diversion).*

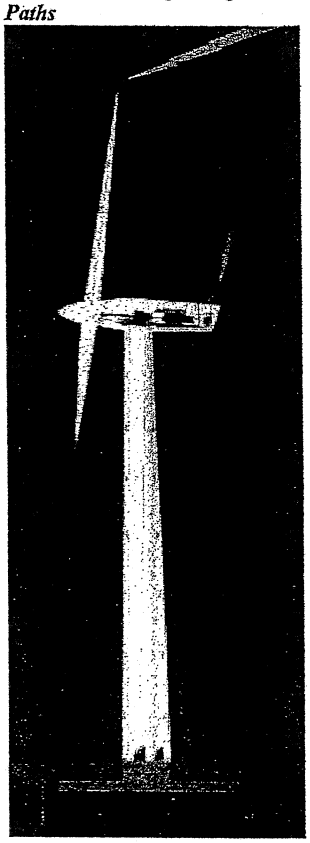
b. Noise

1) What types of noise exist in the area which may affect your project (for example, traffic, equipment, operation, other)?

*Existing sources of noise the Project area include:*

- *Traffic noise – primarily on Highway 97, but also on Bettas, Hayward, and some private roads*
- *Gravel pit operations noise – the gravel pit located off of Highway 97 towards the north end of the Project periodically conducts blasting and operates heavy equipment, rock crushing equipment.*
- *High voltage transmission line electrostatic noise- the six sets of high voltage (230kV to 500kV)lines that traverse the site create significant noise or hum during certain conditions, especially during periods of precipitation*
- *Wind – the site is one of the windiest places in the state and thus wind noise is considerable during high wind periods.*

***Figure 8 WTG Lightning Diversion Paths***



2) What types and levels of noise would be created by or associated with the project on a short-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

*Noise Standards*

*173-60 WAC provides the applicable noise standards for Washington State, including Kittitas County. Kittitas County has not promulgated independent state-approved noise standards pursuant to WAC 173-60-110. WAC 173-60 establishes maximum permissible environmental noise levels. These levels are based on the environmental designation for noise abatement (EDNA) which is defined as "an area or zone (environment) within which maximum permissible noise levels are established. " There are three EDNA designations (WAC 173-60-030), which roughly correspond to residential, commercial/recreational, and industrial/agricultural uses:*

- *Class A: Lands where people reside and sleep (such as residential)*
- *Class B: Lands requiring protection against noise interference with speech (such as commercial/recreational); and*
- *Class C: Lands where economic activities are of such a nature that higher noise levels are anticipated (such as industrial/agricultural).*

***TABLE 6***
***State of Washington Noise Regulations (173-60-040 WAC)***

| | *Maximum Permissible Noise Levels (dBA) from a Class C EDNA* | | |
|---|---|---|---|
| | ***Class A EDNA Receiver*** | | ***Class C EDNA Receiver [1]*** |
| ***Statistical Descriptor*** | ***Daytime (7 a.m. – 10 p.m.)*** | ***Nighttime (10 p.m. – 7 a.m.)*** | ***Anytime*** |
| $L_{eq}$ | *60* | *50* | *70* |
| $L_{25}$ | *65* | *55* | *75* |
| $L_{16.7}$ | *70* | *60* | *80* |
| $L_{2.5}$ | *75* | *65* | *85* |

*Note: 1. Standard applies at the property line of the receiving property Source: WAC 173-60.*

*As used in this section, "noise-sensitive areas" are equivalent to Class A EDNA areas. Table 6 summarizes the maximum permissible levels applicable to noise received at noise-sensitive areas (Class A EDNA) and at industrial/agricultural areas (Class C EDNA) from an industrial facility (Class C EDNA).*

*The following are exempted from the limits presented in Table6 (per 173-60-050 WAC):*

- *Construction noise (including blasting) between the hours of 7 a.m. and 10 p.m.*
- *Motor vehicles when regulated by 173-62 WAC ("Motor Vehicle Noise Performance Standards" for*

*vehicles operated on public highways)*

- *Motor vehicles operated off public highways, except when such noise affects residential receivers*

*Note that 173-60-50(6) WAC states, "Nothing in these exemptions is intended to preclude the Department from requiring installation of the best available noise abatement technology consistent with economic feasibility."*

*173-62 WAC, "Motor Vehicle Noise Performance Standards," regulates noise generated by vehicles traveling on public roads.*

*Construction*

*Noise generated by construction of the Project is expected to vary, depending on the construction phase. Table 7 lists the typical noise levels associated with common construction equipment at various distances.*

*All noise generating construction activities will be conducted between the hours of 7 a.m. and 10 p.m. and are therefore exempt from the limits presented in Table 6 (per 173-60-050 WAC). Blasting is anticipated for the foundations and potentially some road areas. Blasting will be conducted only between the hours of 7 a.m. and 10 p.m. and is anticipated to occur over a period of eight weeks. Blasting activities are specifically exempted from the noise regulations (per WAC 173-60-050 (1)(c)).*

***TABLE 7***
***Noise Levels from Common Construction Equipment at Various Distances (dBA)***

| Construction Equipment | Typical Sound Pressure Level at 50 feet | Expected Sound Pressure Level at 1,000 feet | 2,500 feet | 5,000 feet |
|---|---|---|---|---|
| Bulldozer (250 to 700 horsepower) | 88 | 62 | 54 | 43 |
| Front-end loader (6 to 15 cubic yards) | 88 | 62 | 54 | 43 |
| Truck (200 to 400 horsepower) | 86 | 60 | 52 | 41 |
| Grader (13- to 16-foot blade) | 85 | 59 | 51 | 40 |
| Shovel (2 to 5 cubic yards) | 84 | 58 | 50 | 39 |
| Portable generators (50 to 200 kilowatts) | 84 | 58 | 50 | 39 |
| Mobile crane (11 to 20 tons) | 83 | 57 | 49 | 38 |
| Concrete pumps (30 to 150 cubic yards) | 81 | 55 | 47 | 36 |
| Tractor (3/4 to 2 cubic yards) | 80 | 54 | 46 | 35 |

*Source: Barnes et al., 1977.*

*As with most wind farms, this Project is located in a rural area with low population density and low ambient noise levels. The Applicant has entered into legal agreements with landowners controlling properties on which turbines will be erected and with several landowners who are near the Project. As part of those legal arrangements, a noise easement or option to purchase has been obtained for the parcels shown in Exhibit 10 , 'House and WTG Locations.' In this document, these parcels are referred to as participating landowners. Noise impacts to non-participating land owners are therefore the primary focus of this document. As shown in Exhibit 10 , 'House and WTG Locations', the vast majority of the area surrounding the Project consists of participating land owners.*

*Operations*

*Overall, wind turbines are typically quiet, especially when compared to their combustion-based alternatives. The noise generated by wind turbines is likely to be most noticeable at low wind speeds (8-10 mph) near the speed at which the wind turbines begin operating, when the background noise is at its lowest levels. Wind turbine noise tends to be masked by other background sources (i.e., the sound generated by the wind) at higher wind speeds.*

*The procedures for determining sound power levels from wind turbines are defined in International*

*Electrotechnical Commission 61400 Wind Turbine Generator Systems Part 11: Acoustic Noise Measurement Techniques (Reference Number: IEC 61400-11:1998(E)). The measurement technique outlines procedures to determine corrections for background noise, apparent sound power level, and wind speed dependence.*

*Although the exact turbine model to be use for the Project has not been determined yet, representative values for the type of equipment being considered for this Project have been used. The turbines are expected to be warranted by the manufacturer not to exceed a maximum sound power level 104 dBA with a wind speed of 18 mph (8 meters per second) at 33-feet (10 meters) in accordance with the protocol established in IEC 61400. This is approximately equivalent to a sound pressure level of 72 dBA at 50 feet from the turbine. Measurements conducted by others at existing projects substantiate that the guaranteed sound power levels are realized under field conditions*

*Modeling Results and Regulatory Compliance*

*A three-dimensional noise model was developed using CADNA/A, a sophisticated program developed by DataKustik, GmbH, Munich, Germany. The algorithms in CADNA/A are based on the International Standard ISO –9613-2 "Attenuation of Sound During Propagation Outdoors". Octave band sound power levels (determined in accordance with IEC 61400) for the wind turbines and topographic information from the USGS were input into the model.*

*The wind turbine noise emissions are required by 173-60 WAC not to exceed 70 dBA at all Class C EDNA (industrial/agricultural) property boundaries of non-participating land owners. The project will comply with this requirement at property boundaries of all non-participating landowners. In fact, the predicted property line noise levels are less than 60 dBA (see Table 8).*

*Non-participating residential daytime levels are required by 173-60 WAC not to exceed 60 dBA while nighttime levels are not to exceed 50 dBA. As shown in Exhibit 11, 'Noise Impact Zones', and summarized in Table 8, the project will comply with the more restrictive nighttime limit of 50 dBA at all existing residential structures owned by non-participating landowners. In fact, the project is anticipated to comply with the residential nighttime noise limit at all existing residences, participating or non-participating.*

*The Applicant is committed to designing and operating the Project in a manner that complies with all applicable noise standards.*

***TABLE 8***
***Summary of Model Results at Nearby Non-Participating Landowners***

| Map ID | Description | EDNA Classification | 173-60 WAC Standard (dBA) | Predicted Noise Level from Wind Project (dBA) | Complies with Standard |
|---|---|---|---|---|---|
| 117 | Geisick Property Line | Class C | 70 | 50 | YES |
| 117 | Geisick Residence | Class A | 50 | 46 | YES |
| 417 | Nelson Property Line | Class C | 70 | 56 | YES |
| 417 | * Nelson Residence | Class A | 50 | 48 | YES |
| 215 | Schwab Property Line | Class C | 70 | 52 | YES |
| 215 | * Schwab Residence | Class A | 50 | 42 | YES |
| 216 | Oslund Property Line | Class C | 70 | 46 | YES |
| 216 | * Oslund Residence | Class A | 50 | 43 | YES |
| | US Timber Property Line | Class C | 70 | 56 | YES |
| | Burke Property Line | Class C | 70 | 56 | YES |
| | Thomas Property Line | Class C | 70 | 56 | YES |
| | Swauk Valley Ranch Property Line | Class C | 70 | 51 | YES |
| | Kuhn Property Line | Class C | 70 | 56 | YES |
| | Gagnon Property Line | Class C | 70 | 56 | YES |

*Sources: 173-60 WAC and CH2M HILL. Refer to Exhibit 11, 'Noise Impact Zones', for predicted project noise contours.*
*Note: * These are recreational structures not occupied on a permanent basis and lack water and/or power.*

3) Proposed measures to reduce or control noise impacts, if any.

*The type of wind turbine generators under consideration for this Project are all advanced technology models with very low noise output compared to earlier generations of wind turbines. The Applicant has conducted extensive noise modeling to ensure noise levels will not exceed the regulatory standards defined in WAC 173-60. Wind turbine generators will be placed, at a minimum 1,000 feet from homes.* See *Exhibit 10, 'House and WTG Locations'*

8. LAND AND SHORELINE USE

a. What is the current use of the site and adjacent properties?

*The Project would be located in central Kittitas County, northwest of the City of Ellensburg. The general study area is characterized by a hilly rural landscape of rangeland with some scattered residences. The overall population density in the area is low. There are approximately 60 dwellings within one mile of the proposed Project. Many of these are not permanent or full time residences but rather are seasonal cabins. There are approximately 7 residences within the immediate Project area; all but one of them have signed option agreements with the Applicant. Land use in the entire study area consists of open space and cattle grazing. Forest cover exists to the north of the Project but there are no commercial forestry operations taking place in the immediate vicinity of the Project. There are no Conservation Resource Program (CRP) lands, prime soils, or aircraft flight paths in the study area. Seasonal hunting is allowed on some parcels with landowner permission.*

*Additional land uses in the area include:*

- *A commercial gravel quarry on Highway 97 just south of the northern junction with Bettas Road operated by Ellensburg Cement Products;*
- *An inactive gravel quarry on Bettas Road north of the junction with Hayward Road owned by the Washington Department of Transportation;*
- *Five sets of BPA electric transmission lines running east to west across the Project area, divided into one group of four near the middle of the Project and one to the north;*
- *One set of Puget Sound Energy electric transmission lines running east to west across the Project area just north of the southern set of BPA lines;*
- *Three communication towers;*
- *Two state highways: Highway 97, running through the middle of the Project area, and Highway 10 south of the Project area;*
- *Two county roads: Bettas Road, a paved, two lane road near the western edge of the Project area and Hayward Road, an unpaved road toward the south of the Project area;*
- *Five parcels of land owned by the Washington Department of Natural Resources, located in T 19 N R 17 E, Sections 2, 10, 16 and 22, which are currently leased for grazing;*
- *A parcel of private land located on either side of the Swauk Creek drainage is currently under a conservation easement with the Nature Conservancy of Washington. Agricultural lands are located south of Highway 10 along the Yakima River. The Project would be located on privately owned land except for the parcels owned by the DNR.*

b. Has the site been used for agriculture? If so, describe.

*Land uses in the Project area are predominantly open space and grazing, with some rural residential development occurring in certain locations. There is currently no agricultural activity taking place on any of the parcels where Project facilities are proposed other than grazing. None of the land is irrigated and no crops are grown on these parcels. This area is not highly productive rangeland, and most grazing use is seasonal (spring) in nature. Less than half of the private property owners on whose land Project facilities are proposed currently utilize their land for grazing. All but one of these private property owners graze cattle, the other grazes bison and horses. Less than half of the parcels owned by Washington DNR where turbines are proposed are currently being used for cattle grazing.*

*During construction of the Project, it will be necessary to remove cattle from those areas where blasting or heavy equipment operations are taking place. Applicant will make arrangements with property owners and livestock owners to keep livestock out of these areas during those periods.*

*Once the Project is completed, grazing activities can resume as before. The operation of wind turbines is highly compatible with grazing activities. Cattle, sheep, and other domestic animals routinely graze underneath operating wind turbines at projects across the US and around the world. The total area that will be permanently occupied by the Project facilities is 90 acres, much of which is not currently being used for grazing. As part of the proposed mitigation package for plants and animals, the Applicant plans to acquire a parcel of approximately 550 acres and exclude cattle from this parcel in order to restore and enhance its value as habitat. In the context of the very large amount of rangeland available for grazing in Kittitas County, this impact is insignificant.*

c. Describe any structures on the site.

*The site is a rural area with few structures – see Section b above for a further description.*

d. Will any structures be demolished? If so,what?

*It is anticipated that no structures will be demolished.*

e. What is the current zoning classification of the site?

*The property on which the wind turbines would be located contains two zoning designations: Agriculture-20 and Forest and Range. The areas east of Highway 97 are zoned Forest and Range while those west of Highway 97 are zoned Agriculture-20.* ***Exhibit 4, 'Zoning- Aerial Photo',*** *indicates where these County zoning designations fall within the Project area.*

*According to the County's zoning code, the Agriculture-20 agricultural zone is dominated by farming, ranching, and rural lifestyles. The purpose of the zoning classification is to preserve fertile farmland from encroachment by nonagricultural land uses and to protect the rights and traditions of those engaged in agriculture.*

*The intent of the Forest and Range zone is to provide areas of Kittitas County where natural resource management is the highest priority and where the subdivision and development of lands for uses and activities incompatible with resource management are discouraged.*

e. What is the current comprehensive plan designation of the site?

*Rural*

g. If applicable, what is the current shoreline master program designation of the site?

*Not applicable*

h. Has any part of the site been classified as an "environmentally sensitive" area?

*No*

i. Approximately how many people would the completed project displace?

*None*

j. Approximately how many people would reside or work in the completed project?

*Sixteen to eighteen people will work during the operations phase.*

k. Proposed measures to avoid or reduce displacement impacts, if any.

*Not applicable*

1. Proposed measures to ensure the proposal's compatibility with existing and projected land uses and plans, if any.

*See Section III 3a (Request for Rezone) for a detailed description of "consistency with land use policies."*

Consistency with Zoning

*On December 3, 2002, the Kittitas County BOCC changed the zoning ordinance pertaining to wind farm development to shift responsibility for reviewing and permitting wind farms from the Board of Adjustment to the BOCC (Kittitas County Code Chapter 17.61 A ). Wind farms are a permitted use in a Wind Farm Resource Overlay Zoning District.*

*The development agreement is conditioned upon development standards such as densities, number, size, setbacks, location of turbines and mitigation measures and other appropriate development conditions to protect the surrounding area. In a typical non-EFSEC permit application context, the BOCC would: 1) adopt a site-specific amendment to the Comprehensive Plan land use designation map to Wind Farm Resource Overlay District; 2) adopt a site specific rezone of the county zoning map to Wind Farm Resource Overlay Zoning District; 3) issue a Wind Farm Development Permit; and (4) negotiate and approve a development agreement. Under the terms of the County's ordinance, these approvals can be made only if the BOCC determines that 1) the proposal is essential or desirable to the public convenience; 2) the proposal is not detrimental or injurious to the public health, peace, or safety or to the character of the surrounding neighborhood; and 3) the proposed use at the proposed location(s) will not be unreasonably detrimental to the economic welfare of the County and it will not create excessive public cost for facilities and service.*

*Because the requirements set out in the Kittitas County Code Chapter 17.61A for approval are of the same nature as those used by EFSEC in its administrative and SEPA process, the Project will be built and operated consistent with Kittitas County Code Zoning Code and the Wind Farm Resource Development Overlay Zone criteria.*

*The Project would be considered desirable to public convenience because it would use a renewable resource to provide clean, safe, quiet, non-polluting energy to help the region meet its energy needs. It would be located on private and DNR property and no public access to the wind turbines would be allowed. It would not be detrimental or injurious to the public health, peace, or safety.*

*Changes to the surrounding neighborhood would consist of visual changes resulting from the addition of wind turbines to the local landscape. However, the inherent rural character of the surrounding area would not significantly change. Potential visual impacts of the Project are discussed in Section IX B 10, "Aesthetics".*

*Development of the Project would generate additional local tax revenues and provide substantial economic benefits to Kittitas County during both construction and operation. Local products and services would be purchased during the construction phase, and hundreds of construction jobs would be created. In addition, lease payments would be made to landowners throughout the life of the Project. The portions of the Project located on DNR property would generate lease revenues that would be applied to local public schools through the state's Common School Fund. The Project would not increase the need for public services such as schools, roads, police and fire service or water and sewer service because no facilities would be developed that require these services (see Section IX B 15 and 16, "'Public Service" and "Utilities", below)*

*The Project would not require the use of hazardous materials; therefore, there are no safety risks associated with hazardous materials. The wind turbine strings and roads would use public right-of-ways and established utility corridors where possible. In some cases, existing farm and private roads would be widened to accommodate construction vehicles. The Project would be constructed and operated in accordance with the latest industry standards and available technology.*

*Land use impacts associated with construction and operation of the Project would be negligible because the Project would not impair or impact current land uses, change land use patterns, or be incompatible with existing uses or zoning ordinances. Wind farms are generally considered compatible with agricultural and grazing uses. The Agriculture-20 and Forest and Range zoning of the site allows Major Alternative Energy Facilities and Special Utilities as a conditional use. The Project meets the County criteria for a CUP. The Project will not cause impacts or changes to the existing land use in the study area or surrounding area.*

9. HOUSING

a. Approximately how many units would be provided, if any? Indicate whether high, middle or low-income housing.

*None*

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle or low-income housing.

*None*

c. Proposed measures to reduce or control housing impacts, if any.

*Population and Housing*
*The Project is not expected to result in a substantial increase of population in the county; the Project is expected to require 16 to 18 total workers during operations, some of whom are expected to be hired locally. Less than 15 additional workers are projected from additional spending (multiplier effects) in the County.*

*During major construction projects, there is always a chance that an influx of temporary workers requiring overnight accommodations will outstrip the supply of temporary housing. During construction, the Project would require up to 160 workers during a four-month period when construction activity is at its peak, and up to 90 workers for a couple of months on each end of the peak. Many of these workers would not require overnight lodging as construction crews could come from the local area, or may commute from the Yakima metropolitan area (within a one-hour drive), or the Seattle-Tacoma metropolitan area (a one and one-half to two hour drive).*

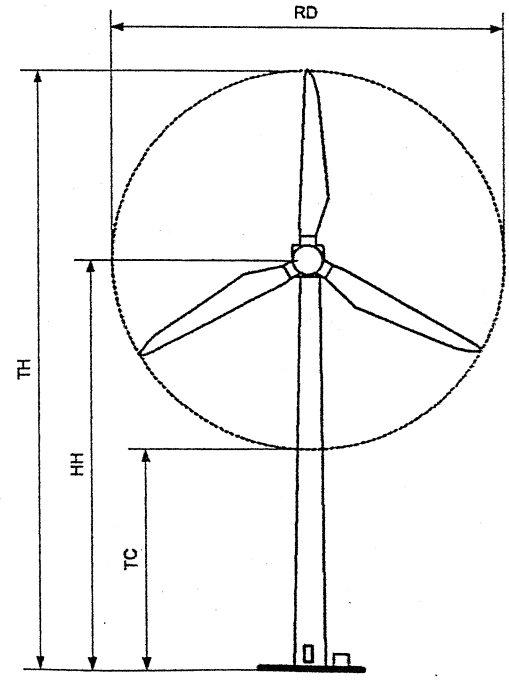
*For those workers that would require overnight lodging, the results of a recent telephone survey conducted by the Applicant of hotel, motel, RV Park, and campgrounds in Kittitas County indicates that there are 1,150 rooms or sites available in the county. The results indicate further that during the peak summer season, there are typically about 240 rooms or sites vacant at any one time. During the non-summer months, vacancy rates are much higher and it is estimated that there are usually around 760 rooms or sites vacant at any one time. As discussed above, there are also more than 1,000 vacant, non-seasonal housing units in Kittitas County. There are also many overnight lodging opportunities in the greater Yakima area, which had a population of 224,500 in 2000, which are within a one-hour drive of the Project. Thus, there appears to be an adequate supply of temporary housing available to accommodate non-local workers.*

10. AESTHETICS

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

*Wind Turbine Generators and Towers*
*Several wind turbine generators (WTGs) are under evaluation for the Project. Based on these evaluations, a number of wind turbine vendors have been pre-qualified to supply equipment for the Project including GE Wind Energy, NEG-Micon, Vestas, Nordex, Bonus, and Gamesa Eolica. The Project will consist of up to 150 wind turbines for an installed nameplate capacity of up to 205 megawatts (MW). The Project will implement 3-bladed wind turbines on tubular steel towers each ranging in size from 1.3 MW to 2.5 MW (generator nameplate capacity) and with dimensions*

***Figure 9 Wind Turbine Dimensions***




| | MAX | MIN | Dimension |
|---|---|---|---|
| HH | 80 m/262 ft. | 46 m/151 ft. | Hub Height |
| RD | 90 m/295 ft. | 60 m/197 ft. | Rotor Diameter |
| TC | 40 m/131 ft. | 15 m/49 ft. | Tip Clearance |

*as shown in Figure 9. The WTGs are the tallest structures on the site.*

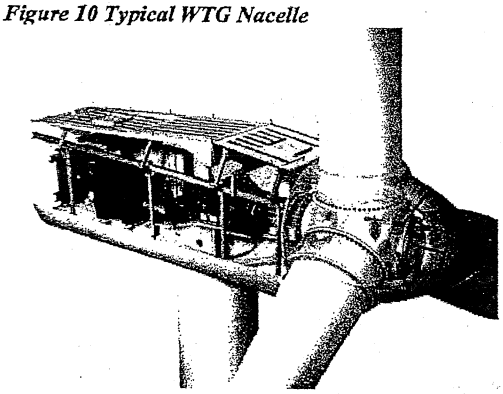
*Wind Turbines consist of 3 main physical components that are assembled and erected during construction: the tower, the nacelle (machine house) and the rotor (3-blades).*

*Tower*

*The WTG tower is a tubular conical steel structure that is manufactured in multiple sections depending on the tower height. Towers for the Project will be fabricated, delivered and erected in 2 to 3 sections. An internal ladder runs to the top platform of the tower just below the nacelle. A nacelle ladder extends from the machine bed to the tower top platform allowing nacelle access independent of its orientation.*

*The tower design is certified by experienced and qualified structural engineers who have designed several generations of turbine towers that have proven themselves well in some of the most aggressive wind regions of the world. The towers and foundations are designed for a survival gust wind speed of 90+ mph with the blades pitched in their most vulnerable position. For the cold-weather winter conditions on the Project site, special material specifications are set to ensure that materials do not go below the brittle transition temperature.*

***Figure 10 Typical WTG Nacelle***



*Nacelle*

*Figure 10 shows the general arrangement of a typical nacelle that houses the main mechanical components of the WTG. The nacelle consists of a robust machine platform mounted on a roller bearing sliding yaw ring that allows it to rotate (yaw) to keep the turbine pointed into the wind to maximize energy capture. A wind vane and anemometer are mounted at the rear of the nacelle to signal the controller with wind speed and direction information.*

*The main components inside the nacelle are the drive train, a gearbox and the generator. On some turbines, the step-up transformer is situated at the rear of the nacelle that eliminates the need for a pad-mounted transformer at the base of the tower.*

*The nacelle is housed by a fully enclosed steel reinforced fiberglass shell that protects internal machinery from the environment and dampens noise emissions. The shroud is designed to allow for adequate ventilation to cool internal machinery such as the gearbox and generator.*

*Drive Train*

*The rotor blades are all bolted to a central hub. The hub is bolted to the main shaft on a large flange at the front of the nacelle. The main shaft is independently supported by the main bearing at the front of the nacelle. The rotor transmits torque to the main shaft that is coupled to the gearbox. The gearbox increases the rotational speed of the high speed shaft that drives the generator at 1200-1800 RPM to provide electrical power at 60 Hertz (Hz).*

*Rotor Blades*

*Modern WTGs have 3-bladed rotors that range in span from 200 to 300 feet in diameter. The rotor blades turn quite slowly at about 20-25 RPM resulting in a graceful appearance during operation. The rotor blades are typically made from a glass-reinforced polyester composite similar to that used in the marine industry for sophisticated racing hulls. Much of the design and materials experience comes from both the marine and aerospace industries and has been developed and tuned for wind turbines over the past 25 years. The blades are non-metallic.*

b. What views in the immediate vicinity would be altered or obstructed?

*Visual or aesthetic resources are generally defined as the natural and built features of the landscape that can be seen. The combination of landform, water, and vegetation patterns represent the natural landscape*

*features that define an area's visual character while built features such as buildings, roads and other structures reflect human or cultural modifications to the landscape. These natural and built landscape features or visual resources contribute to the public's experience and appreciation of the environment. Visual resource or aesthetic impacts are generally defined in terms of a project's physical characteristics and potential visibility and the extent to which the project's presence would change the perceived visual character and quality of the environment in which it would be located.*

*This section documents the visual conditions that now exist in the area in which the Kittitas Valley Wind Power Project (Project) is located and evaluates the implications that the Project would have for the public's experience of the area's aesthetic qualities, and day and night light conditions. A number of specialized terms are used in presenting this analysis; definitions of these terms are available upon request.*

*Overview of Wind Energy Aesthetic Issues*

*Wind energy has a long history in that it has been used for centuries for grinding grain and pumping water. As a consequence in many places, including ranches in the American west, windmills have been a long-established and well-accepted part of the landscape. In the United States, large-scale use of wind power to generate electricity first took place in California in the 1980's with establishment of wind farms such as those in the Altamont, Tehachapi, and San Gorgonio Passes involving large numbers of small turbines that were closely spaced.[1] Many of these early turbines were supported on lattice steel towers that were similar in appearance to the towers frequently used for transmission lines. These wind farms were located on highly visible sites, in many cases, within close range view of major freeway corridors, and generated considerable discussion about their appearance. Reaction to the wind farms was split. In the view of some, the turbines were visually dominant technological structures that adversely affected the natural or rural character of the landscapes in which they were located. In the view of others, though, the wind turbines were visually interesting technological objects, and the strings of turbines along the ridgelines were seen as delineating and emphasizing the topography's variations. In addition, the movement of the turbines in the wind was seen as introducing an unusual kinesthetic dimension to the visual experience. To some extent, the turbines became a point of visual interest, and were featured in films and advertisements, and were depicted on post cards sold in the regions around the facilities. Although many appreciated the early California wind farms as positive visual features, they created a number of specific aesthetic problems. These problems included creation of dense, disorderly, cluttered-appearing arrays of turbines on hillsides; use of rickety appearing lattice steel towers with awkward designs; use of a variety of highly divergent turbine designs of varying heights in a single installation, creating a sense of visual disunity; the presence of non-operating turbines; visual impacts related to insensitive road cuts; and visible erosion of hillsides related to improper drainage of access roads.[2] This experience in California provided valuable lessons that have been drawn on in planning and designing subsequent wind energy installations in a way that avoids the aesthetic issues associated with these early projects.*

*Perception research validates that even though these early California wind farms created specific aesthetic problems, the public perceptions of them, although mixed, were generally favorable. For example, research on public perceptions of the Altamont Wind Energy Area by Thayer and Freeman (1987) found that those surveyed perceived the wind farms in the Altamont Pass area to be highly visible, constructed environments, but that more respondents tended to like wind energy developments than dislike them. However, when asked to rate photos of the wind installations on a scale from beautiful to ugly, respondents rated the views as neutral to slightly ugly. Thayer and Freeman discovered that reactions to the Altamont Wind Energy installations were complex and factors other than beauty played a major role in determining them. The symbolic or connotative aspects of the wind energy facilities were found to be particularly important in influencing reactions. Those who indicated strongly positive attitudes toward the wind energy facilities were likely to find them to be appropriate, efficient, safe, natural (in the production of energy) progressive, and a sign of the future. Those who indicated strongly negative attitudes tended to cite the visual conspicuousness, clutter, and unattractiveness of the facilities. This finding led Thayer and Freeman to conclude that the two groups focused on different aspects of the facilities "...with the 'like' group responding strongly to the symbolic, referential attributes not automatically associated with the visual stimuli. This group was willing to forgive the visual intrusion of the turbines on the existing landscape for the presumably higher goals of the Project where dislikers were not." (Thayer and Freeman 1987, p. 394)*

*One of Thayer and Freeman's key findings related to the importance of symbolic aspects in influencing*

1 At the Altamont Pass, turbines typically had towers 60 to 80 feet in height and blades 50 to 60 feet in diameter.
[2] For fuller documentation of this experience see Gipe 1995b, 1997.

*evaluations of wind energy developments is that viewers have negative responses when they see turbines that are not operating. They discovered that viewers expect the turbines to turn when the wind is blowing, and when these expectations are not met, they have negative reactions. Based on their research, Thayer and Freeman reached a number of conclusions related to design measures that could improve the public's perceptions of wind farm attractiveness. Design measures supported by their research include:*

- *Use of neutral colors for turbines[3];*
- *Evenly spaced arrays;*
- *Consistency in turbine type and size within arrays;*
- *Use of fewer, larger turbines versus use of more smaller ones;*
- *Minimization of conspicuously malfunctioning turbines (Thayer and Freeman 1987, pp. 395-396)4.*

*The proposed Kittitas Valley Wind Power Project builds on and applies the lessons learned from the California experience. Development of the Project's proposed layout and operational plans were informed by the design principles identified by Thayer and Freeman, and other observers of recent wind energy experience in California and in Europe as well, where the level of concern with landscape values is particularly high.[5] In addition, the Project will make use of the latest generation of turbines, which are larger, more widely spaced and rotate at lower RPM (revolutions per minute) than those used in earlier projects. The equipment being used reflects design refinements made by industrial designers intended to make the turbine towers, nacelles, and rotors, sleek and attractive elements in the landscape.*

***Methodology***

*This analysis of the visual effects of changes that might occur with implementation of the proposed wind energy facility is based on field observations and review of the following information: research about wind energy facility visual effects, public perceptions of wind energy facilities, and design measures for integrating wind energy facilities into their landscape settings; local planning documents; Project maps, drawings, and technical data; computer-generated maps of the areas from which the Project facilities are potentially visible; aerial and ground level photographs of the Project area; and computer-generated visual simulations. Site reconnaissance was conducted from February 2002 through December 2002 to observe the Project area, to take representative photographs of existing visual conditions and to identify key public views appropriate for simulation.*

*The visual study employs assessment methods based, in part, on the U.S. Department of the Transportation Federal Highway Administration (FHWA) (US DOT 1988) and other accepted visual analysis techniques as summarized by Smarden et al. (1988). Included are systematic documentation of the visual setting, an evaluation of visual changes associated with the Project and measures designed to mitigate the Project's visual effects, including lessening of any light and glare impacts and restoration or enhancement of any portions of the landscape that may have been disturbed during construction.*

**Existing Conditions**

***Regional and Local Landscape Setting***

*The lands on which the Kittitas Valley Wind Power Project is sited extend across a roughly 3.4 by 5.5 mile area of ridge lands located along the northern edge of the Kittitas Valley, approximately 11 miles to the north and west of the City of Ellensburg. These ridge lands slope southward toward the valley from Table Mountain, a 6,359 foot high peak that is part of the Wenatchee Range to the north. The ridges on which the Project is located range in elevation from 2,160 to 3,445 feet above mean sea level, and lie in the area defined by Swauk Creek on the west and Green Canyon on the east. The tops of the ridges have a gentle*

[3] This recommendation is consistent with experience in the electric utility industry, which has found through studies and experience that neutral gray colors perform the best in visually integrating electric transmission lines into the landscape. See for example, Goulty (1990) pp 110-120.

[4] Thayer and Freeman note that in addition to being supported by their own research, these design recommendations are also supported by research by Nassauer and Benner (1984) on landscape preferences that included scenes of oil and gas developments, who found that perceived tidiness was a strong predictor of landscape preference.

[5] Paul Gipe, a long-time observer of the wind industry in California and an advocate for wind energy development that respects community landscape values has developed further lists of aesthetics guidelines for wind plants based on the lessons learned in California and elsewhere that are consistent with and expand upon those identified by Thayer and Freeman (Gipe 1995a, 1995b, 2002). For reflections on experience in integrating wind energy facilities into the landscape in the US and Europe, see Pasqualetti, Gipe, and Righter 2002.

*southward slope, and the ridge area is dissected by a number of deep, narrow, steep-sided canyons.*

*The Project area has an open, windswept appearance. Most of the ridge tops on which the Project facilities would be located consist of dry, rocky grasslands used for grazing. To a large degree, trees and shrubs are limited to the areas along the streams in the canyons. The exception is in the higher elevation areas at the Project's northern fringes, where there are clusters of ponderosa pines and other conifers that form the southern edge of the forests that lie upslope to the north.*

*The Project area is roughly bisected by Highway 97, a north-south route of regional importance. The most visually prominent built features in the Project area in addition to Highway 97 are the sets of large electric transmission lines in the Bonneville Power Administration (BPA) and Puget Sound Energy (PSE) transmission corridors that cross the Project area in an east-west direction. Although many portions of the Project area are uninhabited, there are clusters of rural residences on large parcels in several areas, most notably along the Highway 97 corridor just south of the Project site, in portions of the ridge area east of Highway 97, and along Bettas Road. Under the Kittitas County Comprehensive Plan (Kittitas County, 2001) and Zoning Ordinance, the lands in the Project area have been designated as Agriculture-20 and Forest and Range land use areas. The Comprehensive Plan does not acknowledge any special scenic or visual resource values in the Project area, and does not include policies that are specifically oriented to protection of Project area scenic qualities.*

*Although the County's Comprehensive Plan is silent on the question of scenic values in the Project area and vicinity, the corridor along Highway 10, which runs along the southern edge of the Project area, has gained some recognition as having scenic values[6]. In the 1990's, Kittitas County received a grant from the Quad County Regional Transportation Organization that enabled it to prepare a plan for a scenic route that would include this segment of Highway 10, along with segments of Highways 970 and 903, which follow the segments of the Yakima and the Cle Elum Rivers between Ellensburg and Salmon La Sac. To prepare this plan, the County established a Corridor Planning Management Team (CPMT) that included citizens, agency representatives, and technical experts, including county staff and representatives from the Washington State Department of Transportation and the Forest Service. Under the CPMT's direction, a planning report for this corridor, titled The Swift Water Corridor Vision (Kittitas County, 1997) was prepared. This report documents the corridor's scenic values and identifies opportunities for undertaking road improvement measures and development of roadway amenities and interpretive installations. As the vision statement takes pains to point out, "This Vision is not intended to be a plan that creates additional management policies, regulations, or restriction on private property, beyond those that already exist under federal, state, regional, and local plans and regulations.* ***This Vision is not a mandate; it is a recommendation."*** *Although the Swiftwater Vision was completed and published in 1997, it has not been formally adopted by the County.*

***Project Site Visibility***

*Exhibits 13 and 14, Potential Project Visual Impact in the Region and Potential Project Visual Impact, provide a generalized indication of the areas from which the proposed wind turbines will be potentially visible. These visibility analyses were prepared using the "Zones of Visual Influence" (ZVI) feature of the WindPro software system, a sophisticated program developed to assist in the planning, design, and environmental assessment of wind energy projects (EMD 2002). To identify the areas from which the turbines are potentially visible, the ZVI module makes use of a digital height model generated from digital height contour lines. The module calculates lines of sight between each point on the land surface and the tops of each of the proposed turbines, and notes whether there is an unobstructed view toward the turbine. When the analysis is complete, the module produces maps showing the areas from which the turbines will be potentially visible, and can create the maps in a way that indicates the numbers of turbines that are potentially visible from each point in the surrounding landscape.*

*The visibility data presented in Exhibits 13 and 14 represent the potential visibility of the turbine towers, which will extend up to 262 feet above the surface of the ground, and the rotor blades, which will extend up to 410 feet above the ground surface. Both figures were prepared using the 20 foot contour lines from the USGS topographic maps available for the region. Both figures represent "worst case" assessments of potential Project visibility because they do not take into account the effect that other structures close to viewer might have on obstructing views toward the turbines. The visibility analyses presented on these*

[6] For example, the American Automobile Association map of Washington indicates that the segment of Highway 10 between Cle Elum and Ellensburg is an "AAA Designated Scenic Byway" and local tourist literature promotes Route 10 as a scenic alternative to I-90.

*figures do not reflect any screening effects that might be provided by trees, and thus overstate the potential visibility of the turbines to some degree. The overstatement of the potential visibility is particularly pronounced in and around Section 35 in the area to the north of the turbines located on the ridge lands east of Highway 97 where in reality, the presence of thick tree cover will provides substantial screening of views from the cluster of lots located on the slope above the Project area.*

*Exhibit 12 provides an understanding of the Project's potential visibility in the Project area's larger landscape context, including areas that are as far as 12 miles away from the Project site. This exhibit indicates the areas from which any turbines at all would be potentially visible.*

*Exhibit 13 is a more detailed map that focuses in on the Project area's foreground and middle ground viewing areas (the areas up to 5 miles). These viewing areas derive from the landscape visual analysis systems developed by the US Forest Service and other agencies, which divide the landscape up into distance zones that are related to the degree to which landscape details are detectable to the viewer. The foreground distance zone is defined as the area within ¼ to ½ mile from the viewer, where the maximum discernment of detail is possible. The middle ground is defined as the area from ¼ to 3 to 5 miles from the viewer, where there is visual simplification of vegetative surfaces into textures, overall shapes and patterns, and there is linkage between foreground and background parts of the landscape. The background is defined as the landscape zone 3 to 5 miles and further from the viewer in which little color or texture is apparent, colors blur into values of blue or gray, and individual visual impacts become least apparent (USDA Forest Service 1973, pp. 56-57). The graphic display on this map provides an indication of the relative numbers of turbines that can be seen from each location in the surrounding landscape. Both Exhibits 13 and 14 are annotated with numbers and arrows that indicate the locations from which the character photos, presented as Exhibit 14, Figures 3a through 3i, and the simulation views, presented as Exhibit 14, Figures 4 through 19, were taken.*

*Review of Exhibit 12 suggests that one or more turbines will be visible to one degree or another from most of the valley and foothill areas to the north and west of Ellensburg. The one notable exception is in the corridor along Highway 10 to the northwest of Ellensburg, where there are pockets where views toward the turbines will be blocked by the ridge defining the river canyon road corridor's northeastern edge. Based on field work conducted in the area, it is fair to say that the seen area analysis presented on Exhibit 12 substantially overstates the Project's potential visibility in that there are many areas, particularly in the City of Ellensburg and in the corridors along I-90 and the Yakima River where structures and trees in the foreground of the view create substantial or complete blockage of views toward the distant foothill region where the Project will be located.*

*Review of Exhibit 13 indicates that the greatest numbers of turbines will be visible from the wide, flat valley area north of Ellensburg and east of Highway 97, from the tops of the ridges in the foothill areas, and from Thorp Prairie. From most areas of the narrow, steep sided valleys that lie within and close to the Project area, relatively small numbers of turbines will be visible from any given location.*

***Viewing Areas***

*To structure the analysis of the Project's effects on visual resources, the Project area was divided up into a number of viewing areas – areas which offer similar kinds of views toward the Project site and/or within which there would likely be similar concerns about landscape issues. The existing visual conditions of views from these areas toward the Project site are described below. Within most of these viewing areas, Simulation Viewpoints (SVs) were selected as locations for taking photos that could be used for the development of simulated views of the Project that could form the basis for visualizing the Project's potential visual effects. The simulation viewpoints were established to capture views that are typical of the conditions that exist in each of the viewing areas. The emphasis was placed on views from publicly accessible locations that would be likely to be seen by the largest numbers of people.*

***Assessment of Scenic Quality***

*To assess the scenic quality of the landscapes potentially affected by the proposed alternatives, the analyses of the views toward the Project site from each of the viewing areas includes an overall rating of the level of scenic quality prevailing in the views. These ratings were developed based on field observations made in November 2002, review of photos of the affected area, review of methods for assessment of visual quality, and review of research on public perceptions of the environment and scenic beauty ratings of landscape scenes. The final assessment of scenic quality was made based on professional judgment that took a broad spectrum of factors into consideration, including:*

- *Natural features, including topography, water courses, rock outcrops, and natural vegetation;*
- *The positive and negative effects of man-made alterations and built structures on visual quality; and*
- *Visual composition, including an assessment of the vividness, intactness, and unity of patterns in the landscape.*[7]

*The final ratings assigned to each view fit within the rating scale summarized in Table 9. Development of this scale builds on a scale developed for use with an artificial intelligence system for evaluation of landscape visual quality (Buhyoff et al., 1994), and incorporates landscape assessment concepts applied by the U.S. Forest Service and the U.S. Department of Transportation.*

***Table 9 Landscape Scenic Quality Scale***

| *Rating* | *Explanation* |
|---|---|
| *Outstanding Visual Quality* | *A rating reserved for landscapes with exceptionally high visual quality. These landscapes are significant nationally or regionally. They usually contain exceptional natural or cultural features that contribute to this rating. They are what we think of as "picture post card" landscapes. People are attracted to these landscapes to view them.* |
| *High Visual Quality* | *Landscapes that have high quality scenic value. This may be due to cultural or natural features contained in the landscape or to the arrangement of spaces contained in the landscape that causes the landscape to be visually interesting or a particularly comfortable place for people. These landscapes have high levels of vividness, unity, and intactness.* |
| *Moderately High Visual Quality* | *Landscapes that have above average scenic value but are not of high scenic value. The scenic value of these landscapes may be due to man-made or natural features contained within the landscape, to the arrangement of spaces, in the landscape or to the two-dimensional attributes of the landscape. Levels of vividness, unity, and intactness are moderate to high.* |
| *Moderate Visual Quality* | *Landscapes, that are common or typical landscapes that have, average scenic value. They usually lack significant man-made or natural features. Their scenic value is primarily a result of the arrangement of spaces contained in the landscape and the two-dimensional visual attributes of the landscape. Levels of vividness, unity, and intactness are average.* |
| *Moderately Low Visual Quality* | *Landscapes that have below average scenic value but not low scenic value. They may contain visually discordant man-made alterations, but these features do not dominate the landscape. They often lack spaces that people will perceive as inviting and provide little interest in terms of two-dimensional visual attributes of the landscape.* |
| *Low Visual Quality* | *Landscapes that have below average scenic value. They may contain visually discordant man-made alterations, and often provide little interest in terms of two-dimensional visual attributes of the landscape. Levels of vividness, unity, and intactness are below average.* |

*Note: Rating scale based on Buhyoff et al., 1994; U.S. DOT Federal Highway Administration, 1988, and United States Department of Agriculture Forest Service. 1995.*

***Assessment of Visual Sensitivity***

*The analysis of viewers, viewing conditions, and viewer sensitivity in each viewing area was structured to consider residential viewers, roadway viewers, and, to the extent to which they are present, recreational viewers. To summarize the insights developed through the analysis of viewer sensitivity, overall levels of visual sensitivity along the various sections of the alternative routes were identified as being High, Moderate, or Low. In general, High levels of sensitivity were assigned in situations where turbines would be potentially visible within 0.5 mile or less from residential properties, heavily traveled roadways, or heavily used recreational facilities. Moderate levels of sensitivity were assigned to areas where turbines would be potentially visible within 0.5 to 5 miles within the primary view cone of residences and roadways. In distinguishing between moderate and low levels of sensitivity in the 0.5 to 5 mile zone, account was also taken of contextual factors, including the viewing conditions in the immediate foreground of the view. In areas lying 5 miles or more from the closest turbine, where a wind farm would be distant and relatively minor element in the overall landscape, a low level of sensitivity was assigned.*

**Existing Visual Conditions in the Landscape Viewing Areas**

**Highway 97 Corridor**

[7] For definitions of these terms, please refer to the Technical Terms section at the end of this chapter.

*Landscape Description and Scenic Quality:*

*The Project area is roughly bisected by Highway 97, an old US highway that begins in California, and extends along the eastern edge of the Cascades through Oregon and Washington. Locally, Highway 97 plays an important role as a route between Ellensburg and Wenatchee. As indicated in Table 12 in the 'Transportation' section, in 2001 the Average Daily Traffic on the segment of Highway 97 between Ellensburg and Highway 970 was 2,800 vehicles.*

*As it heads north from Ellensburg, Highway 97 travels along the wash along Dry Creek as it passes through the generally flat and open upper reaches of the Kittitas Valley. Along the stretch of highway approaching the Project area from the south, northbound travelers are able to see the grass and shrub-steppe covered lower slopes of the ridge spurs that define the Valley's northern edge, as well as the forest covered upper ridge areas (Exhibit 14, Photo 1). As travelers approach within a mile or closer to the Project area, the lower slopes of the ridge spurs become more prominent in the view, and block the views toward the forested upper slopes. In this area, the landscape consists of open shrub-steppe lands with a scattering of rural residences that are generally highly visible because of the openness of the surrounding landscape. The most visually prominent built features in this area are the lattice steel transmission towers on the Bonneville Power Administration (BPA) transmission corridor that crosses Highway 97 and the adjoining ridge lands along the southern edge of the Project area (Exhibit 14, Photo 2 and Simulation View 1 on Figure 4a). The BPA transmission corridor accommodates 4 sets of high voltage transmission towers of varying design (Exhibit 14, Photo 4) that extend up to 182 feet in height. Along the segment of Highway 97 that extends from a point several miles south of the Project area to the place where the Project area begins at the BPA transmission corridor, the level of existing visual quality can be generally be classified as moderately low.*

*As Highway 97 enters the Project area, the corridor along Dry Creek that it follows becomes a well-defined valley through the ridge lands (Exhibit 14, Photo 3). The highway passes though this valley (Exhibit 14, Photo 5 and Photo 6) and up a long, steep slope to a crest at approximately 1,700 feet in elevation where it passes over the side of one of the ridges. The most prominent landmark at the crest area is a privately owned gravel pit and gravel storage area located along the west side of the road. In this area, views for northbound travelers toward the ridge lands to the east where many of the Project turbines will be located are constrained to some degree by the steep-sided road cuts along the east side of the road. Views toward the ridgeline to the west where String F is proposed are more open. The area along the west side of the highway at Bettas Road, where the proposed operations and maintenance (O&M) facility and Project substation would be located, is also in open view from the highway (Exhibit 14, Photo 6). Although the landscape in this area consists primarily of open shrub-steppe lands, there are clusters of ponderosa pines and other trees at scattered locations along the edge of Dry Creek (Exhibit 14, Photo 5 and Photo 6). This area is crossed by a single PSE 230-kV line that is carried on wood pole H-frame towers (Exhibit 14 Photo 6). The level of existing visual quality in the area along Highway 97 extending from the BPA transmission corridor to the road's crest on the side of the ridge ranges from moderately low to moderate.*

*From the gravel pit area at the crest, Highway 97 travels northward down a long slope, and in the area close to Highway 970, enters Hidden Valley a small valley formed by Swauk Creek, and continues to the intersection with Highway 970. The area along this segment of the highway is a transition zone between the open, grass and shrub-steppe covered ridges to the south and the more heavily forested mountain and valley areas to the north. In this area, like the area to the south, views for northbound travelers toward the ridge lands to the east where many of the turbines will be located are constrained to a large degree by the steep road cuts along the road's eastern edge. In this area, the road cuts include scattered clusters of trees at various stages of maturity (Exhibit 14, Photo 7). The BPA Rocky Reach – Maple Valley 230-kV transmission line, which is carried on tall lattice steel transmission towers, crosses this segment of the highway. One of this line's towers is visible in the mid-distance in the hillside area seen in Simulation View on Exhibit 14, Figure 5a. In the area between the gravel pit at the crest and the transmission line crossing, the level of visual quality is moderate. A half mile north of the transmission line crossing, where the highway enters Hidden Valley and a more rugged, forested, and visually intact landscape comes into view, the level of visual quality is moderately high to high (Exhibit 14, Photo 8).*

*Traveling south toward the Project area from the intersection with Highway 970, Highway 97 first passes through the meadows and forests of Hidden Valley, and as the road starts to travel up the ridge, the view opens up to reveal the ridge along the east side of the highway where String G is proposed (Exhibit 14, Photo 9). Further up the road, in the vicinity of the intersection with the northern end of Bettas Road, this ridge becomes the primary element in the cone of vision of roadway viewers (Exhibit 14, Simulation View 3 on Figure 6a). South of the intersection with Bettas Road, as the roadway travels along the base of the*

*steep slopes of the ridge, the view to the east and to the ridge top becomes more constrained, but the view toward the southwest and the ridge top on which String F will be located opens up (Exhibit 14, Photo 10). Along this segment of the highway, the most salient developed features in the southbound view are the road and road cuts, the BPA Rocky Reach-Maple Valley transmission line (Exhibit 14, Photo 9), and the gravel piles at the gravel facility at the top of the ridge (Exhibit 14, Photo 10). Along this segment of Highway 97, the visual quality of southbound views ranges from moderately high in Hidden Valley to moderate in the area further to the south.*

*After Highway 97 crosses over the crest by the gravel facility, views for southbound travelers open up to reveal a panorama to the southwest and then to the south across the ridge lands and the Kittitas Valley toward Manastash Ridge and other high ridges 20 miles or more in the distance. In this area, views toward the ridge lands to the east where many of the turbines will be located are constrained to some degree by the road cuts, but views toward the ridge top to the west where String F is planned are more open, although they are screened in places by clusters of trees along the highway's edge (Exhibit 14, Photo 11). Further south along Highway 97, the ridge lands on which turbines would be located move out of the southbound traveler's cone of vision, but the Project's substation and O&M facility sites become prominently visible in the canyon area at the base of the slope. In this area, the landscape consists primarily of open shrub-steppe land and the transmission towers in the PSE and BPA transmission corridors become prominent elements of the landscape pattern. Along this segment of Highway 97, southbound views from the highway range from moderate to moderately high on the upper slopes to moderately low in the areas on the lower slopes where the many transmission lines are an important element of the view.*

*South of the BPA transmission lines at the southern end of the Project area, there is a scattering of rural residential development in the corridor alongside the highway. Some of this development lies along Sagebrush Road and Ellensburg Ranches Road, private roads that serve a large-lot subdivision developed on the ridge slopes to the west of the highway. In this area, there are over 30 lots, of which about half have been developed with residences. All of these residences are located 0.7 mile or more from the closest turbines proposed for the ridge lands across Highway 97 to the east. Several of the residences at the northern end of Sagebrush Road lie within 0.5 mile of the southernmost turbine proposed as a part of String E, which will be located on the ridge top to the northwest. Simulation View 4 on Figure 7a, Exhibit 14, is a view looking north along Sagebrush Road toward the ridge lands east of Highway 97 on which development of Strings G, H, I and J is proposed. Several additional rural residences on large lots lie along the east side of Highway 97 in the area along Nacho Lane. These residences all lie more than 0.5 mile from the closest turbine. Some of these residences are visible in Exhibit 14, Photo 1. In general, views toward the Project site from residences in the area along both sides of the Highway 97 corridor in this area have visual quality levels that range from moderately low to moderate.*

*Viewers and Visual Sensitivity:*
*The traffic volume on Highway 97 is 2,800 vehicles per day, a figure that, according to WDOT information, includes about 500 trucks. For the entire length of Highway 97 extending from the intersection with northern end of Nacho Road to a point slightly north of the intersection with the northern end of Bettas Road, the highway lies within 0.5 mile of the closest proposed wind turbine. In this area within 0.5 mile from the proposed turbine locations, the sensitivity of viewers is assumed to be high. Along the portions of the highway to the north and south of this road segment where travelers are in the zone between 0.5 and 2 miles from the closest turbine, the level of traveler sensitivity is considered to be moderate. For the most part, the sensitivity of the views from the rural residences located in the Highway 97 corridor in the area south of the BPA transmission corridor can be considered to be moderate because most of these residences are located 0.5 mile or more from the closest proposed turbine. The exception is that there are several residences located at the northern end of Sagebrush Road that lie less than 0.5 mile from proposed turbines E4 and E5, and because of their proximity to these proposed turbines, the level of visual sensitivity is being rated as high. However, an additional factor that needs to be considered is that some of these residences are located downslope from these turbine sites, and that none of these residences are oriented toward these turbine locations.*

**Ridge Lands East of Highway 97**

*Landscape Description and Scenic Quality:*
*This viewing area encompasses the terrain east of Highway 97 that consists of long, north-south trending ridges separated by narrow canyons. In this area, 71 of the Project's turbines will be located along the ridgelines in Strings G, H, I, and J. Most of this area is open in character and covered in grass and shrub-*

*steppe vegetation, although there is some riparian vegetation along the creeks in the canyons, and the slopes at the northern end of the ridges are covered with forests of Ponderosa pine and other evergreen trees. The most visually prominent developed features in this area are the transmission structures in the BPA transmission corridor that runs across the southern ends of the ridges (visible in Photo 12, Exhibit 14) and the PSE and BPA transmission lines that run through the area at points further up the ridges. For the most part, the lands in this area are used for grazing, but the area also contains a number of scattered rural residences. Some of these residences are accessed by Cricklewood Lane, a private road that extends into the canyon area between the ridges on which Strings I and J will be located. Although Cricklewood Lane is a private road, it is un-gated in the area from Highway 97 to the BPA transmission line corridor. North of this area, access is restricted by a locked gate. Photo 12, Exhibit 14, is a view toward the Project site from the lower portion of this road. A total of approximately 35 residences and recreational properties are accessed by way of Elk Springs Road, a private road that extends along the top of the ridge on which String I will be developed. Elk Springs Road is gated at Highway 97, and is accessible only to property owners with a key. Several residences are located at widely dispersed locations along the ridge, but the largest single concentration is in Township 20 North, Range 17 East, Section 35, which is located on the forested slopes that lie to the north of proposed Strings G and H. Photo 14, Exhibit 14, is a view toward Section 35 from the upper end of Elk Springs Road; Section 35 encompasses the sloped and forested area visible on the right half of the photo, as well as a portion of the flat, open area at the base of the slope. This section has been divided into 32 lots ranging from 10 to 60 acres in size. Approximately 20 of these parcels have some kind of structure or a trailer on them. Conversations with residents of Elk Springs Road suggest that approximately 5 of the parcels in Section 35 have residences that are occupied on a full-time basis; 6 of the parcels are used on weekends, that 9 are used occasionally (more than a few times a year, but less frequently than most weekends); and that the rest are used infrequently (a few times a year). Simulation View 5 (Figure 8a, Exhibit 14) is a view from one of the residences in Section 35, looking south toward the area in which Strings F, G, H, I, and J are planned. The visual quality of the views in this area range from moderately low in the area at the base of the ridges (Photo 12, Exhibit 14), moderate, along the ridgetops (Photo 13, Exhibit 14), and in locations in Section 35 from which panoramic views toward the south are available, moderately high to high (Figure 8a, Exhibit 14).*

*Visual Sensitivity:*
*Because portions of Cricklewood Lane and most of Elk Springs Road are located in areas with open views that lie within 0.5 mile or less of proposed turbines, the views from these roads can be considered to be sensitive. Because these are private, dead-end roads whose primary function is to provide access to abutting properties, the numbers of road users affected can assumed to be relatively small. In light of the restricted access to these road segments and the small numbers of viewers, the level of sensitivity to Project visual effects is classified as low.*

*For the total of 11 residences located along Cricklewood Lane and the lower and middle sections of Elk Springs Road that lie within 0.5 mile of the proposed turbines and which would have unobstructed views of them, the sensitivity of views is high. Field studies, aerial reconnaissance, and review of maps and photos indicate that in Section 35, there is heavy tree cover that provides partial to full screening of many of the views toward the area where the turbines would be located. Given this tree screening, it appears that there are 5 existing residences from which the proposed turbines would be potentially visible. Three of these residences lie within 0.5 mile of the proposed turbines, and views from these residences would be considered to have a high level of sensitivity. Because the other two residences in Section 35 from which the turbines would be potentially visible lie more than 0.5 miles from the location of the closest proposed turbine, the visual sensitivity of views from those properties is considered to be moderate.*

**Bettas Road**

*Landscape Description and Scenic Quality:*
*This viewing area consists of the corridor along Bettas Road that extends westward from the area west of the site of the proposed O&M facility and substations, and then north to the point where the northern end of Bettas Road intersects with Highway 97. The southeastern portion of this corridor lies in a draw that drains into Dry Creek to the east. This area has a shrub-steppe landscape, and except for the road itself and a PSE 230 kV transmission line carried on wood pole, H-frame towers that pass through it, this portion of the Bettas Road corridor is undeveloped. After passing over the crest of the ridge, Bettas Road descends into Horse Canyon, a small valley with a rural character. At the southern end of the valley, there is a cluster of five rural residences on ranchette parcels. Further north along the road, there are two dwellings associated with larger ranch properties. Photo 15 on Figure 3f, Exhibit 14, is a panoramic view from Bettas Road at*

*the intersection with Hayward Road, at the top of the ridge that separates the Dry Creek drainage to the east from Horse Canyon to the west and north. The southernmost of the cluster of rural residences along the west side of Bettas road is visible at the left side of the photos. Just to the right of this house, the slopes defining the western side of Horse Canyon are visible. The ridge area visible on the right side of the photo is the location where String F is proposed. The tilt to the trees visible in this portion of the view reflects the high wind levels that prevail in this area. Photo 16, Exhibit 14, is a view looking north along Bettas Road from within Horse Canyon. One of the ranch residences is visible in the mid-distance on the left side of the road. Simulation View 6 (Figure 9a, Exhibit 14) is a view toward the north from the northern portion of Bettas Road. The BPA Rocky Reach-Maple Valley transmission line is visible crossing the ridge in the mid-distance. String G is proposed for development on the ridgeline on which the transmission towers are now visible. In the middle ground of the view, Highway 97 can be seen traveling up the slope at the base of this ridge. Along the portion of the Bettas Road corridor south and east of the ridgeline separating the two drainages, the level of existing visual quality is moderately low. North and west of the ridgeline the level of visual quality is moderately high, reflecting more vivid topographic and vegetative conditions, and moderately high levels of unity and intactness.*

*Visual Sensitivity:*
*The level of sensitivity of views on Bettas Road is moderate. Although from most portions of the road, turbines will be visible within 0.5 miles, the numbers of travelers affected is very low. As indicated in Table 12 in the 'Transportation' section, in 2001 the Average Daily Traffic (ADT) on Bettas Road was only 26 vehicles per day. It should also be noted that from the portions of the road at the base of steep slopes, the slopes will constrain views toward the closest turbines. All of the residences along the Bettas Road corridor are within 0.5 mile, or are close to 0.5 mile from the closest proposed turbine location. From most of the residences, the level of visual sensitivity is high, but from several which are oriented toward views down the valley to the southwest, rather than to views toward the ridgelines to the east and north, the level of sensitivity is moderate.*

**Highway 970/Hidden Valley**

*Landscape Description and Scenic Quality:*
*This viewing area encompasses the corridor along Highway 970 and Hidden Valley, areas that lie a mile or more to the west and north of the Project site. Highway 970 is a state highway that connects Cle Elum to Highway 97 and Wenatchee, and has an ADT of 5,100 vehicles per day. Hidden Valley is a valley formed by Swauk Creek that extends toward the southwest from the intersection of Highways 970 and 97. The Valley has a rural character and contains a mix of ranches and rural residences on ranchette parcels. Photo 17, Exhibit 14, is a panoramic view taken from a viewpoint on Hidden Valley Road near Highway 970 at a point a little less than 3 miles from the Project area. The ridgeline on which String G is proposed is visible as the un-forested ridge that can be seen in the distance in the middle of the right side of the view. The BPA Rocky Reach-Maple Valley transmission line can be seen crossing the meadow in the far foreground of this view. Simulation View 7 on Figure 10a, Exhibit 14, is a single frame view from a viewpoint just south of the location from which Photo 17 was taken. This view focuses specifically on the ridgeline on which the development of String G is proposed. One of the transmission structures that is a part of the Rocky Reach – Maple Valley transmission line is detectable on the ridgeline in the area slightly to the right of the view's center. In general, views toward the Project site from the Highway 970/Hidden Valley area have moderately high levels of visual quality, reflecting moderately high levels of vividness, unity, and intactness.*

*Visual Sensitivity:*

*Although Highway 970 carries relatively high levels of traffic, because the areas from which the Project might potentially be seen from the highway lie 1.5 mile or more from the closest proposed turbine and generally do not lie within the primary cone of vision of highway travelers, the level of sensitivity of views from this roadway to Project-related visual changes is low. In this viewing area, the closest residences to the Project site are those located along the eastern end of Hidden Valley Road, at a distance of approximately 1.5 miles to the northwest of the closest turbine. Other residences lie further to the west at distances of 2 miles or more from the Project site. Because the ridgeline on which the closest turbines will be located lies in the middle ground viewing zone, the sensitivity of views from these residences to Project effects is considered to be moderate.*

**Hayward Hill**

*Landscape Description and Scenic Quality:*
*Hayward Hill is the 2300 to 2400 foot elevation ridge that lies along the northeastern edge of the Yakima River in the area approximately 2 miles northwest of the community of Thorp. This ridge, which extends for about 2.5 miles, is proposed as the site of Strings A and B. This windswept ridge has a grassland and shrub steppe landscape, and as a consequence has a very open appearance. The ridge is crossed by Hayward Road, a narrow, unpaved county-maintained road that extends approximately 2.7 miles from the intersection of Highway 10 and Thorp Road on the south to Bettas Road on the north. Except for the road and the BPA and PSE transmission lines that cross the ridge at its north end near its intersection with Bettas Road, Hayward Hill is essentially undeveloped. A large parcel on the southwest side of the ridge is owned by the Cascade Field & Stream Club, and is proposed for use as a recreational firing range, although a permit for such use has not yet been approved. Photo 18 in Exhibit 14 is a view from the northern end of Hayward Road looking north toward the BPA transmission line. Photo 19 is a view from the same general area looking south across the top of the ridge and across the upper Kittitas Valley toward the distant ridges to the south. In general, the existing level of visual quality of views on Hayward Hill is moderate, reflecting generally lower than average levels of vividness and mixed but not particularly high levels of unity and intactness.*

*Visual Sensitivity:*
*The sensitivity of views on Hayward Hill is low. As indicated in Table 12 in the 'Transportation' section, average daily traffic on Hayward Road is estimated to be 26 vehicles per day. Although Hayward Road passes in close proximity to and well within 0.5 mile from the proposed turbines, given the low numbers of travelers, the views of users of this road are considered to have a low level of sensitivity. Because there are no residences on Hayward Hill that are located within 0.5 mile of proposed turbines, there are no residences in this area that are considered to have a high or moderate level of sensitivity to the visual changes that the Project might create.*

**Highway 10 Corridor**

*Landscape Description and Scenic Quality:*
*This viewing area extends along an approximately 6 mile long segment of Highway 10, a state highway that travels along the northern banks of the Yakima River and which provides both nearby and more distant views of portions of the Project areas. Highway 10 was formerly a major east-west route across the state, but since the opening of Interstate 90, now plays the role of an alternative route between Ellensburg and Cle Elum. The section of Highway 10 between Ellensburg and Cle Elum is also recognized as having scenic qualities, and to some degree is promoted as a scenic byway. As indicated in this section's Regional and Local Landscape Setting discussion, this section of Highway 10 is designated on the American Automobile Association's State of Washington map as a scenic route, and a planning report, the Swift Water Corridor Vision (Kittitas County, 1997), has been prepared that identifies measures to develop roadway improvements and roadside amenities that will enhance the road's scenic qualities. As indicated on Table 12, the Average Daily Traffic on Highway 10 is 1,200 vehicles per day. The area along the corridor is only lightly developed. Except for scattered ranch dwellings and clusters of rural residences the landscape along the southeastern and central portions of this highway segment consists of open grasslands and areas of riparian forest. A distinctive landscape element in this area is an old flume structure that skirts the base of the bluffs just to the east of the road. Photo 20, Exhibit 14, is a view from Highway 10 in this area looking northwest toward Hayward Hill, where String B is proposed. Simulation View 8 on Figure 11a, Exhibit 14, is a view looking west along the Highway at the intersection of Hayward Road and taking in the ridge tops where String A and a portion of String B would be located. Photo 21 on Figure 3i, Exhibit 14, is a view looking east toward Hayward Hill from Thorp Road at Highway 10. Along this segment of Highway 10, the visual quality of views toward the Project site is generally moderate to moderately high. Further to the northwest, where the highway alignment is located at a higher elevation along the side of the bluff defining the river canyon, there is no development, and the landscape is characterized by rock outcrops, clusters of trees and shrubs, and views of the canyon below and the rail corridors that follow it. Photos 22 and 23 on Figure 3i and Simulation view 9 on Figure 12a, Exhibit 14, represent views to the east from Highway 10 in this area, looking toward the ridgeline of Hayward Hill where String B is proposed. Along this segment of the highway corridor, the visual quality of views toward the Project site also ranges from moderate to moderately high.*

*Visual Sensitivity:*
*Because several short segments of Highway 10 lie within 0.5 mile of the closest proposed turbine, because the highway carries a moderately high level of traffic, because the road has been recognized as having*

*scenic qualities, and because efforts have been started to enhance the highway's role as a scenic corridor, the sensitivity of views from the highway toward the Project is high.*

*Although ridgelines where turbines are proposed are potentially visible from the small number of residences scattered along this corridor, the level of visual sensitivity of views from these properties is moderate at most, because these residences are not generally located within the foreground viewing zone, and in most cases, the residences are not oriented toward views of the ridge tops.*

*The segment of the Yakima River that Highway 10 follows in this area receives a low to moderate level of recreational use, primarily for fishing. Recreational use of this segment of the river is limited by the fact that there are no public river access facilities in this area. Along the western portion of this corridor, a segment of the John Wayne Trail makes use of an abandoned railroad right-of-way along the south side of the River. This trail is described in more detail in the discussion below. Because of the relatively low numbers of recreational users in this area, because most areas of the River and Trail are located a mile or more from the closest proposed turbine and because in many places views toward the Project site are constrained by the steep sides of the bluffs and by stands of riparian vegetation, the sensitivity of views toward the Project site from the recreational use areas is low to moderate.*

**John Wayne Trail**

*Landscape Description and Scenic Quality:*
*This viewing area encompasses the segment of the John Wayne Trail that lies within 5 miles of the Project site. The John Wayne Trail is a hiking, biking, and equestrian trail that has been developed in the Iron Horse State Park, a state park created on the former right of way of the Milwaukee Road railroad, which was acquired by Washington State Parks in the 1980s. The John Wayne Trail extends 109 miles from a trailhead near North Bend to the west to the Columbia River on the east. In the Project area, the Trail has a wide gravel surface, and is paralleled by a PSE electric transmission line and distribution line carried on wood poles. The only formal trailhead in this area is on Thorp Depot Road south of the community of Thorp. From most areas of the trail, the ridges on which the Project would be developed are visible at a distance ranging from one to five miles. Simulation View 11 on Figure 14a, Exhibit 14, is a representative view from the trail toward the Project area. This photo was taken along the trail at a point just north of Taneum Road in the area north of Thorp. At this point, the closest turbine would be located approximately two miles from the Trail. From most areas along the Trail, the visual quality of views toward the Project site would be rated as moderately high. The ridgelines in the middle ground and the higher elevation slopes visible in some places in the background provide a moderately high level of vividness. The level of visual unity and intactness is decreased to some degree by the presence of the transmission and distribution lines in the immediate foreground of the view.*

*Visual Sensitivity:*
*Washington State Parks reports that in 2001, the portion of the John Wayne Trail extending from North Bend to Thorp had 163,532 visitors, that the segment from Thorp eastward to Vantage had 21,079 visitors, and that most visits took place during the summer season. It is likely that use levels in the portions of the trail closest to the Project area are relatively low in comparison with those in the westernmost part of the county, particularly in the area near Snoqualmie Pass where the Trail is closer to the population centers of the Puget Sound area, the scenery is more outstanding and where the Trail ties in with other recreational facilities. Because of the Trail's character as an engineered right-of-way that has a wide gravel surface and is paralleled with utility lines, its visual sensitivity is assumed to be lower than that of a more conventional park or wildland trail. In light of the Trail's visual character, the moderate level of trail use this segment receives, and the middle ground viewing distances toward the Project area, the level of sensitivity of views from the Trail to potential Project visual effects is low.*

**Thorp**

*Landscape Description and Scenic Quality:*
*Simulation View 12 on Figure 15a, Exhibit 14, is a view toward the Project site taken from Thorp Highway in the center of the small, unincorporated community of Thorp. The ridgelines on which the Project is proposed for development lie three miles and further to the north, and form the backdrop of the view. The existing level of visual quality of the view toward the Project site is moderate, reflecting moderate levels of vividness, unity, and intactness.*

*Visual Sensitivity:*
*No data is available on traffic volumes on Thorp Highway in Thorp where Simulation View 12 is located, but based on land uses and field observations; it is assumed that traffic volumes are moderate. Given the moderate levels of traffic in this area, the Project area's location in the far middle ground of the view, and the fact that the Project area does not lie within the primary cone of vision of views from the road, the sensitivity of traveler views in this area to potential Project visual effects is considered to be low.*

*There are a total of approximately 118 residences in Thorp and the immediately surrounding area. From many of these residential properties, views toward the ridgeline are screened to some degree by other structures and by trees and other vegetation in the near foreground of the views. However, from other properties in the community, the ridgelines on which the Project is proposed for development are visible. Because these ridgelines are a part of the far middle ground zone of the view, the sensitivity of the residential views in this area to changes that might result from the Project is moderate at most.*

**Sunlight Waters**

*Landscape Description and Scenic Quality:*
*Sunlight Waters is a small lot subdivision that lies in the middle of a region of large ranch parcels located between I-90 and the Yakima River. This development, which is partially built out, contains a golf course and a total of approximately 150 dwellings located on an upper and a lower terrace above the south bank of the River. From some areas of this development, there are views toward the ridges on which the Project is proposed, which lie about 2.8 miles and further to the east. Simulation View 13 on Figure 16a, Exhibit 14, is a view toward the Project site from Highline Loop, a high point in the upper terrace area which provides the fullest and least obstructed views toward the Project area. The existing visual quality of views of the site is moderately high to high, reflecting high levels of vividness and unity. The level of intactness is reduced to some degree by the towers located in the BPA transmission corridor that are prominently visible along the top of the first line of ridges in the view.*

*Visual Sensitivity:*
*Although views toward the Project site from this area are open, and some residences are oriented toward this view, the sensitivity of residential views in this area to potential Project effects is moderate at most because of the distance of the viewers from the Project area.*

**Interstate-90**

*Landscape Description and Scenic Quality:*
*Interstate 90, the most important east/west cross-state route in Washington, angles through the upper Kittitas Valley on an alignment that lies approximately 2.5 miles southeast of the Project site. WDOT figures indicate that in 2001, the average daily traffic on I-90 in this area was 21,000 vehicles per day. From some areas along I-90 in the general Project vicinity, views toward the ridges on which the Project will be developed are screened by topography, trees, and other features in the foreground of the view. In many areas, however, these ridges are clearly visible in views across an open valley landscape. It is important to note, though, that the views toward the Project area from I-90 are at a right angle to the road and do not fall within the primary cone of vision of drivers. Simulation View 14 on Figure 17a, Exhibit 14, is a view toward the Project area from I-90 at Springwood Ranch, a point along the highway that is approximately 2.5 miles from the closest proposed turbine location. In this area, the visual quality of views toward the Project site is high, reflecting the high level of vividness attributable to the presence of the peaks of the Stuart Range in the far background of the view, and the view's relatively high levels of unity and intactness. The 100 mile segment of I-90 beginning at the Seattle waterfront and extending east to Thorp was designated as a National Scenic Byway by the Federal Highway Administration in 1998. This highway segment is also a part of the Mountains to Sound Greenway. The greenway, which consists of the corridor along I-90 from downtown Seattle to Thorp, is conceived of as a scenic, historic, and recreation corridor intended to function as a scenic gateway to the Seattle metropolitan area and a pathway to nature for the metropolitan area's population. The greenway concept has provided a framework within which the Mountains to Sound Greenway Trust, a private non-profit organization and state and federal agencies have been able to plan and implement measures to acquire, protect, and develop lands along the corridor that provide recreational opportunities and/or protect natural, historic, and scenic resources.*

*Visual Sensitivity:*

*The sensitivity of views from this area to potential visual changes associated with the Project is moderate, reflecting on the one hand, the very high numbers of roadway users and I-90's Scenic Byway status, and on the other, the fact that the views toward the Project site do not fall within the primary cone of vision of drivers, and appear in the far middle ground of the view.*

**Lower Green Canyon Road**

*Landscape Description and Scenic Quality:*
*Simulation View 15 on Figure 18a, Exhibit 14, is a view looking northwest toward the Project site from a viewpoint on Lower Green Canyon Road in the area between Highway 97 and Clarke Road. This view represents views in the portion of the Kittitas Valley northwest of Ellensburg, where the Project area is visible across the flat valley lands on the distant hillsides that frame the northwestern edge of the valley. In the upper valley, viewing distances to the Project site range from approximately 2 to over 8 miles. In the view from Simulation View 15, the Project site lies approximately 5 miles in the distance. The upper valley is highly rural in character, and the landscape consists of large farms and ranches and a scattering of non-farm residences on smaller parcels. In general, views from this area toward the Project site have a moderately high to high level of visual quality.*

*Visual Sensitivity:*
*Taking into account the relatively large numbers of residential and roadway viewers in this area on the one hand, and the distant nature of the views on the other, the sensitivity of traveler and residential views from this area to the potential changes that might be brought about by the Project is no more than moderate.*

**Ellensburg**

*Landscape Description and Scenic Quality:*
*The outer edges of the city of Ellensburg lie approximately 11 miles to the southwest of the Project site. From most areas of the city, views toward the Project site are blocked by structures and trees in the foreground of the view, although there are a few locations in parking lots and other open areas in the community where the ridges on which the Project will be developed are visible in the far distance. Simulation View 16 on Figure 19a, Exhibit 14, is a view from Reed Park, a small park located on an elevated knoll in the neighborhood southeast of Central Washington University in Ellensburg. Because of its elevated location, this park provides Ellensburg's most complete and unobstructed view toward the Project site. This viewpoint is located approximately 13 miles from the site of the closest proposed turbine. The existing level of visual quality of this view is high, reflecting the very high level of vividness created by the presence of the Stuart Range in the far distance of the view, and moderate levels of visual unity and intactness.*

*Visual Sensitivity:*
*Although there are large numbers of potential viewers in Ellensburg, the level of sensitivity of views from Ellensburg is low because the areas from which views toward the Project can be seen are limited and because the Project area is in such a distant portion of the view.*

**Environmental Impacts of the Proposed Action**

***Analysis Procedure***
*The impact analysis is based primarily on the Federal Highway Administration (FHWA) methodology for determining visual resource change and assessing viewer response to that change (US DOT, 1988). The analysis is focused on evaluating impacts and recommending measures to minimize adverse visual effects. Central to this assessment is an evaluation of representative public views from which the Project would be most visible. To document the visual changes that would occur, visual simulations show the proposed Project from a set of 16 viewpoints selected to be representative of views toward the Project from a range of locations. The visual simulations are presented as "before" and "after" images from each of these simulation viewpoints. Presented as Figures 4 through 19 in Exhibit 14, the simulation images provide a clear image of the existing character and quality of the views from each of the simulation viewpoints and of the scale, and visual appearance of the changes that would be brought about by the proposed Project. The computer-generated simulations are the result of an objective analytical and computer modeling process and are accurate within the constraints of the available site and Project data.*

*The simulations were developed using photographs taken with a digital camera, using a wide-angle 28 mm*

*focal length. The Photomontage module of the WindPro software program (a widely accepted and applied program used for planning and assessing wind generation projects) was used to carry out the computer modeling and rendering required to produce the images of the Project facilities that were superimposed on the photographs to create the simulations. Existing topographic and site data provided the basis for developing an initial digital model. The Applicant provided site plans and digital data for the proposed wind turbines. These were used to create three-dimensional (3-D) digital models of these facilities. These models were combined with the digital site model to produce a complete computer model of the wind farm. For each viewpoint, viewer location was digitized from topographic maps, using 5 feet as the assumed eye level. The WindPro program overlaid computer "wire frame" perspective plots on the photographs of the views from the Simulation Viewpoints to verify scale and viewpoint location. Digital visual simulation images were produced as a next step based on computer renderings of the 3-D model combined with high-resolution digital base photographs. The final "hardcopy" visual simulation images that appear in this document were produced from the digital image files using a color printer.*

*The visual impact assessment was based on evaluation of the changes to the existing visual resources that would result from construction and operation of the Project. These changes were assessed, in part, by evaluating the "after" views provided by the computer-generated visual simulations and comparing them to the existing visual environment. Consideration was given to the following factors in determining the extent and implications of the visual changes:*

- *The specific changes in the affected visual environment's composition, character, and any specially valued qualities;*
- *The affected visual environment's context;*
- *The extent to which the affected environment contains places or features that have been designated in plans and policies for protection or special consideration; and*
- *The relative numbers of viewers, their activities, and the extent to which these activities are related to the aesthetic qualities affected by the expected changes. Particular consideration was given to effects on views identified as having high or moderate levels of visual sensitivity.*

*Levels of impact were classified as high, moderate, and low. In general, High levels of aesthetic impacts were assigned in situations in which turbines would be highly visible in areas with sensitive viewers, and would alter levels of landscape vividness, unity, and intactness to the extent that there would be a substantial decrease in the existing level of visual quality. Moderate levels of aesthetic impact were assigned in situations in which turbines would be visible in areas with high levels of visual sensitivity in which the presence of the turbines would alter levels of landscape vividness, unity and intactness to the extent that there would be a moderate change in existing visual quality. Moderate levels of visual impact were also found in situations in which the presence of turbines in the view would lead to more substantial changes in visual quality, but where levels of visual sensitivity were moderate to low. Low levels of visual impact were found in situations where the Project would have relatively small effects on overall levels of landscape vividness, unity, and intactness and/or where existing levels of landscape aesthetic quality are low or where there are low levels of visual sensitivity.*

**Project Appearance**

*The physical elements of the Project are described in Question #9 at the beginning of this document, 'Project Site Layout', is a general site layout that indicates the locations of the proposed roads, overhead and underground transmission lines, substation, operations and maintenance facility, and other features that comprise the Project.*

*The Project will include up to 121 turbines. The turbines will be mounted on tubular steel towers that will be approximately 18 feet in diameter at the base and will rise to a hub height of about 213 feet. Each tower will support a nacelle that houses a drive train, gearbox, generator, and other generating equipment. The nacelles will be approximately 30 feet long, 11 feet wide and 12 feet high and will be completely sheathed in an aerodynamically shaped fiberglass or metal shell. The rotors will be attached to the front of the nacelles, which are mounted on the tops of the towers. The rotors will have three blades, and will have a diameter of 213 feet to 236 feet. Although not required for functionality, each rotor will have an aerodynamic appearing nose cone to improve its appearance. The dimensions provided here represent the range of sizes of the various turbine models being considered for this Project. The Applicant is considering several turbine models from different vendors. The final decision regarding turbine and tower dimensions is driven largely by Project economics such as turbine pricing and the performance of specific turbines under different wind*

*conditions. Given the relatively low wind shear at the Project site, it is not anticipated that taller towers will be necessary. The primary difference among the turbine models being considered is the rotor diameter, which range from 62 meters to 80 meters. Most of the visual simulations presented here are based on a turbine with a hub height of 210 feet and a rotor diameter of 203 feet, which are representative of the dimensions of the turbines that are being considered for the Project. For two of the simulation views, simulations are provided of the turbines with dimensions at the high end of the dimension range (Exhibit 14, Figures Vis 4c and Vis 6c) to permit the appearance of the slightly larger turbines to be compared with that of the slightly smaller turbines that have been simulated.*

*The surfaces of the turbine towers, rotors, and nacelles will be neutral gray in color and will be given a finish that has a low level of reflectivity.*

*The power generated by the turbines will be delivered to the Project substation by means of a largely underground electric collection system. Small, pad-mounted transformers located at the base of each turbine tower will convert the electricity produced by the turbine to a transmission voltage of 34.5 kV and will connect to the underground collection lines. Each of the transformers will be housed in a metal-sided case that is approximately 8 feet wide, 8 feet long, and 8 feet high. The transformer housings will be painted in earth tone colors using paint with a low-reflectivity finish. An approximately 1.2 mile long segment of the collection system connecting the eastern and western portions of the Project may be above ground due to the large amount of power flowing through this portion of the collection system. This line would run from near the northern end of Hayward Road (String D) to near the junction of Bettas Road and Highway 97 (substation). This portion of the system would be carried on single wood poles with dual cross arms that are 40 to 50 feet tall. The overhead portion of the transmission system will utilize non-specular conductors and insulators that are non-reflective and non-refractive.*

*The network of roads that will provide access to each of the turbines will consist of both existing and new roads which will have a standard width of 20 feet and a compacted gravel surface. In areas with steeper slopes, cutting and filling will be required to keep grades below 15%.*

*The proposed operations and maintenance (O&M) facility is planned for an approximately 2-acre site located in the flat area along the north side of the southern end of Bettas Road in the area just west of its intersection with Highway 97. This area is visible in Exhibit 14, Photo 6. To construct this facility, the existing shrub-steppe vegetation on the site will be removed and the site will be graded and fenced. The primary structure in the O&M facility will be a main building that is approximately 50 feet wide, 100 feet long, and 35 feet high. This building will house offices, spare parts storage, and a shop area. This building will be steel framed and will have steel siding that will be painted with low reflectivity paints in earth-tone colors that blend well with the surrounding landscape. The outdoor areas devoted to parking and vehicle turning will be paved with asphalt in areas that are heavily used and with gravel in less frequently used areas. The color of the asphalt and gravel used on the site will be selected to minimize contrast with the colors of the surrounding landscape. Naturalistic groupings of indigenous trees and shrubs will be established in the area surrounding the O&M facility to provide partial screening and to integrate it into the landscape setting.*

*Two sites have been proposed as locations for Project substations. One of the sites would be located adjacent to the proposed O&M facility along the north side of the southern end of Bettas Road just west of its intersection with Highway 97, and would tie into the adjacent PSE 230-kV Rocky Reach to White River transmission line. The other site is located approximately 800 feet southwest of this site, on the sloped area south of Bettas Road and immediately north of the BPA transmission corridor. It is possible that either or both of these sites would be developed. In either case, the substation would occupy an area of 2 to 3 acres that would need to be cleared and graded. Because of the sloped terrain, considerable grading would be required to accommodate a substation on the site adjacent to the BPA corridor. The primary elements of a substation on either site would include a small control building, large transformers, structures housing switchgear, bus work, steel support structures, a transmission take-off tower, lightning suppression structures, outdoor lighting, and a perimeter chain link fence. The tallest structures would be the transmission take-off structures, which would be on the order of 60 feet high. The bus work and steel support structures would be in the range of 40 to 45 feet high. The transformers, switchgear structures, and control building would be no more than 12 to 15 feet in height. Although the substation control buildings would be painted an earth-tone color using low-reflectivity paints, the substation equipment would have a standard low reflectivity neutral gray finish.*

**Assessment of Visual Effects**

*Short Term Construction Impacts*

*During the construction period, large earth moving equipment, trucks, cranes, and other heavy equipment will be highly evident features in views toward the Project site from nearby areas. At some times, small, localized clouds of dust created by road-building and other grading activities may be visible at the site. Because of the construction-related grading activities, areas of exposed soil and fresh gravel that contrasts with the colors of the surrounding undisturbed landscape will be visible. In close-at-hand views, particularly those seen by travelers on the segment of Highway 97 that passes through the Project site, and those seen from the closest residences, the visual changes associated with the construction activities will be highly visible and will have a moderate to high level of visual impact. From more distant viewing locations, the visual effects will be relatively minor and will have little or no impact on the quality of views. It is important to note that because construction activities take place over a period of only 12 months, the construction impacts will be relatively short in duration. After construction, is complete, all construction-related debris will be removed from the site and any other non-road surface areas disturbed during construction will be replanted to recreate the appearance of their original vegetative cover.*

*Long-Term Impacts During the Project Operation Phase*

*The Project's aesthetic impacts during the operational period are summarized in Table 10, and presented in more detail in Table 11 in part "c" below. As these tables indicate, the Project has the potential to create High levels of visual impact at several points along Highway 97, at the residential area along Sagebrush Road in the Highway 97 corridor, and in views from residences in the ridgelands east of Highway 97. Moderate levels of impact would occur at other points along Highway 97, in views from residences along Bettas Road, in views from Highway 10, and in views from the Sunlight Waters residential development. From all the other areas evaluated, the Project's impacts on aesthetics would be minimal.*

***Table 10***
***Summary of Impacts to Visual Resources During Project Operation***

| *Viewing Area* | ***Existing Visual Quality*** | ***Visual Sensitivity*** | ***Distance to Closest Turbines (in miles)*** | ***Number of turbines visible*** | ***Potential Level of Visual Impact*** |
|---|---|---|---|---|---|
| ***Highway 97 Corridor*** | | | | | |
| *Simulation View 1* | *Moderately Low* | *Moderate* | *0.8* | *Approximately 40* | *Low to Moderate* |
| *Simulation View 2* | *Moderate* | *High* | *0.4* | *9* | *Moderate to High* |
| *Simulation View 3* | *Moderate* | *High* | *0.5* | *5* | *Moderate* |
| *Simulation View 4* | *Moderately Low to Moderate* | *Moderate to High* | *0.9* | *More than 70* | *Moderate to High* |
| ***Ridgelands East of Highway 97** Simulation View 5* | *High* | *Moderate* | *0.7* | *Approximately 40* | *Moderate to High* |
| ***Bettas Road** Simulation View 6* | *Moderately High* | *Moderate to High* | *0.5* | *10* | *Moderate* |
| ***Highway 970/Hidden Valley** Simulation View 7* | *Moderately High* | *Moderate* | *3* | *11* | *Low* |
| ***Hayward Hill** (no simulation prepared)* | *Moderately Low to Moderate* | *Low* | | | *Low* |
| ***Highway 10 Corridor*** | | | | | |
| *Simulation View 8* | *Moderate* | *High* | *1.25* | *7* | *Moderate* |
| *Simulation View 9* | *Moderate* | *High* | *1.5* | *14* | *Moderate* |
| *Simulation View 10* | *Moderately High* | *High* | *2* | *11* | *Low* |

| Table 10<br>Summary of Impacts to Visual Resources During Project Operation | | | | | |
|---|---|---|---|---|---|
| ***Iron Horse Trail***<br>*Simulation View 11* | *Moderately High* | *Low* | *2* | *Over 30* | *Low* |
| ***Thorp***<br>*Simulation View 12* | *Moderate* | *Moderate* | *3* | *Over 20* | *Low* |
| ***Sunlight Waters***<br>*Simulation View 13* | *Moderately High to High* | *Moderate* | *2.8* | *Over 40* | *Moderate* |
| ***I-90***<br>*Simulation View 14* | *High* | *Moderate* | *2.5* | *Over 20* | *Low* |
| ***Upper Kittitas Valley***<br>*Simulation View 15* | *Moderately High to High* | *Moderate* | *5* | *116* | *Low* |
| ***Ellensburg***<br>*Simulation View16* | *High* | *Low* | *13* | *116* | *Low* |

b. Proposed measures to reduce or control aesthetic impacts, if any.

*The Project's aesthetic impacts during the operational period are summarized in detail in Table 11 below.*

| Table 11<br>Analysis of Impacts to Visual Resources During Project Operation | | | | |
|---|---|---|---|---|
| ***Simulation Views*** | ***Existing Level of Visual Quality*** | ***Level of Visual Sensitivity*** | ***Assessment of Visual Change*** | ***Potential Level of Visual Impact*** |
| ***Highway 97 Corridor*** | | | | |
| *Simulation View 1 (Exhibit 14, Figures 4a and 4b) Highway 97 at Ellensburg Ranches Road looking north* | *Moderately Low* | *Moderate* | *Approximately 40 turbines will be visible on the ridge tops in the center of the view at distances of 0.8 to 3 or more miles. Although the turbines will in reality be considerably taller than the existing transmission towers, because they will be sited behind the transmission towers, they will, for the most part, appear to be similar to them in scale. About half the turbines will be visually absorbed by the landscape backdrop to some degree, but the other half will be silhouetted against the sky, increasing their visual salience. The presence of the turbines will reduce the scene's degree of intactness to some extent by introducing a large number of highly visible engineered vertical elements, but because the pattern that the turbines will form will be consistent with the pattern created by the existing transmission towers, they will not substantially change the scene's degree of visual unity.* | *Low to Moderate* |
| *Simulation View 2 (Exhibit 14, Figures 5a 5b, and 5c) Highway 97 north of gravel pit looking north* | *Moderate* | *High* | *From this viewpoint, 9 turbines will be visible on top of the ridge defining the east side of the ridge at distances ranging from 0.4 to 1.0 miles. Because the turbines will be seen against the sky at relatively close range, they will be highly visible in this view. These turbines will be new and visually dominant constructed features in a landscape setting that now has a relatively high degree of visual unity, and will reduce that unity to a degree that will substantially alter the scene's existing character. It can be argued that because the turbines have an attractive design and are sited along the ridgeline in an orderly and uncluttered way, that their presence will not necessarily create a change the in the setting's existing moderate level of visual quality. Exhibit 14, Figure 5c simulates the turbines as they would appear* | *Moderate to High* |

| Table 11<br>Analysis of Impacts to Visual Resources During Project Operation | | | | |
|---|---|---|---|---|
| | | | *with use of brown paint. Under this alternative, the contrast of the turbines with their sky backdrop and their visual salience and effect on the view would be intensified. It is likely that the effects of the Project on views of northbound travelers along this area of the highway will be a little less than suggested by this simulation because the photograph on which the simulation is based was taken from the west side of the road, where the ridge top area is more visible. On the east side of the road where northbound travelers would be located, views toward the ridgetop and the turbines would be constrained to some degree by the proximity of the slope to the side of the road.* | |
| *Simulation View 3 (Exhibit 14, Figures 6a and 6b) Highway 97 at northern end of Bettas Road looking south* | *Moderate* | *High* | *10 turbines will be prominently visible in the driver's cone of vision in the ridgetop area along the east side of the road. These turbines will be located at distances ranging from approximately 0.5 to 1.0 miles from this viewpoint. Because the turbines will be seen against the sky at relatively close range, they will be highly visible in this view and will reduce the level of visual unity to a degree that will substantially alter the scene's existing character Because the turbines have an attractive design and will be arrayed along the ridgeline in an orderly and uncluttered way, that their presence will not necessarily create a substantial change the in the setting's existing moderate level of visual quality.* | *Moderate* |
| *Simulation View 4 (Exhibit 14, Figures 7a and 7b) Sagebrush Road looking north* | *Moderately Low to Moderate* | *Moderate to High* | *A total of more than 70 turbines will be visible to the east and north at distances ranging from 0.9 to over 4 miles from this viewpoint. Although most of the turbines will be seen against hills in the backdrop, which will reduce their visual salience to some degree, a number of the closer turbines and many of the turbines to the north will be seen silhouetted against the sky, which will increase their noticeablity. The high visibility of the many of the turbines and the large numbers of turbines involved will reduce the visual intactness and unity of this view.* | *Moderate to High* |
| ***Ridgelands East of Highway 97*** | | | | |
| *Simulation View 5 (Exhibit 14, Figures 8a and 8b) View looking south from residence in Section 35 at upper end of Elk Springs Road* | *High* | *Moderate* | *A total of approximately 40 turbines will be visible from this viewpoint. Three strings of turbines will be visible in the middle ground, and an additional two strings will be visible in the far middle ground. Because of the elevated viewing position, these turbines will be seen against the backdrop of the ridgetop's ground surface. The contrast between the light color of the turbines and the darker color of the ground will create a moderate level of visual contrast, increasing the visibility of the turbines. Because of the elevated position of this viewpoint and its distance from the turbines, the turbines' apparent scale will be consistent with that of other features in the setting. The presence of the turbines will have little effect on the vividness of this view, but will reduce its overall sense of unity and intactness.* | *Moderate to High* |
| ***Bettas Road*** | | | | |
| *Simulation View 6 (Exhibit 14, Figures 9a and 9b) View looking* | *Moderately High* | *Moderate (views of travelers on road) High (views* | *10 turbines that are a part of String G will be visible along the top of the ridgeline, as close as 0.5 mile from this viewpoint. Although the turbines will be seen against the sky, their neutral gray color will reduce their contrast with the sky backdrop. The apparent height of the turbines will be relatively consistent with the heights of the trees in the* | *Moderate* |

| Table 11<br>Analysis of Impacts to Visual Resources During Project Operation | | | | |
|---|---|---|---|---|
| *north along northern portion of Bettas Road* | | *from residences* | *foreground of the view, reducing the degree of scalar contrast. The presence of the string of turbines that accentuates the ridgeline could be thought of enhancing the vividness of this view. Because only a single string of turbines that have a clean design and form an orderly composition will be visible, the visual unity of this view will not be substantially reduced. However, the presence of the turbines will reduce the level of intactness, contributing to the creation of a moderate level of visual impact.* | |
| ***Highway 970/Hidden Valley*** | | | | |
| *Simulation View 7 (Exhibit 14, Figures 10a and 10b) View looking east from viewpoint on northern portion of Hidden Valley Road* | *Moderately High* | *Moderate* | *11 turbines that are a part of String G will be visible on the top of the ridgeline visible in the distance nearly three miles away from this viewpoint. Although the turbines will be seen against the sky, their neutral gray color will reduce their contrast with the sky backdrop. Although the turbines appear taller than the trees and transmission tower along the ridgetop, at this distance, their apparent slimness and their neutral color causes them to fade into the sky backdrop, downplaying any scalar contrasts. The presence of the turbines has little effect on the vividness and unity of this view, but creates a slight decrease in the overall level of intactness.* | *Low* |
| ***Hayward Hill*** | | | | |
| *Refer to photos 18 and 19 on Exhibit 14, Figure 3h* | *Moderately Low to Moderate* | *Low* | *Because of the low level of visual sensitivity of views in this viewing area, no visual simulations were prepared. In light of the low level of viewer sensitivity and the unexceptional visual resource values, it can be assumed that the level of the Project's impacts on this area's aesthetic values would be low.* | *Low* |
| ***Highway 10 Corridor*** | | | | |
| *Simulation View 8 (Exhibit 14, Figures 11a and 11b) View looking west from a viewpoint along Highway 10 at Hayward Road* | *Moderate* | *High* | *A total of 7 turbines from Strings A, B, and D will be visible on the ridgeline located 1.25 miles and further from this viewpoint. The turbines will be seen against the sky, but their neutral gray color will reduce their contrast with the sky. Because of their low level of contrast and their apparent slimness, they will appear to fade into the sky backdrop to some degree, reducing the sense of a contrast in scale with the surrounding landscape. The presence of the turbines will have little effect on the vividness of this view, but would create a small degree of change in the view's overall levels of unity and intactness.* | *Moderate* |
| *Simulation View 9 (Exhibit 14, Figures 12a and 12b) View looking east from viewpoint along Highway 10 between Morrison Canyon and Swauk Creek* | *Moderate* | *High* | *14 turbines from Strings B and C will be visible on the ridgeline located 1.5 miles and further from this viewpoint. The turbines will be seen against the sky, but their neutral gray color will reduce their contrast this backdrop. Because of their low level of contrast and their apparent slimness, they will appear to fade into the sky to some degree, reducing the sense of a contrast in scale with the surrounding landscape. The presence of the long line of turbines may create a slight increase in the vividness of this view, may have a small adverse effect on the view's unity, and would have a more substantial effect on the view's level of intactness.* | *Moderate* |
| *Simulation View 10* | *Moderately High* | *High* | *11 turbines from Strings A, B and C will be visible on the ridgeline located approximately 2 miles and further from* | *Low* |

| Table 11<br>Analysis of Impacts to Visual Resources During Project Operation | | | | |
|---|---|---|---|---|
| *(Exhibit 14, Figures 13a and 13b) View looking east from viewpoint along Highway 10 west of Swauk Creek* | | | *this viewpoint. The turbines will be seen against the sky, but their neutral gray color will reduce their contrast with this backdrop. At this distance, because of their low level of contrast and their apparent slimness, they will appear to fade into the sky to a large degree, greatly reducing their visual salience and any sense of scalar contrast with the surrounding landscape. Because of their low level of visual salience, the turbines will have relatively small effects on this view's levels of vividness, unity, and intactness.* | |
| ***Iron Horse Trail*** | | | | |
| *Simulation View 11 (Exhibit 14, Figures 14a and 14b) View looking north from a viewpoint along the Iron Horse/John Wayne Trail at Taneum Road* | *Moderately High* | *Low* | *Over 30 turbines from Strings A, B and C and from strings on ridges located further to the north will be visible on the ridgelines located 2 miles and further from this viewpoint. The closer turbines will be seen against the sky, but their neutral gray color will reduce their degree of contrast with this backdrop The more distant turbines will be seen against the slopes of distant hills, and under some lighting conditions, may contrast with their backdrop, increasing their visual salience. The turbines visible in this view will have little effect on this view's level of vividness, but will reduce its level of unity to a small degree and its level of intactness to a slightly greater extent. Because the sensitivity of this view to visual change is low, the moderate degree of visual change will result in a low level of overall visual impact.* | *Low* |
| ***Thorp*** | | | | |
| *Simulation View 12 (Exhibit 14, Figures 15a and 15b) View looking north from the Thorp Highway in the center of the community of Thorp* | *Moderate* | *Moderate* | *Over 20 turbines from Strings A, B and C and from strings on ridges located further to the north will be visible on the ridgelines located 3 miles and further from this viewpoint. Most of the turbines will be seen against the sky, but their neutral gray color will reduce their degree of contrast with this backdrop, and at this distance, they will have a relatively low level of visual salience. Some of the turbines will be seen in front of the tops of the peaks of the Stuart Range, but because of their relatively low level of bulk at this viewing distance, will not detract from the views toward the Stuarts to a substantial degree. The turbines visible in this view will have little effect on this view's levels of vividness, unity and intactness and will result in a low level of overall visual impact to this view.* | *Low* |
| ***Sunlight Waters*** | | | | |
| | *Moderately High to High* | *Moderate* | *Over 40 turbines from many of the Project's turbine strings will be visible on the ridgelines located 2.8 miles and further to the east and northeast of this viewpoint. All of the turbines will be seen against the dark, forested slopes of distant hills, and under some lighting conditions, may contrast with their backdrop, increasing their visual salience. The presence of the turbines will have little effect on the vividness of this view, but will have some adverse effect on the view's unity, and because of the visual clutter introduced by the large number of turbines, will have a more substantial effect on the view's level of intactness. In light of this view's moderate level of sensitivity, the overall level of visual impact will be moderate.* | *Moderate* |
| ***I-90*** | | | | |
| *Simulation* | *High* | *Moderate* | *Over 20 turbines from Strings A, B C and E and from* | *Low* |

| Table 11<br>Analysis of Impacts to Visual Resources During Project Operation | | | | |
|---|---|---|---|---|
| *View 14 (Exhibit 14, Figures 17a, 17b, and 17c) View looking northeast from I-90 at Springwood Ranch* | | | *strings on ridges located further to the north and east will be visible on the ridgelines located 2.5 miles and further from this viewpoint. Some of the turbines will be seen against the sky, but their neutral gray color will reduce their degree of contrast with this backdrop The more distant turbines will be seen against the slopes of distant hills, and under some lighting conditions, may contrast with their backdrop, increasing their visual salience. The turbines visible in this view will have little effect on this view's level of vividness, but will reduce its level of unity and intactness to a small degree. This small degree of visual change, when combined with the moderate level of visual sensitivity, will result in a low level of overall visual impact. Exhibit 14, Figure 17c is a simulation that illustrates the Project's visual effects under a scenario in which the turbines would be painted with an earth tone color rather than a neutral gray. In this view, the visual contrast of the turbines seen against the backdrop of distant hills would be lower, but the contrast of the turbines seen against the sky would be slightly higher. Although the relative visibility of the various turbines would change a little bit with the use of earth tone colors, the overall level of impact on this particular view would remain the same.* | |
| ***Upper Kittitas Valley*** | | | | |
| *Simulation View 15 (Exhibit 14, Figures 18a and 18b) View looking northwest from Lower Green Canyon Road* | *Moderately High to High* | *Moderate* | *Nearly all of the Project's turbines will be visible on the ridgelines located in the background zone of this view, 5 miles and further from this viewpoint. Most of the turbines will be seen against the slopes of the ridges and more distant hills, and under some lighting conditions, may contrast somewhat with their backdrop, but at this distance, this contrast has little effect on their overall visual salience. Because the visual salience of the turbines will be relatively low, the turbines will have little effect on this view's level of vividness, unity and intactness and will have only a small overall visual impact on this view.* | *Low* |
| ***Ellensburg*** | | | | |
| *Simulation View 16 (Exhibit 14, Figures 19a and 19b) View looking northwest from Reed Park in Ellensburg* | *High* | *Low* | *Essentially all of the Project's turbines will be visible on the ridgelines located in the background zone of this view, 13 miles and further from this viewpoint. Nearly all of the turbines will be seen against the slopes of the ridges and more distant hills, and under some lighting conditions, may contrast somewhat with their backdrop, but at this distance, this contrast has little effect on their overall visual salience. Because the visual salience of the turbines will be low, the turbines will have little effect on this view's level of vividness, unity and intactness and will have only a small overall visual impact on this view.* | *Low* |

11. LIGHT AND GLARE

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

*Light and Glare*

*To respond to the Federal Aviation Administration's aircraft safety lighting requirements, the Project will be marked with lights that flash white during the day (at 20,000 candela) and red (at 2,000 candela) at night. These lights are designed to concentrate the beam in the horizontal plane, thus minimizing light*

*diffusion down toward the ground and up toward the sky. The exact number of turbines that will require lighting will be specified by the FAA after it has reviewed final Project plans; however, typically, FAA has required that warning lights be mounted on the first and last turbines of each string, and every 1000 to 1400 feet on the turbines in between. Aside from the aircraft warning lights, the turbines will not be illuminated at night.*

*At the O&M facility, outdoor night lighting will be required for safety and security. This lighting will be restricted to the levels required to meet safety and security needs. Sensors and switches will be used to keep lights turned off when not required. All lights will be hooded and directed to minimize backscatter and illumination of areas outside the O&M site. The lighting, paving and landscaping mitigation measures proposed for the O&M facility would be applied to the substation(s) as well.*

*Based on experience at the Stateline and Nine Canyon Wind projects in Washington, it appears that the white flashing lights that will be mounted on the turbines and flash during daylight hours as required by the FAA for daytime aircraft safety will be visible, but not particularly intrusive to viewers in the areas surrounding the Project and are thus unlikely to create a moderate or high level of visual impact. The flashing red lights (2,000 candela) that the FAA requires be operated at nighttime will introduce a new element into the Project area's nighttime environment. At present, the Project site and surrounding area are relatively dark at night. The major sources of light in the area are floodlights and other outdoor lights at the residential properties located in the vicinity of the Project area, and headlights on the surrounding highways. The flashing red lights will be most noticeable in the areas within a mile or so of the Project, and are likely to be perceived as having an adverse effect on views from residential properties in these areas.*

*The Project's O&M facility and substation(s) will create sources of light in areas where there are no nighttime sources of light other than the headlights of vehicles on adjacent roadways. However, the impacts of the lighting associated with these facilities will not be substantial. As indicated previously, some night lighting will be required for operational safety and security, but mitigation measures will be put into place to restrict this lighting to the minimum required and to attenuate its effects. High illumination areas not occupied on a regular basis will be provided with switches or motion detectors to light these areas only when occupied. At times when lights are turned on, the lighting will not be highly visible offsite and will not produce offsite glare effects because lighting will be restricted by specification of non-glare fixtures, and placement of lights to direct illumination into only those areas where it is needed. The naturalistic plantings of indigenous trees and shrubs to be installed in the areas around these facilities will further reduce the visibility of their night lighting.*

b. Could light or glare from the finished project be a safety hazard or interfere with views?

*No—see part 'a' above*

c. What existing off-site sources of light or glare may affect your proposal?

*None – see part 'a' above*

d. Proposed measures to reduce or control light and glare impacts, if any.

*Mitigation Measures*
*Mitigation measures that have been made an integral part of the Project's design include:*

- *During the construction period, active dust suppression will be implemented to minimize the creation of dust clouds;*
- *When construction is complete, areas disturbed during the construction process will be restored to natural appearing conditions;*
- *The wind turbine towers, nacelles, and rotors used will be uniform and will conform to the highest standards of industrial design to present a trim, uncluttered, aesthetically attractive appearance;*
- *The turbines will have neutral gray finish to minimize contrast with the sky backdrop. Comparison of simulations of towers with a neutral gray finish with simulations of towers with an earth-tone brown finish (Simulation Views 2 and 14 in Exhibit 14) indicate that although the earth tone finish reduces visual contrast in views in which the turbines are seen against a landscape backdrop, it accentuates the visibility of the turbines in views in which they are seen against the sky. Because the*

*turbines are most frequently seen against the sky, particularly in close range views where visual concerns are the greatest, the gray finish is the better choice for minimizing Project aesthetic impacts;*

- *A low-reflectivity finish will be used for all surfaces of the turbines to minimize the reflections that can call attention to structures in a landscape setting;*
- *Because of the prevailing wind conditions and the high level of reliability of the equipment being used, the rotors will be turning approximately 80-85%of the time, minimizing the amount of time that turbines will appear to be non-operational, a condition that the public often finds to be unattractive8;*
- *The small cabinets containing pad-mounted equipment that will be located at the base of each turbine will have an earth-tone finish to help them blend into the surrounding ground plane;*
- *The only exterior lighting on the turbines will be the aviation warning lighting required by the FAA. It will be kept to the minimum required intensity to meet FAA standards. It is anticipated that the FAA will soon be issuing new standards for marking of wind turbines that will entail lighting far fewer turbines in a large wind farm than is now required, and having all the lights be synchronized. These potential regulatory changes are being closely monitored, and if, as is likely, they are made before Project construction begins, the aviation safety marking lighting will be redesigned to meet these standards;*
- *Nearly all of the Project's electrical collection system will be located underground, eliminating visual impacts;*
- *On the 1.2 mile segment of the electrical collection system that will be above ground, simple wooden poles, non-specular conductors (i.e. conductors that have a low level of reflectivity), and non-reflective and non-refractive insulators will be used. This line parallels two existing sets of overhead high voltage transmission lines and a paved road;*
- *To the extent feasible, existing road alignments will be used to provide access to the turbines, minimizing the amount of additional surface disturbance required. Access road widths will be restricted to 20 feet. The roads will have a gravel surface and will have grades of no more than 15%, minimizing erosion and its visual effects;*
- *The O&M facility building will have a low-reflectivity earth-tone finish to maximize its visual integration into the surrounding landscape;*
- *The colors of the asphalt and gravel used for circulation and parking areas at the O&M facility will be selected to minimize contrast with the site's soil colors;*
- *Outdoor night lighting at the O&M facility and the substations will be kept to the minimum required for safety and security, sensors and switches will be used to keep lighting turned off when not required, and all lights will be hooded and directed to minimize backscatter and off-site light trespass;*
- *At the substation(s), all equipment will have a low reflectivity neutral gray finish to minimize visual salience;*
- *All insulators in the substations and on takeoff towers will be non-reflective and non-refractive;*
- *The control buildings located at each substation would have a low-reflectivity earth-tone finish;*
- *The chain link fences surrounding the substations will have a dulled, darkened finish to reduce their contrast with the surroundings;*
- *In the areas surrounding the O&M facility and substations, naturalistic groupings of indigenous trees and shrubs will be established to provide partial screening and to visually integrate the facilities into their landscape settings.*

12. RECREATION

a. What designated and informal recreational opportunities are in the immediate vicinity?

*There are no designated or informal recreational opportunities in the immediate vicinity. Iron Horse State Park and Wenatchee National Forest are located approximately one mile from the boundaries of the Project Site. Iron Horse State Park is a linear, multi-use trail over 100 miles long that is primarily used for walking, biking, and horseback riding. Wenatchee National Forest offers camping, picnic areas, and multi-use trails. While two DNR-owned parcels are accessible to the public, they are not regularly used.*

b. Would the proposed project displace any existing recreational uses? If so, describe.

[8] This finding is supported by research by Thayer and Freeman (1987), among others.

*No permanent impacts to recreational uses are anticipated, however, there may be some temporary displacement of recreational use of the DNR lands during Project construction.*

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

*As no permanent impacts are anticipated no mitigation is proposed.*

13. HISTORIC AND CULTURAL PRESERVATION

a. Are there any places or objects listed on, or proposed for, national, state, or local preservation registers known to be on or next to the site? If so, generally describe.

*No*

b. Generally describe any landmarks or evidence of historic, archaeological, scientific, or cultural importance known to be on or next to the site.

*A cultural resources evaluation was implemented to identify and assess any potential impact on cultural resources located within the Kittitas Valley Wind Power Project area. These resources may include previously documented or undocumented historic, cultural and archaeological resources as well as traditional cultural properties. To determine if the Project area contains any significant cultural deposits, Lithic Analysts was contacted to conduct an extensive and systematic on-ground cultural resource survey of the proposed Project area. This included a pedestrian archaeological survey of all turbine generator and turbine string locations as well as the proposed Project substations, existing and new access roads, and any overhead or underground electrical lines.*

*Prior to starting fieldwork, Johnson Meninick, Cultural Resources Director of the Yakama Nation, was contacted by Lithic Analysts, by letter, to inform him of the archaeological work to be conducted on the Project. Prior to this letter, the Applicant contacted Mr. Meninick by telephone and certified mail inviting Yakama Nation participation in the cultural resources survey. A response from Mr. Meninick was not received. In addition, David Powell, Ceded Lands Archaeologist for the Yakama Nation, was also contacted by telephone to inform him of the archaeological work to be conducted on the Project. Mr. Powell was invited to visit the Project area during the archaeological survey, but declined.*

*Lithic Analysts conducted a literature search of the recorded archaeological sites and other archaeological information at the Washington State Office of Archaeology and Historic Preservation (OAHP) in Olympia. All pertinent files concerning investigations of historic and prehistoric resources were reviewed for archaeological information regarding the immediate Project area and the area surrounding the proposed site.*

*No previously recorded historic or prehistoric archaeological sites within the Project area were identified during the OAHP literature search or during the few archaeological surveys conducted in and around the Project area.*

*Field Survey and Results*

*This Project differed from most archaeological surveys in that the areas affected by ground-altering activities will be linear in nature, not large surface parcels. All affected areas were walked in meandering transects by three surface investigators. Ground visibility was excellent in almost all areas of this Project. Only a few very short lengths of transects were covered by thick grass.*

*All proposed wind turbine generator strings (A, B, C, D, E, F, G, H, I and J) were covered by three meandering transects each at approximately 100 feet intervals. All existing access roads, new access roads, underground electrical lines, and overhead electrical lines were investigated by approximately 35 feet meandering transects. The areas proposed for the Project substations were surveyed by approximately 35 feet meandering transects also.*

*Two previously unrecorded lithic scatter sites were identified during the survey described above. Project Site #1 is located at the north end and to the east of turbine string G, just west of a seep and given its location near water, may have been a lithic scatter. Project Site #2 is located just west of the proposed BPA*

*substation location and just north of the BPA power line right-of-way. This site is a small debitage concentration.*

c. Proposed measures to reduce or control impacts, if any.

*This archaeological survey project covered the entire area within the Project where ground-altering activities are proposed. Two small lithic scatter sites were identified (see part "b" of this section above). Both lithic scatter sites will be avoided during construction and operation.*

14. TRANSPORTATION

a. Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any.

*The region within which the Project is located is a rural area with low population density in Kittitas County, Washington between the cities of Cle Elum to the west and Ellensburg to the southeast. The main study area has a triangular shape, bound by State Route 970 in the north, I-90 in the south, and US 97 in the east. The study area also includes roads maintained by Kittitas County such as Bettas Road and Hayward Road. Most of the public roads within the region are paved county roads, with a few state routes traversing the area. The remaining public road system is comprised of county roads that have bituminous pavement, gravel, or unimproved dirt. Exhibit 15, 'Roadway Network', illustrates the locations of the Project's main transportation routes.*

*Street Network*

*Two kinds of roads are involved in constructing the Project: transporter routes and turbine site access roads. Transporter routes are roads used to bring in equipment, materials and manpower from outside of the Project study area to the Project site. Transporter routes include state and county roads within the study area, as well as existing private roads and newly constructed roads. Site access roads are gravel surfaced roads that run between the individual turbines. The site access roads connect to the transporter route. There is currently one main transporter route that will provide access to the site.*

*I-90 is an interstate highway and the main Project access heading east from the Port of Seattle to the Project site. I-90 has posted speed limits of 60 miles per hour (mph) in urban areas and 70 mph in rural areas. The 70 mph designation begins east of Issaquah. From I-90, US 97 (north of I-90) will be the next leg on the transporter route. US 97 has a posted speed limit that ranges between 40- to 65 mph and is a two-lane, north-south roadway with 4 to 8-foot-wide asphalt shoulders between I-90 and State Route 970. There are no sidewalks on this road, which is classified as a rural-principal arterial, according to the WSDOT road classification system. US 97 is also classified as having rolling terrain, causing trucks to slow down frequently. US 97 provides access to and across Blewett Pass in the north. From US 97, Kittitas County roads that will be used include Bettas Road, (between US 97) and the northern portion of Hayward Road above the KRD canal bridge (which branches off of Bettas Road). These roads only provide local access. Bettas Road is a two-lane, north-south paved roadway that branches off of US 97 approximately 10 miles north of the I-90 interchange. Hayward Road, the northern portion of which will also be utilized for transport, is a two-lane, north-south gravel road that branches off of Bettas Road to the south.*

*Traffic Patterns and Volumes*

*Table 12 shows the average daily traffic (ADT) volumes on roadways in the study area between 1997 and 2001. These volumes are based on available traffic data from WSDOT. US 97 varies as it runs north from a fairly urban setting near I-90 to a much more rural setting near Bettas Road. Therefore, traffic was analyzed in two different sections where data was available from WSDOT. The first 2 mile section immediately north of I-90 represents US 97 in an urban setting and is referred to as US 97 (North of I-90). The 2 mile section immediately before the intersection of Bettas Road represents a rural setting and is referred to as US 97 (South of Bettas Road).*

***Table 12***
***Average Daily Traffic (ADT) Volumes and Estimated Percent Trucks***

| *Roadway* | *1997 ADT* | *1998 ADT* | *1999 ADT* | *2000 ADT* | *2001 ADT* | *Estimated % Truck* |
|---|---|---|---|---|---|---|
| *I-90 (West of US 97)* | *22,000* | *23,000* | *23,000+* | *22,000+* | *22,000* | *20* |

*Table 12*
*Average Daily Traffic (ADT) Volumes and Estimated Percent Trucks*

| Roadway | 1997 ADT | 1998 ADT | 1999 ADT | 2000 ADT | 2001 ADT | Estimated % Truck |
|---|---|---|---|---|---|---|
| US 97 (N. of I-90) | 2,500 | 2,600 | 2,800 | 2,800 | 2,800 | N/A |
| US 97 (S. of Bettas Rd.) | 2,000 | 2,100 | 2,200 | 2,200 | 2,200 | 26 |
| Bettas Road | N/A | N/A | 43 | 36 | 26 | N/A |
| Hayward Road | N/A | N/A | N/A | 29 | 24* | N/A |

*ADT = Average daily traffic.*
*N/A = Not available.*
*+ 1999 and 2000 ADT for I-90 estimated.*
** 2001 ADT for Hayward Road estimated.*
*Sources: Washington State Department of Transportation, 2000, 2001. Kittitas County Public Works.*

*Truck Volumes and Routes, Weight and Load Limitations*

*The Kittitas County road network would comprise the primary public haul routes used in the construction of the Project. The regulatory framework for transportation in Kittitas County consists of program and project planning, design standards related to roadway geometry and paving materials, load limits for bridges, and weight limits or closures under defined circumstances. Kittitas County roads are designed to sets of standards with respect to paving materials and methods, and with respect to roadway geometry and design. All new road construction in the County must be in accordance with the current edition of WSDOT's "Standard Specifications for Road & Bridge Construction." Kittitas County Road Standards state the minimum requirements for road construction in the County.*

*Kittitas County Code 10.28 specifies load and weight restrictions on Kittitas County roads during load sensitive periods. It also authorizes the county engineer to issue emergency permits for the operation of vehicles exceeding the allowable gross load.*

*Along the Transporter Route, there is a restricted bridge on I-90. This is the Cle Elum River Bridge. This bridge is height restricted only in the westbound direction and thus will not cause problems for loaded trucks carrying oversize equipment eastbound on I-90 to the Project site. Besides this bridge, there are no other weight and load limits on any of the roads in the vicinity of the Project site.*

*The Cle Elum and Ellensburg School Districts indicate that their buses use US 97 and some stop on the route where shoulders are provided. Given that construction-related traffic is not anticipated to increase total truck volume along the highways by more than 15% over the current level and this increase will be for a short period, it is not expected to cause problems for school bus service in the area.*

*Existing Roadway Levels of Service*

*To analyze the traffic conditions, ADT data from WSDOT and the County were used to determine a level of service (LOS) for each of the roadways. LOS is a qualitative measure describing operational conditions in a traffic stream, and motorists' or passengers' perceptions of those conditions. A LOS definition generally describes these conditions in terms of speed and travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety. 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. A conservative estimate of 10 percent of the ADT volume is used to estimate the peak hour volumes.*

*LOS was determined on the basis of the most current Highway Capacity Manual (HCM) (Transportation Research Board Special Report 209, 2000). Daily volumes represent the estimated 2001 ADTs in both directions of travel.*

*To determine the LOS for selected roadways in the study area, daily traffic capacity was determined by estimating capacities obtained from the HCM. Daily traffic volumes were compared with these capacities to determine volume-to-capacity ratios, which were used to calculate the existing LOS. Table 13 summarizes the existing roadway traffic conditions in the Project vicinity and includes existing roadway classification, number of lanes, daily volume, design capacity, peak-hour volume, and LOS.*

**Table 13**
**2001 Conditions of Affected Roadways**

| Roadway | Classification | No. of Lanes | Average Daily Volume | (a) Hourly Design Capacity | (b) PM Peak Hour Volume | PM Peak Hour LOS |
|---|---|---|---|---|---|---|
| I-90 (W. of US 97) | Rural-Interstate | 4 | 22,000 | 6,020 | 2,200 | C |
| US 97 (N. of I-90) | Rural-Principal Arterial | 2 | 2,800 | 2,800 | 280 | C |
| US 97 (S. of Bettas Rd.) | Rural-Principal Arterial | 2 | 2,200 | 2,800 | 220 | C |
| Bettas Road | County Road | 2 | 26 | 2,800 | 3 | B |
| Hayward Road | County Road | 2 | 24 | 2,800 | 3 | B |

*a) Maximum number of vehicles per hour in both directions for LOS E.*
*b) Peak hour volumes estimated at 10% of ADT.*
*LOS = Level of service.*

*The overall LOS for the current roadways surrounding the proposed Project site prior to construction is LOS C, which represents generally smooth traffic operating conditions. Individual users feel unrestricted by the presence of others in the traffic stream.*

*Existing Intersection Level of Services*
*Existing intersections along the Transporter Route include ramp termini at I-90 and State Route 97, and also at State Route 97 and Dolarway Road.*

*All intersections without traffic signals are expected to operate at LOS C or better during construction due to the low existing traffic on these roadways.*

b. Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?

*Kittitas County is primarily a rural county where the need for public transportation in or near its towns is not a high priority. The cities of Cle Elum and Ellensburg, near the vicinity of the Project site, currently do not have public transit systems. However, there is an accessible/special needs transportation program provided by the Kittitas County Action Council (KCAC) for citizens. Besides this service, Greyhound bus service is the main form of public transit between cities such as Cle Elum and Ellensburg.*

c. How many parking spaces would the completed project have? How many would the project eliminate?

*During construction, parking will be located at the site of the O&M facility and along the site access roads. The O&M facility site will also serve as a construction staging area. Parking along turbine string roads will be primarily for those working on turbine foundations and electrical infrastructure and turbine erection crews. Vehicles will park in areas that are already temporarily or permanently disturbed for other construction purposes, no additional ground disturbance is anticipated solely for parking needs. It is anticipated that roughly half of all construction worker vehicles will be parked at the O&M facility location and the other half will be dispersed across the various turbine strings. Assuming a peak workforce of 160 people, the maximum number of worker vehicles anticipated at any one time is 106, assuming that efforts to encourage carpooling will result in about one third of construction workers carpooling to and from the Project site. In terms of acreage necessary for parking, the worst-case scenario (assuming no carpooling) would require less than 2 acres of gravel surface for parking.*

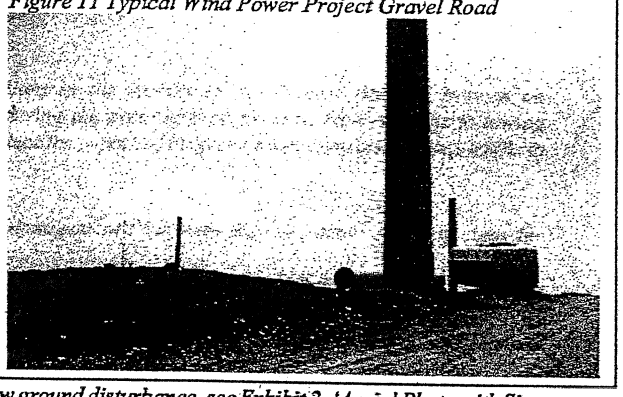
*During the operational phase, parking will be at the O&M facility parking lot. With an anticipated operations workforce of 16 people, plus occasional guests, delivery vehicles, etc. no more than 20 vehicles are expected to be parked at the facility at any one time. The permanent parking area at the O&M facility will be graveled to reduce dust and soil erosion.*

*No parking spaces would be eliminated.*

d. Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private).

*Access to the various rows of turbines will be achieved via private graveled access roads branching from state highway 97 and county roads Bettas and Hayward roads. The access roads are designed to allow for heavy equipment to be transported to the Project and will be used for construction to allow access to and from the wind turbines, substations and meteorological monitoring towers (see Exhibit 2, Project Site Layout and Figure 11).*

*Figure 11 Typical Wind Power Project Gravel Road*



*Road Footprint*

*The road design has been prepared to minimize the overall disturbance footprint and avoid erosion risks. Wherever practical, existing roads have been utilized to minimize new ground disturbance, see Exhibit 2, 'Aerial Photo with Site Layout'. Approximately 26 miles of gravel road construction will be undertaken for the Project consisting of roughly 19 miles of new road and improvements to roughly 7 miles of existing roads.*

*The roads will consist of a 20 feet wide compacted graveled surface. In areas of steeper grades, a cut and fill design will be implemented to keep grades below 15% and prevent erosion.*

*Applicant does not anticipate that improvements to public roads will be necessary other than some reinforcement of the upper portion of Hayward Road.*

e. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

*It is not anticipated that any of the equipment or materials necessary for the Project operations or construction will be transported by water, rail, or air to the Project Site ; therefore, there will be no impact to such transportation.*

*Air Traffic*

*There are no regional or municipal airports in the vicinity of the Project site. The nearest airport is near Ellensburg, approximately 12 miles to the southeast. The Ellensburg airport does not have scheduled air service, but is limited to private and charter plane service. The Project will not interfere with airport operations.*

f. How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur.

*Operations*

*The Project will operate continuously (24 hours per day, 7 days per week) using an automated system. It will employ an estimated 16 to 18 full time workers. The operations crew will normally work 8 hour days Monday through Friday, with one person working half days on the weekends. This equates to a maximum of 36 worker commuting trips during a 24-hour period and infrequent deliveries of supplies to the O&M facility. Traffic between the O&M facility and the individual turbines will be minimal during operations, as scheduled maintenance is normally performed only every 6 months on each turbine. The Applicant will be responsible for maintenance of turbine string access roads, access ways, and other roads built by the Applicant to construct and operate the Project.*

*Table 13 describes current and future traffic volumes and LOS during the operation phase of the Project, including traffic volumes from the generation plant site. Future year 2030 volumes were estimated using a 1*

*percent growth factor. This growth factor is considered reasonable because of the area's rural nature. As shown in Table 13, all roadways will operate at LOS D or better during evening peak conditions.*

g. Proposed measures to reduce or control transportation impacts, if any.

*No significant unavoidable adverse impacts on traffic and transportation are associated with construction or operation and maintenance of the Project. However, the Applicant has proposed specific mitigation measures for Project construction.*

*Construction*

*During construction, roadways and intersections in the vicinity of the Project site will provide an acceptable level of passage for traffic, even during the evening peak periods. However, the following mitigation measures are proposed to further reduce the impact of Project construction on roadway traffic in the region:*

- *The Applicant will prepare a Traffic Management Plan with the contractor outlining steps for minimizing construction traffic impacts;*
- *The Applicant will provide notice to landowners when construction takes place to help minimize access disruptions;*
- *Coordination with WS DOT and County road works department with project traffic and planned road construction or improvements.*
- *The Applicant will provide proper road signage and warnings of "Equipment on Road," "Truck Access," or "Road Crossings;"*
- *When slow or oversized wide loads are being hauled, advance signage and traffic diversion equipment will be used to improve traffic safety. Pilot cars will be used as DOT codes dictate depending on load size and weight;*
- *The Applicant will construct necessary site access roads and entrance driveways that will be able to service truck movements of legal weight;*
- *The Applicant will encourage carpooling for the construction workforce to reduce traffic volume;*
- *In consultation with Kittitas County, the Applicant will provide detour plans and warning signs in advance of any traffic disturbances;*
- *Applicant will employ flaggers as necessary to direct traffic when large equipment is exiting or entering public roads to minimize risk of accidents;*

*Operations*

*During Project operations and maintenance related traffic is limited to 3-4 light pickup trucks mostly on private roads. There will be no significant impact to other traffic and transportation; therefore, no mitigation is proposed.*

15. PUBLIC SERVICE

a. Would the project result in an increased need for public services (for example: fire protection, police protection, health care, schools, other)? If so, generally describe.

*During construction and operations there will be little impact to police and fire departments and little or no impact to schools.*

**Police**

*Construction*

*Construction activities associated with the Project will increase traffic volume on roadways surrounding the Project area, as a result of both commuting construction workers and the transportation of materials. This increased volume will occur in mid-summer to fall, in addition to current peak demands during the summer months when vacationers use the roadways. It is possible that the number of accidents and call for service along major roadways (SR-9 and I-90) will increase for about six months, when most of the on-site work will be done. Enforcement activities may peak when employees peak, at about 160 employees for about one month. Since the period of time for construction is short, existing staff should likely be able to provide the adequate enforcement services. The Applicant will consult with the County regarding the impact on county*

*staffing. If additional staffing is required the Applicant proposes to mitigate by prepaying taxes in a sufficient amount to provide adequate staffing levels during construction.*

*Operations*
*Because the number of employees during operations will range from 16-18 workers, there will be no significant impacts to law enforcement.*

**Fire Services**

*Construction*
*Because of the number of workers and the construction activities occurring in an area susceptible to wild land fires, there is increased potential for calls for emergency fire services. Local fire districts have sufficient staff to meet this increased demand. There is little or no potential for nacelles to catch on fire during construction, as they will not be operating yet.*

*Turbines located on DNR property are under the fire protection of DNR. There are turbines outside of a fire district, currently without contracted service protection, and these properties would be more vulnerable to the spread of fire. The Applicant intends to contract with local fire districts for fire protection during construction.*

*Operations*
*Impacts from fire, either from a turbine or wild land fire in the Project area could increase or be more difficult to control unless provisions are made for fire fighters to have easy access to the Project property.*

*Fires caused by lightning are rare when compared to manmade fires, and they usually occur on timbered ground. A lightning-caused fire at the turbines is unlikely because all turbines and towers will be built with engineered lightning protection systems. Fires in modern turbine nacelles due to mechanical failures are also extremely rare. In the event of a nacelle fire, Project operations staff and fire personnel will not attempt to put it out but only prevent the fire from spreading to any adjacent land. This can be achieved either by use of fire suppressant material or a small controlled burn around the base of the tower.*

*All operations personnel working on the turbines will work in pairs. In the unlikely event that an injury occurs while working in the nacelle, all staff will be trained in lowering injured colleagues from the nacelle. A rescue basket specially designed for this purpose will be kept at the operations and maintenance facility and will be available for use by local emergency medical services personnel. Training in its use will also be provided to local EMS personnel.*

**Medical Services/Hospitals**

*Because the local hospital has capacity for additional patients and there are several ambulances available to service the Project area, there will be no significant impacts to medical services in the Project area during construction and operation. The Applicant will make arrangements with the Kittitas Valley Community Hospital for helicopter transportation service in the unlikely event that any operations personnel are seriously injured and require evacuation from a remote location within the Project area.*

**Schools**

*Construction*
*It is unlikely that construction workers and their families will relocate to the study area during construction because of the short term (maximum of three to three and one half months) of employment for each craft. Therefore, there are no impacts expected to local school districts.*

*Operations*
*There will be an insignificant impact on schools during operations because the number of employees who might have families moving to the area is small. Up to half of the 16-18 employees can be hired locally.*

**Public Water Supply/Stormwater**

*There will not be an impact to public water systems because none of the public water utilities will be used. Water during construction will be supplied by the contractor. An on-site domestic well is proposed for the operation and maintenance facility during operations.*

*There are no existing stormwater systems in the Project area. The Project will manage stormwater based on an NPDES permit for stormwater and a stormwater pollution control plan. Therefore, there will be no significant impacts during construction or operations.*

b. Proposed measures to reduce or control direct impacts on public services, if any.

*Potential impacts to public services and utilities will be mitigated by tax revenues generated by the Applicant. Tax revenue generation by the Project, in net present value, will include the following:*

***Property taxes:*** *Based on an estimated value of $750,000 per turbine and the 1.35 percent property tax rate in Kittitas County, it is estimated that the Project will contribute directly to an increase of $1,221,000 in property tax revenue to Kittitas County. The estimated increase in value of other properties, as a result of the Project, will result in an additional $85,000 in property taxes annually for the County. Thus, it is estimated that Kittitas County will receive approximately $1,306,000 in added property tax revenue each year from the Project (see details below).*

*Sales taxes: As construction workers and full-time employees will purchase goods and services in the Project area, increased retail sales in local communities are estimated to be approximately $17,000. Sales taxes are also expected to increase in the Project area as a result of Project purchases (for annual operating supplies and materials) within the surrounding communities.*

*Should there be construction impacts requiring additional staffing levels during construction or other impacts or costs related to services which will not be covered timely by tax revenues the Applicant will enter into agreement(s) with the respect local governmental agency for prepayment of taxes for mitigation of the cost impacts. This would include fire, police and county roads.*

*Construction*

*Because construction activities at the Project are not expected to result in significant impacts to medical services, schools, public utilities, communications, water supplies, sewage/solid waste disposal, or stormwater systems, no mitigation measures will be necessary for those services or utilities.*

*The following mitigation measures will be implemented to reduce impacts to public services resulting from construction of the Project:*

- *The Applicant will provide all police, fire, and emergency medical personnel with emergency response details for the Project including Applicant contact information, procedures for rescue operations to the nacelles, and location of rescue basket.*

*Additionally, potential impacts to fire services will be mitigated by the following:*

- *Contract with fire district(s) for protection services during construction;*
- *Provide special training to fire district personnel for fires related to wind turbines, and to EMS personnel in how to use a rescue basket that will be kept at the operations and maintenance facility for the purpose of removing injured employees from the towers;*
- *Provide detailed maps that show all access roads to the Project;*
- *Provide keys to a master lock system that will enable emergency personnel to unlock gates that would otherwise limit access to the Project;*
- *Use spark arresters on all power equipment, e.g., cutting torches, and cutting tools;*
- *Inform workers at the Project of emergency contact phone numbers and train them in emergency response procedures;*
- *Carry fire extinguishers in all maintenance vehicles; and*
- *Coordinate with DNR when the fire danger is high.*

*Operation and Maintenance*

*During operation and maintenance of the Project, impacts to local services and utilities are expected to be insignificant. However, emergency preparedness planning will be implemented as mentioned above, to reduce potential impacts in the event of an emergency. No additional mitigation will be required.*

16. UTILITIES

a. Circle utilities currently available at the site: electricity, natural gas, water, refuse services, telephone, sanitary sewer, septic system, other.

*Utilities currently available at the site vary depending on the parcel of land. Some areas have electricity, telephone service, refuse services, septic system and some do not. Non-well water and natural gas are not available on any of the parcels.*

b. Describe the utilities that are proposed for the project, the utility providing the services, and the general construction activities on the site or in the immediate vicinity which might be needed.

*The Applicant proposes to construct the domestic well septic system and to contract with the local service provider for refuse collection. Electricity for the O&M facility will be provided by Kittitas County PUD.*

C. 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 Date

THE REMAINING QUESTIONS ARE EXCLUSIVELY FOR REZONE APPLICANTS AND FOR AMENDMENTS TO COUNTY COMPREHENSIVE PLAN AND CODE. UNLESS THESE APPLY TO YOU, THIS IS THE END OF THE SEPA CHECKLIST.

SEPA ENVIRONMENTAL CHECKLIST QUESTIONS FOR NON-PROJECT ACTIONS ONLY. WHEN ANSWERING THESE QUESTIONS, BE AWARE THE EXTENT OF THE PROPOSAL, OR THE TYPE OF ACTIVITIES LIKELY TO RESULT FROM THE PROPOSAL, WOULD AFFECT AN ITEM AT A GREATER INTENSITY OR AT A FASTER RATE THAN IF THE PROPOSAL WERE NOT IMPLEMENTED. RESPOND BRIEFLY AND IN GENERAL TERMS (ATTACH ADDITIONAL SHEETS AS NECESSARY)

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise? Proposed measures to avoid or reduce such increases.

2. How would the proposal be likely to affect plants, animals, fish or marine life: Proposed measures to protect or conserve plants, animals, fish or marine life?

3. How would the proposal be likely to deplete energy or natural resources? Proposed measures to protect or conserve energy and natural resources.

4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands? Proposed measures to protect such resources or to avoid or reduce impacts.

5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses? Proposed measures to avoid or reduce shoreline and land use impact.

6. How would the proposal be likely to increase demands on transportation or public services and utilities? Proposed measures to reduce or respond to such demand(s).

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.

**SECTION X. ADMINISTRATIVE REVIEW** TO BE COMPLETED BY PLANNING DEPARTMENT.

1. FILE TITLE AND NUMBERS:

2. APPLICATION COMPLETION DATE:

3. COMPREHENSIVE PLAN LAND USE DESIGNATIONS:

4. ZONING DISTRICT:

5. IN SHORELINES JURISDICTION?

o NO o YES, ENVIRONMENT: URBAN, RURAL, CONSERVANCY, NATURAL
DESCRIBE NATURE OF EXISTING SHORELINE:

6. IN 100-YEAR FLOODPLAIN?

o NO o YES BASE FLOOD ELEVATION (BFE):
FIRST FLOOR ELEVATION:

7. CRITICAL AREAS BINDING DETERMINATION NECESSARY: o YES o NO DATE OF ISSUANCE:

o WETLAND TYPE: _____

o GEOLOGICALLY HAZARDOUS AREA
o EROSION o GEOLOGIC
o MINE o LANDSLIDE
o SEISMIC

o FISH & WILDLIFE HABITAT AREA
o BIG GAME WINTER RANGE
o RIPARIAN CORRIDOR
o PRIORITY SPECIES HABITAT
o HABITAT/SPECIES LOCAL IMPORTANCE

o FREQUENTLY FLOODED AREA
o FLOODPLAIN o FLOODWAY

8. ADDITIONAL APPROVALS/PERMITS NECESSARY:

NOTES:

**Exhibit 1**

# APPENDIX 1: LEGAL DESCRIPTIONS AND LAND OWNERSHIP INTERESTS

## Introduction

The Kittitas Valley Wind Power Project will be constructed across a land area of approximately 5,000 acres in Kittitas County, although the actual permanent facility footprint will only comprise approximately 90 acres of land. Proposed turbine strings will be located primarily on the north-south oriented ridges in Township 19 N Range 16E, Township 19N Range 17E, and Township 20N Range 17E.

The core of the Kittitas Valley Wind Power Project site and the proposed interconnect points lie on privately-owned lands and there are also parcels which are owned by the Washington Department of Natural Resources (WA DNR). The Applicant has obtained wind option agreements with landowners for all private lands within the Project site boundary necessary for installation of the plant. Copies of the recorded Memorandums of Wind Option with all private landowners are attached to this exhibit (Attachment 1).

Approximately one fourth of the proposed turbines lie on WA DNR lands. The Applicant has secured access to all of the DNR lands as well as all of the private lands surrounding the DNR parcels of interest. The Applicant has been coordinating with the WA DNR during the development of this Project. WA DNR published a notice of intent to negotiate a lease agreement for these parcels on June 6, 2002. A letter of intent from WA DNR is in Attachment 2 to this Exhibit.

## Legal Descriptions of Lands Under Option with Applicant

---

Noel Andrew
2701 Elk Springs Road
Ellensburg, WA 98926
Phone No. 509-306-5348

Legal Description:
The Property consists of approximately 150 Acres of land located in Kittitas County, Washington State, and more specifically described as follows:
Tracts 1, 2 & 3 of Survey No. 501915, (located in the West one-half (W1/2)), Section 11, Township 19 North, Range 17 East, W.M.

Kittitas County Tax Parcel No's 19-17-11000-0002, 19-17-11000-0003 & 19-17-11000-0011

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Larry L. Tritt
PO Box 725
Roslyn, WA 98941
Phone No.509-649-3611

Legal Description:
The Property consists of approximately 50 Acres of land located in Kittitas County, Washington, State, and more specifically described as follows:
Tract 4, of Survey No. 501915, (located in the West one-half (W1/2)), Section 11, Township 19 North, Range 17 East, W.M.

Kittitas County Tax Parcel No. 19-17-11000-0004

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Michael and Louise Genson
PO Box 521
Snoqualmie, WA 98065
Phone No. 509-964-9082

Legal Description:
The Property consists of approximately 425 Acres of land located in Kittitas County, Washington State, and more specifically described as follows:
Tracts 5 and 6 of Survey No. 501915, located in the Southwest one-quarter (SW1/4), Section 11; and the West one-half (W1/2) of Section 14, Excepting there from that portion lying Southwesterly of the State Highway, and that portion of the West one-half (W1/2), Section 23, lying Northerly of the B.P.A. power line road and being a portion of Tract B of Survey No. 504472.

Kittitas County Tax Parcel No's, 19-17-11000-0005, 19-17-14000-0002, 19-17-14000-0003, 19-17-14000-0004 & 19-17-23000-0014.

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Pautzke Bait Co., Inc.
Gerry Williams
PO Box 36
Ellensburg, WA 98926
Phone No. 509-925-9365

Legal Description:
The Property consists of approximately 700 Acres of land located in Kittitas County, Washington State, and more particularly described as follows:
The Northeast one-quarter (NE1/4), and the South one-half (S1/2) of Section 3, excepting there from that portion lying Westerly of the State Highway, and the East one-half (E1/2) of the East one-half (E1/2) of Section 10, and that portion lying Easterly of the State Highway within the Northeast one-quarter (NE1/4) of Section 15. All of the above is located within Township 19 North, Range 17 East, W.M. And together with the South one-half (S1/2) of the Southeast one-quarter (SE1/4) of Section 34, Township 20 North, Range 17 East, W.M.

Kittitas County Tax Parcel No's 19-17-03000-0003, 19-17-10000-0001, 19-17-15000-0003 & 20-17-34000-0004.

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Carla L. Thomas
911 Robbins Road
Ellensburg, WA 98926
Phone No. 509-962-8572

Legal Description:
The Property consists of approximately 500 Acres of land located in Kittitas County, Washington State, and more specifically described as follows:
All of that portion of the South one-half (S1/2), of Section 3, lying Westerly of the State Highway, and that portion of the Southeast one-quarter (SE1/4) of Section 9, lying Easterly of the County Road, and that portion of Section 15, lying Northerly of the County Road. All of the above is located within Township 19 North, Range 17 East, W.M.

Kittitas County Tax Parcel No's 19-17-03000-0001, 19-17-09000-0003 & 19-17-15000-0001.

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Daniel A. and Marcia M. Green
715 Carplake Road
Camano Island, WA 98282
Phone No. 360-387-3495

Legal Description:
The Property consists of approximately 800 Acres of land located in Kittitas County, Washington State, and more specifically described as follows:
All of that portion of the Southwest one-quarter (SW1/4), Section 1; and the East one-half (E1/2), Section 11, and the West one-half (W1/2), Section 12, Township 19 North, Range 17 East, W. M.

Kittitas County Tax Parcel No's 19-17-01000-0002, 19-17-01000-0009, 19-17-01000-0010 & 19- 17-01000-0011; 19-17-11000-0001, 19-17-11000-0006, 19-17-11000-0007, 19-17-11000-0008, 19-17-11000-0009 & 19-17-11000-0010; 19-17-12000-0002, 19-17-12000-0006, 19-17-12000- 0007, 19-17-12000-0008, 19-17-12000-0009 & 19-17-12000-0010.

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James L. Majors
411 Rustic Road
Ellensburg, WA 98926
Phone No. 509-962-4059

Legal Description:
The Property consists of approximately 50 Acres of land located in Kittitas County, Washington State, and more specifically described as follows:
Lot 3, of Survey No. 505298, (located in the East one-half (E1/2)), Section 14, Township 19 North, Range 17 East, W.M.

Kittitas County Tax Parcel No. 19-17-14000-0006.

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Keith Schober
PO Box 72
Cle Elum, WA 98922
Phone No.509-674-2217

Legal Description:
The Property consists of approximately 785 Acres of land located in Kittitas County, Washington State, and more specifically described as follows:
The Southwest one-quarter (SW1/4) of the Northwest one-quarter (NW1/4) and the Northwest one-quarter (NW1/4) of the Southwest one-quarter (SW1/4), and the East one-half (E1/2) of the Southwest one-quarter (SW1/4), Section 22. Also, all of that portion lying Easterly and Northeasterly of Hayward Road, Section 27, Township 19 North, Range 17 East, W.M.

Kittitas County Tax Parcel No's 19-17-22000-0003, 19-17-22000-0008 & 19-17-22000-0009, and 19-17-27000-0001.

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Cascade Field and Stream Club
Monty D. Miller, Club President
PO Box 424
Cle Elum, WA 98922
Phone No. 509-674-9278

Legal Description:
The property consists of approximately 182 Acres of land located in Kittitas County, Washington State, and more specifically described as follows:
All of that portion of Section 21, lying east of the County road and lying East of the Easterly boundary of the Kittitas Reclamation District Canal, Township 19 North, Range 17 East, W.M.

Kittitas County Tax Parcel No.19-17-21000-0001.

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Jeanice M. Vlasic
9500 NE 137th ST.
Kirkland, WA 98034
Phone No. 425-820-5740

Legal Description:
The Property consists of approximately 50 Acres of land located in Kittitas County, Washington State, and more specifically described as follows:
Located within the South one-half (S1/2) of the Northwest one-quarter (NW1/4), Section 13, Township 19 North, Range 17 East, W.M.

Kittitas County Tax Parcel No. 19-17-13000-0008.

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Karl Krogstad
PO Box 95260
Seattle, WA 98145
Phone No.206-323-6472

Legal Description:
The Property consists of approximately 54 Acres of land located in Kittitas County, Washington State, and more particularly described as follows:
Lot 1, Survey No. 505298, (located within the East one-half (E1/2)), Section 14, Township 19 North, Range 17 East, W.M.

Kittitas County Tax Parcel No. 19-17-14000-0001.

---

Los Abuelos, Inc.
Pete Bugni, President
361 Ceder Cove Road
Ellensburg, WA 98926
Phone No. 609-925-3902

Legal Description:
The Property consists of approximately 282 Acres of land located in Kittitas County, Washington State, and more particularly described as follows:
All that portion lying South and Southwesterly of the County Road located within Section 15, Township 19 North, Range 17 East, W.M., Kittitas County, State of Washington

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Merle Steinman
19822-28 Avenue West

---

Lynnwood, WA 98036
Phone No. 425-774-0790

Legal Description:
The Property consists of approximately 40 Acres of land located in Kittitas County, Washington State, and more particularly described as follows:
Lot 6, of that certain Survey as recorded June 22, 1987 in Book 15 of Surveys at pages 62 and 63 under Auditor's File No. 505298, records of Kittitas County, Township 19 North, Range 17 East, W.M., Kittitas County, State of Washington.

---

Andrea Steinman
19822-28 Avenue West
Lynnwood, WA 98036
Phone No. 425-774-0790

Legal Description:
The Property consists of approximately 40 Acres of land located in Kittitas County, Washington State, and more particularly described as follows:
Lot 7, of that certain Survey as recorded June 22, 1987 in Book 15 of Surveys at pages 62 and 63 under Auditor's File No. 505298, records of Kittitas County, Township 19 North, Range 17 East, W.M., Kittitas County, State of Washington.

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Copies of each of these agreements can be found in **Exhibit 4, 'Memoranda of Option Agreements'**, which includes the signature pages for private landowners who have executed wind energy option agreements with Applicant.

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**Washington State Department of Natural Resources (DNR)**
Milt Johnston, Regional Manager, E. WA
713 Bowers Road
Ellensburg, WA 98926
Phone No. 509-925-8510

The Property consists of approximately 2,080 Acres of land located in Kittitas County, Washington State, and more specifically described as follows:
The East one-half (E1/2), the West one-half of the Southwest one-quarter (W1/2SW1/4), the Southeast one-quarter of the Southwest one-quarter (SE1/4SW1/4), and the Southwest one quarter of the Northwest one-quarter (SW1/4NW1/4), Section 2; The West one-half of the East one-half (W1/2E1/2), and the West one-half (W1/2), Section 10; All of Section 16: The East one-half (E1/2), and the Southwest one-quarter of the Southwest one-quarter (SW1/4SW1/4), and the North one-half of the Northwest one-quarter (N1/2NW1/4), and the Southeast one-quarter of the Northwest one-quarter (SE1/4NW1/4), Section 22; All of the above is located within Township 19 North, Range 17 East, W.M. All of section 36, Township 20 North, Range 17 East, W.M.

Kittitas County Tax Parcel No's 19-17-02000-0001, 19-17-02000-0003 & 19-17-02000-0005; 19-17-10000-0006; 19-17-16000-0001; 19-17-22000-0001, 19-17-22000-0002, 19-17-22000-0005 & 19-17-22000-0007 & 20-17-36000-0001.

200212060008
Page: 1 of 3
12/06/2002 08:58A
Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 21.00

When recorded, please return to:
Zilkha Renewable Energy, LLC
NW Region Office:
210 SW Morrison, Suite 310
Portland, OR 97204
Phone (503) 222-9400

REVIEWED BY
KITTITAS COUNTY TREASURER
DEPUTY K. Bostick
DATE 12-06-02

# MEMORANDUM OF WIND OPTION AGREEMENT

**Grantor: Merle Steinman Jr., a Married Man**

**Grantee:** Zilkha Renewable Energy, LLC, a Delaware limited liability company, its successors and assigns (collectively "ZRE")

**Legal Description (abbreviated): Portion E1/2 Sec. 14, T. 19 N., R. 17 E., W.M.**

**Assessor's Tax Parcel ID Numbers:** 19-17-14000-0009

This is a memorandum of a Wind Option Agreement ("Option Agreement") dated May 29, 2002 ("Effective Date") between Merle Steinman Jr., their successors and assigns ("Owner"), as grantor, and Zilkha Renewable Energy, LLC, 1001 McKinney, Suite 1740, Houston, Texas 77002, Tel. 713-571-6640, its successors and assigns ("ZRE"), as grantee, pertaining to Owner's Property which is legally described on the attached copy of **Exhibit A** to the Option Agreement.

The term of the Option Agreement began on the Effective Date and will end four (4) years after the Effective Date. The Option is an exclusive option with respect to the Owner's Property for a Wind Farm Easement Agreement including turbine site, access, transmission facilities, overhang, construction, and wind non-obstruction easements.

200212060008
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Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 21.00

**Owner:**

Name: Merle Steinman, Jr.
Title: Owner

**ZRE:**

Name: ANDREW YOUNG
Title: DEVELOPMENT DIRECTOR

Dec. 02/02

**Owner:**

Name:
Title:

STATE OF Washington )
)
COUNTY OF Snohomish )

I certify that I know or have satisfactory evidence that Merle Steinman, Jr. is/are the person(s) who appeared before me, acknowledged that they signed this instrument, and acknowledged it to be their free and voluntary act for the uses and purposes mentioned in this instrument.

Dated: 11-13-02, 2002.

Notary Public
My Commission Expires:

JACK T. JARRELL
STATE OF WASHINGTON
NOTARY PUBLIC
MY COMMISSION EXPIRES 12-04-02

STATE OF OR )
)
COUNTY OF Multnomah )

I certify that I know or have satisfactory evidence that Andrew Young is the person who appeared before me and acknowledged that the person signed this instrument; the person is authorized to sign this instrument on behalf of Zilkha Renewable Energy, LLC; and, the execution of this instrument was the free and voluntary act of the person and of Zilkha Renewable Energy, LLC.

Dated: 12/02, 2002.

OFFICIAL SEAL
HILARY A. FOOTE
NOTARY PUBLIC-OREGON
COMMISSION NO. 356929
MY COMMISSION EXPIRES MARCH 20, 2006

Notary Public
My Commission Expires: 3/20/06

200212060008
Page: 3 of 3
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Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 21.00

EXHIBIT "A"

Lot 6, of that certain Survey as recorded June 22, 1987 in Book 15 of Surveys at pages 62 and 63 under Auditor's File No. 505298, records of Kittitas County, State of Washington, being a portion of the East one-half (E1/2) of Section 14, Township 19 North, Range 17 East, W.M., Kittitas County, State of Washington.

200212060006
Page: 1 of 3
12/06/2002 09:58A
Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 21.00

When recorded, please return to:
Zilkha Renewable Energy, LLC
NW Region Office:
210 SW Morrison, Suite 310
Portland, OR 97204
Phone (503) 222-9400

REVIEWED BY
KITTITAS COUNTY TREASURER
DEPUTY K. Bostick
DATE 12-06-02

# MEMORANDUM OF WIND OPTION AGREEMENT

**Grantor: Andrea A. Steinman, A Married Woman**

**Grantee:** Zilkha Renewable Energy, LLC, a Delaware limited liability company, its successors and assigns (collectively "ZRE")

**Legal Description (abbreviated): Portion E1/2 Sec. 14, T. 19 N., R. 17 E., W.M.**

**Assessor's Tax Parcel ID Numbers**: 19-17-14000-0010

This is a memorandum of a Wind Option Agreement ("Option Agreement") dated June 5, 2002 ("Effective Date") between Andrea A. Steinman, their successors and assigns ("Owner"), as grantor, and Zilkha Renewable Energy, LLC, 1001 McKinney, Suite 1740, Houston, Texas 77002, Tel. 713-571-6640, its successors and assigns ("ZRE"), as grantee, pertaining to Owner's Property which is legally described on the attached copy of **Exhibit A** to the Option Agreement.

The term of the Option Agreement began on the Effective Date and will end four (4) years after the Effective Date. The Option is an exclusive option with respect to the Owner's Property for a Wind Farm Easement Agreement including turbine site, access, transmission facilities, overhang, construction, and wind non-obstruction easements.

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Page: 2 of 3
12/06/2002 09:58A
Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 21.00

**Owner:**

Andrea A. Steinman

Name: Andrea A. Steinman
Title: Owner

**ZRE:**

Andrew Young DEC. 02/02

Name: ANDREW YOUNG
Title: DEVELOPMENT DIRECTOR

**Owner:**

Name:
Title:

STATE OF WA )
COUNTY OF Snohomish )

I certify that I know or have satisfactory evidence that Andrea A. Steinman is/are the person(s) who appeared before me, acknowledged that they signed this instrument, and acknowledged it to be their free and voluntary act for the uses and purposes mentioned in this instrument.

Dated: 11-13-02, 2002.

JACK T. JARRELL
STATE OF WASHINGTON
NOTARY PUBLIC
MY COMMISSION EXPIRES 12-04-02

Notary Public
My Commission Expires: 12-04-02

STATE OF OR )
COUNTY OF Multnomah )

OFFICIAL SEAL
HILARY A. FOOTE
NOTARY PUBLIC-OREGON
COMMISSION NO. 355939
MY COMMISSION EXPIRES MARCH 20, 2006

I certify that I know or have satisfactory evidence that Andrew Young is the person who appeared before me and acknowledged that the person signed this instrument; the person is authorized to sign this instrument on behalf of Zilkha Renewable Energy, LLC; and, the execution of this instrument was the free and voluntary act of the person and of Zilkha Renewable Energy, LLC.

Dated: 12/02, 2002.

Notary Public
My Commission Expires: 3/20/06

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12/06/2002 08:58A
Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 21.00

EXHIBIT "A"

Lot 7 of that certain survey as recorded June 22, 1987 in Book 15 of Surveys at pages 62 and 63 under Auditor's File No. 505298, records of Kittitas County, State of Washington, being a portion of the East one-half (E1/2) of Section 14, Township 19 North, Range 17 East, W.M., Kittitas County, State of Washington.

When recorded, please return to:
Zilkha Renewable Energy, LLC
NW Region Office:
210 SW Morrison, Suite 310
Portland, OR 97204
Phone (503) 222-9400

# MEMORANDUM OF WIND OPTION AGREEMENT

**Grantor: Los Abuelos, Inc.,**

**Grantee:** Zilkha Renewable Energy, LLC, a Delaware limited liability company, its successors and assigns (collectively "ZRE")

**Legal Description (abbreviated): That portion lying South and Southwesterly of the County Road located within Sec. 15, T. 19 N., R. 17 E., W.M.**

**Assessor's Tax Parcel ID Numbers**: 19-17-15000-0002

This is a memorandum of a Wind Option Agreement ("Option Agreement") dated June 19, 2002 ("Effective Date") between Los Abuelos, Inc., their successors and assigns ("Owner"), as grantor, and Zilkha Renewable Energy, LLC, 1001 McKinney, Suite 1740, Houston, Texas 77002, Tel. 713-571-6640, its successors and assigns ("ZRE"), as grantee, pertaining to Owner's Property which is legally described on the attached copy of **Exhibit A** to the Option Agreement.

The term of the Option Agreement began on the Effective Date and will end four (4) years after the Effective Date. The Option is an exclusive option with respect to the Owner's Property for a Wind Farm Easement Agreement including turbine site, access, transmission facilities, overhang, construction, and wind non-obstruction easements.

**Owner:**

Name: Pete Bugni
Title: President, Los Abuelos, Inc.

**ZRE:**

Dec. 02/02

Name: _____
Title: _____

**Owner:**

Name: _____
Title: _____

STATE OF Washington )
)
COUNTY OF Kittitas )

I certify that I know or have satisfactory evidence that Pete Bugni is/are the person(s) who appeared before me, acknowledged that they signed this instrument, and acknowledged it to be their free and voluntary act for the uses and purposes mentioned in this instrument.

Dated: November 22, 2002.

Jennifer L. Diaz
Notary Public
My Commission Expires: Oct. 1, 2006

STATE OF OR )
)
COUNTY OF Multnomah)

I certify that I know or have satisfactory evidence that Andrew Young is the person who appeared before me and acknowledged that the person signed this instrument; the person is authorized to sign this instrument on behalf of Zilkha Renewable Energy, LLC; and, the execution of this instrument was the free and voluntary act of the person and of Zilkha Renewable Energy, LLC.

Dated: _____, 2002.

_____
Notary Public
My Commission Expires: _____

200212060009
Page: 1 of 3
12/06/2002 08:58A
Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 21.00

When recorded, please return to:
Zilkha Renewable Energy, LLC
NW Region Office:
210 SW Morrison, Suite 310
Portland, OR 97204
Phone (503) 222-9400

REVIEWED BY
KITTITAS COUNTY TREASURER
DEPUTY K. Boster
DATE 12-06-02

# MEMORANDUM OF WIND OPTION AGREEMENT

**Grantor: Larry Tritt and Suzanne J. H. Tritt, Husband and Wife**

**Grantee:** Zilkha Renewable Energy, LLC, a Delaware limited liability company, its successors and assigns (collectively "ZRE")

**Legal Description (abbreviated): Tract 4, of Survey filed in Book 15 of Surveys, Page 26, No. 501915**

**Assessor's Tax Parcel ID Numbers:** 19-17-11000-0004

This is a memorandum of a Wind Option Agreement ("Option Agreement") dated September 22, 2001 ("Effective Date") between Larry Tritt and Suzanne J. H. Tritt, Husband and Wife, their successors and assigns ("Owner"), as grantor, and Zilkha Renewable Energy, LLC, 1001 McKinney, Suite 1740, Houston, Texas 77002, Tel. 713-571-6640, its successors and assigns ("ZRE"), as grantee, pertaining to Owner's Property which is legally described on the attached copy of **Exhibit A** to the Option Agreement.

The term of the Option Agreement began on the Effective Date and will end four (4) years after the Effective Date. The Option is an exclusive option with respect to the Owner's Property for a Wind Farm Easement Agreement including turbine site, access, transmission facilities, overhang, construction, and wind non-obstruction easements.

**Owner:**

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Page: 2 of 3
12/06/2002 09:58A
Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 21.00

Larry Tritt 11/12/02
Name: Larry Tritt
Title: Owner

**Owner:**

Suzanne J. H. Tritt 11/12/02
Name: Suzanne J.H. Tritt
Title: Owner

**ZRE:**

Andrew Young DEC 02/02
Name: ANDREW YOUNG
Title: DEVELOPMENT DIRECTOR

STATE OF Washington )
)
COUNTY OF Kittitas )

JAMES A. RAY
COMMISSION EXPIRES
NOTARY PUBLIC
SEPTEMBER 23, 2006
STATE OF WASHINGTON

I certify that I know or have satisfactory evidence that Larry Tritt and Suzanne J. H. Tritt is/are the person(s) who appeared before me, acknowledged that they signed this instrument, and acknowledged it to be their free and voluntary act for the uses and purposes mentioned in this instrument.

Dated: Nov. 12, 2002.

Notary Public
My Commission Expires: 9/23/06

STATE OF OR )
)
COUNTY OF Multnomah )

OFFICIAL SEAL
HILARY A. FOOTE
NOTARY PUBLIC-OREGON
COMMISSION NO. 355939
MY COMMISSION EXPIRES MARCH 20, 2006

I certify that I know or have satisfactory evidence that Andrew Young is the person who appeared before me and acknowledged that the person signed this instrument; the person is authorized to sign this instrument on behalf of Zilkha Renewable Energy, LLC; and, the execution of this instrument was the free and voluntary act of the person and of Zilkha Renewable Energy, LLC.

Dated: 12/02/2002, 2002.

Notary Public
My Commission Expires: 3/20/06

200212060009
Page: 3 of 3
12/06/2002 09:58A
Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 21.00

EXHIBIT "A"

The Northwest Quarter;
EXCEPT the North 2532.00 Feet thereof, said 2532.00 Feet being measured perpendicular from the North boundary of said Northwest Quarter.
AND
The Southwest Quarter;
EXCEPT the South 1,786.00 Feet thereof, said 1,784.00 Feet being measured perpendicular from the South boundary of said Southwest Quarter; all being in Section 11, Township 19 North, Range 17 East, W.M., Kittitas County, State of Washington.

(Also known as Tract 4, of Survey filed in Book 15 of Surveys, Page26, No. 501915)

200212080007
Page: 1 of 3
12/08/2002 09:58A
Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 21.00

When recorded, please return to:
Zilkha Renewable Energy, LLC
NW Region Office:
210 SW Morrison, Suite 310
Portland, OR 97204
Phone (503) 222-9400

REVIEWED BY
KITTITAS COUNTY TREASURER
DEPUTY K. Bostick
DATE 12-06-02

# MEMORANDUM OF WIND OPTION AGREEMENT

**Grantor: James L. Majors and Cindy T. Majors, husband and wife**

**Grantee:** Zilkha Renewable Energy, LLC, a Delaware limited liability company, its successors and assigns (collectively "ZRE")

**Legal Description (abbreviated): Portion E1/2, Sec. 14, T. 19 N., R. 17 E., W.M.**

**Assessor's Tax Parcel ID Numbers:** 19-17-14000-0006

This is a memorandum of a Wind Option Agreement ("Option Agreement") dated November 9, 2001 ("Effective Date") between James L. Majors and Cindy T. Majors, husband and wife, their successors and assigns ("Owner"), as grantor, and Zilkha Renewable Energy, LLC, 1001 McKinney, Suite 1740, Houston, Texas 77002, Tel. 713-571-6640, its successors and assigns ("ZRE"), as grantee, pertaining to Owner's Property which is legally described on the attached copy of **Exhibit A** to the Option Agreement.

The term of the Option Agreement began on the Effective Date and will end four (4) years after the Effective Date. The Option is an exclusive option with respect to the Owner's Property for a Wind Farm Easement Agreement including turbine site, access, transmission facilities, overhang, construction, and wind non-obstruction easements.

200212060007
Page: 2 of 3
12/06/2002 09:56A
Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 21.00

**Owner:**

Name: James L. Majors
Title: Owner

**ZRE:**

DEC. 02/02

Name: Andrew Young
Title: NW Development Director

**Owner:**

Name: Cindy T. Majors
Title: Owner

JAMES A. RAY
COMMISSION EXPIRES
NOTARY PUBLIC
SEPTEMBER 23, 2006
STATE OF WASHINGTON

STATE OF Washington )
)
COUNTY OF KITTITAS )

I certify that I know or have satisfactory evidence that James L. Majors and Cindy T. Majors is/are the person(s) who appeared before me, acknowledged that they signed this instrument, and acknowledged it to be their free and voluntary act for the uses and purposes mentioned in this instrument.

Dated: 11/6/, 2002.

Notary Public
My Commission Expires: 9/23/06

STATE OF Oregon )
)
COUNTY OF Multnomah)

OFFICIAL SEAL
HILARY A. FOOTE
NOTARY PUBLIC-OREGON
COMMISSION NO. 355939
MY COMMISSION EXPIRES MARCH 20, 2006

I certify that I know or have satisfactory evidence that Andrew Young is the person who appeared before me and acknowledged that the person signed this instrument; the person is authorized to sign this instrument on behalf of Zilkha Renewable Energy, LLC; and, the execution of this instrument was the free and voluntary act of the person and of Zilkha Renewable Energy, LLC.

Dated: 12/02/2002, 2002.

Notary Public
My Commission Expires: 3/20/06

200212060007
Page: 3 of 3
12/06/2002 09:50A
Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 21.00

EXHIBIT "A"

Lot 3, of that certain Survey recorded June 22, 1987, in Book 15 of Surveys, at pages 62 and 63, under Auditor's File No. 505298, records of Kittitas County, Washington, being a portion of the East one-half (E1/2)), Section 14, Township 19 North, Range 17 East, W.M., Kittitas County, State of Washington.

200212060005
Page: 1 of 3
12/06/2002 09:58A
Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 21.00

When recorded, please return to:
Zilkha Renewable Energy, LLC
NW Region Office:
210 SW Morrison, Suite 310
Portland, OR 97204
Phone (503) 222-9400

REVIEWED BY
KITTITAS COUNTY TREASURER
DEPUTY K. Bostick
DATE 12-06-02

# MEMORANDUM OF WIND OPTION AGREEMENT

**Grantor: Cascade Field and Stream Club**

**Grantee:** Zilkha Renewable Energy, LLC, a Delaware limited liability company, its successors and assigns (collectively "ZRE")

**Legal Description (abbreviated): SE1/4SE1/4, NW1/4SE1/4, NE1/4SE1/4 Lying East of the County Road & lying East of the Easterly boundary of the Kittitas Reclamation District Canal, & NE1/4 lying East of the county road, Sec. 21, T. 19 N., R.17 E., W.M.**

**Assessor's Tax Parcel ID Numbers:** 19-17-21000-0001

This is a memorandum of a Wind Option Agreement ("Option Agreement") dated April 17, 2002 ("Effective Date") between Cascade Field and Stream Club, their successors and assigns ("Owner"), as grantor, and Zilkha Renewable Energy, LLC, 1001 McKinney, Suite 1740, Houston, Texas 77002, Tel. 713-571-6640, its successors and assigns ("ZRE"), as grantee, pertaining to Owner's Property which is legally described on the attached copy of **Exhibit A** to the Option Agreement.

The term of the Option Agreement began on the Effective Date and will end four (4) years after the Effective Date. The Option is an exclusive option with respect to the Owner's Property for a Wind Farm Easement Agreement including turbine site, access, transmission facilities, overhang, construction, and wind non-obstruction easements.

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Page: 2 of 3
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Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 21.00

**Owner:**

Name: Monty D. Miller
Title: President

**ZRE:**

Name: ANDREW YOUNG
Title: DEVELOPMENT DIRECTOR

DEC. 02/02

**Owner:**

Name:
Title:

JAMES A. RAY
COMMISSION EXPIRES
NOTARY PUBLIC
SEPTEMBER 23, 2006
STATE OF WASHINGTON

STATE OF Washinton )
)
COUNTY OF KITTITAS )

I certify that I know or have satisfactory evidence that Monty D. Miller is/are the person(s) who appeared before me, acknowledged that they signed this instrument, and acknowledged it to be their free and voluntary act for the uses and purposes mentioned in this instrument.

Dated: 11/18/02, 2002.

Notary Public
My Commission Expires: 9/23/06

STATE OF OR )
)
COUNTY OF Multnomah )

I certify that I know or have satisfactory evidence that Andrew Young is the person who appeared before me and acknowledged that the person signed this instrument; the person is authorized to sign this instrument on behalf of Zilkha Renewable Energy, LLC; and, the execution of this instrument was the free and voluntary act of the person and of Zilkha Renewable Energy, LLC.

Dated: 12/02, 2002.

OFFICIAL SEAL
HILARY A. FOOTE
NOTARY PUBLIC-OREGON
COMMISSION NO. 355939
MY COMMISSION EXPIRES MARCH 20, 2006

Notary Public
My Commission Expires: 3/20/06

200212060005
Page: 3 of 3
12/06/2002 08:58A
Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 21.00

EXHIBIT "A"

Parcel A:

All of that portion of the Southeast one-quarter (SE1/4) of the Southeast one-quarter (SE1/4), and of the Northwest one-quarter (NW1/4) of the Southeast one-quarter (SE1/4) and of the Northeast one-quarter (NE1/4) of the Southeast one-quarter (SE1/4) lying East of the County road and lying East of the Easterly boundary of the Kittitas Reclamation District Canal, in Section 21, Township 19 North, Range 17 East, W.M., Kittitas County, State of Washington.

Parcel B:

All of the Northeast one-quarter (NE1/4) of Section 21 lying East of the County Road.
Township 19 North, Range 17 East, W.M., Kittitas County, State of Washington.

200212060004
Page: 1 of 3
12/06/2002 09:58A
Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 21.00

When recorded, please return to:
Zilkha Renewable Energy, LLC
NW Region Office:
210 SW Morrison, Suite 310
Portland, OR 97204
Phone (503) 222-9400

REVIEWED BY
KITTITAS COUNTY TREASURER
DEPUTY K. Bostad
DATE 12-06-02

# MEMORANDUM OF WIND OPTION AGREEMENT

**Grantor: Karl Krogstad, an unmarried person,**

**Grantee:** Zilkha Renewable Energy, LLC, a Delaware limited liability company, its successors and assigns (collectively "ZRE")

**Legal Description (abbreviated): Portion E1/2 Sec. 14, T. 19 N., R. 17 E., W.M.**

**Assessor's Tax Parcel ID Numbers:** 19-17-14000-0001

This is a memorandum of a Wind Option Agreement ("Option Agreement") dated June 7, 2002 ("Effective Date") between Karl Krogstad, his successors and assigns ("Owner"), as grantor, and Zilkha Renewable Energy, LLC, 1001 McKinney, Suite 1740, Houston, Texas 77002, Tel. 713-571-6640, its successors and assigns ("ZRE"), as grantee, pertaining to Owner's Property which is legally described on the attached copy of **Exhibit A** to the Option Agreement.

The term of the Option Agreement began on the Effective Date and will end four (4) years after the Effective Date. The Option is an exclusive option with respect to the Owner's Property for a Wind Farm Easement Agreement including turbine site, access, transmission facilities, overhang, construction, and wind non-obstruction easements.

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Page: 2 of 3
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Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 21.00

**Owner:**

Name: Karl Krogstad
Title: Owner

**ZRE:**

12/02/02

Name: Andrew Young
Title: NW Development

**Owner:**

Name:
Title:

JAMES A. RAY
COMMISSION EXPIRES
NOTARY PUBLIC
SEPTEMBER 23, 2006
STATE OF WASHINGTON

STATE OF Washington )
)
COUNTY OF King )

I certify that I know or have satisfactory evidence that Karl Krogstad is/are the person(s) who appeared before me, acknowledged that they signed this instrument, and acknowledged it to be their free and voluntary act for the uses and purposes mentioned in this instrument.

Dated: November 5, 2002.

Notary Public
My Commission Expires: 9/23/2006

STATE OF oregon )
)
COUNTY OF Multnomah )

I certify that I know or have satisfactory evidence that Andrew Young is the person who appeared before me and acknowledged that the person signed this instrument; the person is authorized to sign this instrument on behalf of Zilkha Renewable Energy, LLC; and, the execution of this instrument was the free and voluntary act of the person and of Zilkha Renewable Energy, LLC.

Dated: Dec. 02, 2002

Notary Public
My Commission Expires: 3/20/06

OFFICIAL SEAL
HILARY A. FOOTE
NOTARY PUBLIC-OREGON
COMMISSION NO. 355889
MY COMMISSION EXPIRES MARCH 20, 2006

200212060004
Page: 3 of 3
12/06/2002 09:58A
Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 21.00

EXHIBIT "A"

Lot 1, of that certain Survey as recorded June 22, 1987 in volume 15 of surveys at pages 62 and 63 under Auditor's File No. 505298, records of Kittitas County, State of Washington, being a portion of the East one-half (E1/2), Section 14, Township 19 North, Range 17 East, W.M., Kittitas County, State of Washington.

200212060003
Page: 1 of 3
12/06/2002 09:58A
Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 21.00

When recorded, please return to:
Zilkha Renewable Energy, LLC
NW Region Office:
210 SW Morrison, Suite 310
Portland, OR 97204
Phone (503) 222-9400

REVIEWED BY
KITTITAS COUNTY TREASURER
DEPUTY K. Boston
DATE 12-06-02

# MEMORANDUM OF WIND OPTION AGREEMENT

**Grantor; Noel R. Andrew, single person**

**Grantee:** Zilkha Renewable Energy, LLC, a Delaware limited liability company, its successors and assigns (collectively "ZRE")

**Legal Description (abbreviated): N840'NW1/4; S845'N1,685'NW1/4 & S847'N2,532'NW1/4, Sec. 11, T. 19 N., R. 17 E., W.M.**

**Assessor's Tax Parcel ID Numbers**: 19-17-11000-0002, 19-17-11000-0003 & 19-17-11000-0011

This is a memorandum of a Wind Option Agreement ("Option Agreement") dated October 3, 2001 ("Effective Date") between Noel R. Andrew their successors and assigns ("Owner"), as grantor, and Zilkha Renewable Energy, LLC, 1001 McKinney, Suite 1740, Houston, Texas 77002, Tel. 713-571-6640, its successors and assigns ("ZRE"), as grantee, pertaining to Owner's Property which is legally described on the attached copy of **Exhibit A** to the Option Agreement.

The term of the Option Agreement began on the Effective Date and will end four (4) years after the Effective Date. The Option is an exclusive option with respect to the Owner's Property for a Wind Farm Easement Agreement including turbine site, access, transmission facilities, overhang, construction, and wind non-obstruction easements.

200212060003
Page: 2 of 3
12/06/2002 08:58A
Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 21.00

**Owner:**

Name: Noel R. Andrew
Title: Owner

**ZRE:**

Name: Andrew Young
Title: NW Development Director

**Owner:**

Name:
Title:

STATE OF Washington )
)
COUNTY OF KITTITAS )

I certify that I know or have satisfactory evidence that Noel R. Andrew is/are the person(s) who appeared before me, acknowledged that they signed this instrument, and acknowledged it to be their free and voluntary act for the uses and purposes mentioned in this instrument.

Dated: 11/4/, 2002.

Notary Public
My Commission Expires: 9/27/06

STATE OF Oregon )
)
COUNTY OF Multnomah )

I certify that I know or have satisfactory evidence that Andrew Young is the person who appeared before me and acknowledged that the person signed this instrument; the person is authorized to sign this instrument on behalf of Zilkha Renewable Energy, LLC; and, the execution of this instrument was the free and voluntary act of the person and of Zilkha Renewable Energy, LLC.

Dated: Dec. 02, 2002.

OFFICIAL SEAL
HILARY A. FOOTE
NOTARY PUBLIC-OREGON
COMMISSION NO. 355939
MY COMMISSION EXPIRES MARCH 20, 2006

Notary Public
My Commission Expires: 3/20/06

200212060003
Page: 3 of 3
12/06/2002 09:58A
Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 21.00

EXHIBIT "A"

Parcel A:

The North 840.00 Feet of the Northwest Quarter of Section 11, Township 19 North, Range 17 East, W.M., Kittitas County, State of Washington, said 840 Feet being measured perpendicular to the North Boundary of said Northwest Quarter. (Also known as Tract 1 of Survey Filed in Book 15 of Surveys, Page 26, No. 501915)

Parcel B:

The South 845 Feet of the North 1,685.00 Feet of the Northwest Quarter of Section 11, Township 19 North, Range 17 East, W.M., Kittitas County, State of Washington, said 1,685.00 Feet being measured perpendicular to the North Boundary of said Northwest Quarter. (Also known as Tract 2 of Survey Filed in Book 15 of Surveys, Page 26, No. 501915)

Parcel C:

The South 847.00 Feet of the North 2,532.00 Feet of the Northwest Quarter of Section 11, Township 19 North, Range 17 East, W.M., Kittitas County, State of Washington, said 2,532.00 Feet being measured perpendicular to the North Boundary of said Northwest Quarter. (Also known as Tract 3 of Survey Filed in Book 15 of Surveys, Page 26, No. 501915)

200212060002
Page: 1 of 3
12/06/2002 09:58A
Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 21.00

When recorded, please return to:
Zilkha Renewable Energy, LLC
NW Region Office:
210 SW Morrison, Suite 310
Portland, OR 97204
Phone (503) 222-9400

REVIEWED BY
KITTITAS COUNTY TREASURER
DEPUTY K. Bosek
DATE 12-06-02

# MEMORANDUM OF WIND OPTION AGREEMENT

**Grantor: Daniel A. Green and Marcia M. Green, Husband and wife,**

**Grantee:** Zilkha Renewable Energy, LLC, a Delaware limited liability company, its successors and assigns (collectively "ZRE")

**Legal Description (abbreviated): SW1/4 Sec. 1; E1/2 Sec. 11 & W1/2 Sec. 12, T. 19 N., R.17 E., W.M.**

**Assessor's Tax Parcel ID Numbers:** 19-17-01000-0002, 19-17-01000-0009, 19-17-01000-0010 & 19-17-01000-0011; 19-17-11000-0001, 19-17-11000-0006, 19-17-11000-0007,19-17-11000-0008, 19-17-11000-0009 & 19-17-11000-0010; 19-17-12000-0002, 19-17-12000-0006, 19-17-12000-0007, 19-17-12000-0008, 19-17-12000-0009 & 19-17-12000-0010.

This is a memorandum of a Wind Option Agreement ("Option Agreement") dated October 4, 2001 ("Effective Date") between Daniel A. Green and Marcia M. Green Husband and Wife, their successors and assigns ("Owner"), as grantor, and Zilkha Renewable Energy, LLC, 1001 McKinney, Suite 1740, Houston, Texas 77002, Tel. 713-571-6640, its successors and assigns ("ZRE"), as grantee, pertaining to Owner's Property which is legally described on the attached copy of **Exhibit A** to the Option Agreement.

The term of the Option Agreement began on the Effective Date and will end four (4) years after the Effective Date. The Option is an exclusive option with respect to the Owner's Property for a Wind Farm Easement Agreement including turbine site, access, transmission facilities, overhang, construction, and wind non-obstruction easements.

200212060002
Page: 2 of 3
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Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 21.00

**Owner:**

Name: Daniel A. Green
Title: Owner

**ZRE:**

Dec. 02/02

Name: Andrew Young
Title: NW Development Director

**Owner:**

Name: Marcia M. Green
Title: Owner

JAMES A. RAY
COMMISSION EXPIRES
NOTARY PUBLIC
SEPTEMBER 23, 2006
STATE OF WASHINGTON

STATE OF Washington )
)
COUNTY OF Kittitas )

I certify that I know or have satisfactory evidence that Daniel A. Green and Marcia M. Green is/are the person(s) who appeared before me, acknowledged that they signed this instrument, and acknowledged it to be their free and voluntary act for the uses and purposes mentioned in this instrument.

Dated: November 5, 2002.

Notary Public
My Commission Expires: 9/23/2006

STATE OF Oregon )
)
COUNTY OF Multnomah )

I certify that I know or have satisfactory evidence that Andrew Young is the person who appeared before me and acknowledged that the person signed this instrument; the person is authorized to sign this instrument on behalf of Zilkha Renewable Energy, LLC; and, the execution of this instrument was the free and voluntary act of the person and of Zilkha Renewable Energy, LLC.

Dated: Dec. 02, 2002.

OFFICIAL SEAL
HILARY A. FOOTE
NOTARY PUBLIC-OREGON
COMMISSION NO. 355939
MY COMMISSION EXPIRES MARCH 20, 2006

Notary Public
My Commission Expires: 3/20/06

200212060002
Page: 3 of 3
12/06/2002 09:58A
Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 21.00

EXIBIT "A"

The land is located in Kittitas County, Washington State, and more specifically described as follows:

All of that portion of the Southwest one-quarter (SW1/4), Section 1; The East one-half (E1/2), Section 11, The West one-half (W1/2), Section 12, Township 19 North, Range 17 East, W. M.

200212190010
Page: 1 of 4
12/19/2002 12:29P
Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 22.00

When recorded, please return to:
Zilkha Renewable Energy, LLC
NW Region Office:
210 SW Morrison, Suite 310
Portland, OR 97204
Phone (503) 222-9400

REVIEWED BY
KITTITAS COUNTY TREASURER
DEPUTY K. Hill
DATE 12-19-02

# MEMORANDUM OF OPTION AGREEMENT

**Grantor:** Keith Schober and Geraldine Schober, Husband and Wife (Schober),

**Grantee:** Zilkha Renewable Energy, LLC, a Delaware limited liability company, its successors and assigns (collectively "ZRE")

**Legal Description (abbreviated):** SW1/4 NW1/4, NW1/4 SW1/4 & E1/2 SW1/4, Sec. 22, Sec. 27, and NE1/4 NE1/4, Sec. 34, T. 19 N., R. 17 E., W.M.

**Assessor's Tax Parcel ID Numbers:** 19-17-22000-0003, 19-17-22000-0008, 19-17-22000-0009 19-17-27000-0001, and 19-17-34000-0001

This is a memorandum of a Purchase Option Agreement ("Option Agreement") dated November 5, 2002 ("Effective Date") between Keith Schober, and Geraldine Schober, husband and wife, their successors and assigns ("Owner"), as grantor, and Zilkha Renewable Energy, LLC, 1001 McKinney, Suite 1740, Houston, Texas 77002, Tel. 713-571-6640, its successors and assigns ("ZRE"), as grantee, pertaining to the purchase of Owner's Property which is legally described **Exhibit A**, together with certain rights to real property described in **Exhibit B**, both exhibits of which are attached hereto and incorporated by reference herein as if fully set out.

The initial term of the Option Agreement began on the Effective Date and will be for twelve (12) months after the Effective Date, with the right to ZRE to extend the initial option period for two additional twelve month option periods. The Option is an exclusive option with respect to the the purchase of Owner's Property described in **Exhibit A** and for a Non-Disturbance and Forbearance Agreement creating easements and servitudes on the real property described in **Exhibit B.**

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Page: 2 of 4
12/19/2002 12:29P
Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 22.00

**Owner:**

Keith Schober

Keith Schober

Geraldine Schober

Geraldine Schober

**ZRE:**

Name: ANDREW YOUNG

Title: DEVELOPMENT DIRECTOR

STATE OF WASHINGTON, Kittitas COUNTY: ss

I certify that I know or have satisfactory evidence that Keith Schober and Geraldine Schober are the person(s) who appeared before me, acknowledged that they signed this instrument, and acknowledged it to be their free and voluntary act for the uses and purposes mentioned in this instrument.

DARREL ELLIS COMMISSION EXPIRES NOTARY PUBLIC 11-1-04 STATE OF WASHINGTON

Dated: 11/20, 2002.

Notary Public

My Commission Expires: 11/1/04

STATE OF Oregon, Multnomah COUNTY: :ss

I certify that I know or have satisfactory evidence that Andrew Young, is the person who appeared before me and acknowledged that the person signed this instrument; the person is authorized to sign this instrument on behalf of Zilkha Renewable Energy, LLC; and, the execution of this instrument was the free and voluntary act of the person and of Zilkha Renewable Energy, LLC.

Dated: 12/02/02, 2002.

OFFICIAL SEAL
HILARY A. FOOTE
NOTARY PUBLIC-OREGON
COMMISSION NO. 355939
MY COMMISSION EXPIRES MARCH 20, 2006

Notary Public

My Commission Expires: March 02, 2006

200212190010
Page: 3 of 4
12/19/2002 12:29P
Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 22.00

Exhibit "A"

The property consists of approximately 675 Acres of land located in Kittitas County, Washington State, and more specifically described as follows:

Parcel 1: The Southwest one-quarter (SW1/4) of the Northwest one-quarter (NW1/4); the Northwest one-quarter (NW1/4) of the Southwest one-quarter (SW1/4); and the East one-half (E1/2) of the Southwest one-quarter (SW1/4), Section 22, Township 19 North, Range 17 East, W. M.

Parcel 2: All of that portion of Section 27, Township 19 North, Range 17 East, W.M., lying Northerly and Easterly of the Kittitas Reclamation District's Canal Road; the Northeast one-quarter (NE1/4) of the Southeast one-quarter (SE1/4) of the Southeast one-quarter (SE1/4); and that portion lying Southerly and Easterly of the Kittitas Reclamation District's Canal Road located within the East one-half (E1/2) of the Northeast one-quarter (NE1/4) of the Southeast one-quarter (SE1/4).

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Page: 4 of 4
12/19/2002 12:29P
Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 22.00

Exhibit "B"

The following described Real Property located in Kittitas County, Washington State, and more specifically described as follows:

Parcel 1.
All of that portion of Section 27, Township 19 North, Range 17 East, W.M., lying Southerly of the Kittitas Reclamation District's Canal Road.

Excepting there from the following:

The Northeast one-quarter (NE1/4) of the Southeast one-quarter (SE1/4) of the Southeast one-quarter (SE1/4); and the East one-half (E1/2) of the Northeast one-quarter(NE1/4) of the Southeast one-quarter (SE1/4), of said Section 27.

Parcel 2.
All of that portion of the Northeast one-quarter (NE1/4) of the Northeast one-quarter (NE1/4), Section 34, Township 19 North, Range 17 East, W.M.

200212190013
Page: 1 of 3
12/19/2002 12:29P
Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 21.00

When recorded, please return to:
Zilkha Renewable Energy, LLC
NW Region Office:
210 SW Morrison, Suite 310
Portland, OR 97204
Phone (503) 222-9400

REVIEWED BY
KITTITAS COUNTY TREASURER
DEPUTY K. Hiel
DATE 12-19-02

# MEMORANDUM OF WIND OPTION AGREEMENT

**Grantor: Michael K. Genson and Louise M. Genson, husband and wife**

**Grantee:** Zilkha Renewable Energy, LLC, a Delaware limited liability company, its successors and assigns (collectively "ZRE")

**Legal Description (abbreviated): N944'S1,784' & S840'SW1/4, Sec. 11 & W1/2, Sec. 14 &W1/2, Sec. 23, T. 19 N., R 17 E., W.M.**

**Assessor's Tax Parcel ID Numbers:** 19-17-11000-0005, 19-17-14000-0002, 19-17-14000-0003, 19-17-14000-0004 & 19-17-23000-0014

This is a memorandum of a Wind Option Agreement ("Option Agreement") dated April 19, 2002 ("Effective Date") between Michael K. and Louise M. Genson, their successors and assigns ("Owner"), as grantor, and Zilkha Renewable Energy, LLC, 1001 McKinney, Suite 1740, Houston, Texas 77002, Tel. 713-571-6640, its successors and assigns ("ZRE"), as grantee, pertaining to Owner's Property which is legally described on the attached copy of **Exhibit A** to the Option Agreement.

The term of the Option Agreement began on the Effective Date and will end four (4) years after the Effective Date. The Option is an exclusive option with respect to the Owner's Property for a Wind Farm Easement Agreement including turbine site, access, transmission facilities, overhang, construction, and wind non-obstruction easements.

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Page: 2 of 3
12/19/2002 12:29P
Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 21.00

**Owner:**

Michael K. Genson

Name: Michael K. Genson
Title: Owner

**ZRE:**

Andrew Young Dec. 02

Name: Andrew Young
Title: NW Development Director

**Owner:**

Louise M. Genson

Name: Louise M. Genson
Title: Owner

JAMES A. RAY
COMMISSION EXPIRES
NOTARY PUBLIC
SEPTEMBER 23, 2006
STATE OF WASHINGTON

STATE OF Washington )
)
COUNTY OF KITTITAS )

I certify that I know or have satisfactory evidence that Michael K. Genson and Louise M. Genson is/are the person(s) who appeared before me, acknowledged that they signed this instrument, and acknowledged it to be their free and voluntary act for the uses and purposes mentioned in this instrument.

Dated: 11/6/, 2002.

Notary Public
My Commission Expires: 6/23/06

STATE OF Oregon )
)
COUNTY OF Multnomah)

I certify that I know or have satisfactory evidence that Andrew Young is the person who appeared before me and acknowledged that the person signed this instrument; the person is authorized to sign this instrument on behalf of Zilkha Renewable Energy, LLC; and, the execution of this instrument was the free and voluntary act of the person and of Zilkha Renewable Energy, LLC.

Dated: Dec. 02, 2002.

Notary Public
My Commission Expires: 3/20/06

OFFICIAL SEAL
HILARY A. FOOTE
NOTARY PUBLIC-OREGON
COMMISSION NO. 355939
MY COMMISSION EXPIRES MARCH 20, 2006

200212190013
Page: 3 of 3
12/19/2002 12:29P
Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 21.00

EXHIBIT "A"

Parcel A:

The North 944 Feet of the South 1,784.00 Feet of the Southwest Quarter of Section 11, Township 19 North, Range 17 East, W.M., In the County of Kittitas, State of Washington; Said 1,784.00 Feet being measured perpendicular to the South Boundary of Said premises of said Southwest Quarter. (Also known as Tract 5 of Survey Filed in Book 15 of Surveys, Page 26 No. 501915)

Parcel B:

The South 840 Feet of the Southwest Quarter of Section 11, Township 19 North, Range 17 East, W.M., In the County of Kittitas, State of Washington; Said 840 Feet being measured perpendicular from the South Boundary of said Southwest Quarter. (Also known as Tract 6 of Survey Filed in Book 15 of Surveys, Page 26 No. 501915)

Parcel C:

The West one-half (W1/2) of Section 14, Township 19 North, Range 17 East, W.M., Lying North of State Highway 131 (also known as Highway 97), in the County of Kittitas, State of Washington.

Parcel D:

That portion of the West one-half (W1/2), Section 23, Township 19 North, Range 17 East, WW.M. lying North of the Bonneville Power Administration (BPA) power line road as it now exists.

Kittitas Co Auditor ZILKHA RENEWABLE ENE 200212190012
Page: 1 of 3
12/19/2002 12:29P
MEMO 21.00

When recorded, please return to:
Zilkha Renewable Energy, LLC
NW Region Office:
210 SW Morrison, Suite 310
Portland, OR 97204
Phone (503) 222-9400

REVIEWED BY
KITTITAS COUNTY TREASURER
DEPUTY K. Hied
DATE 12-19-02

# MEMORANDUM OF WIND OPTION AGREEMENT

**Grantor: Carla L. Thomas**

**Grantee:** Zilkha Renewable Energy, LLC, a Delaware limited liability company, its successors and assigns (collectively "ZRE")

**Legal Description (abbreviated): SW1/4, Sec. 3, S1/2NE1/4 & SE1/4, Sec. 9 & that portion of Sec. 15 lying North and East of the right of way of the County Road, T. 19 N., R. 17 E., W.M.**

**Assessor's Tax Parcel ID Numbers**: 19-17-03000-0001, 19-17-09000-0003 & 19-17-15000-0001

This is a memorandum of a Wind Option Agreement ("Option Agreement") dated December 11, 2001 ("Effective Date") between Carla L. Thomas, their successors and assigns ("Owner"), as grantor, and Zilkha Renewable Energy, LLC, 1001 McKinney, Suite 1740, Houston, Texas 77002, Tel. 713-571-6640, its successors and assigns ("ZRE"), as grantee, pertaining to Owner's Property which is legally described on the attached copy of **Exhibit A** to the Option Agreement.

The term of the Option Agreement began on the Effective Date and will end four (4) years after the Effective Date. The Option is an exclusive option with respect to the Owner's Property for a Wind Farm Easement Agreement including turbine site, access, transmission facilities, overhang, construction, and wind non-obstruction easements.

200212190012
Page: 2 of 3
12/19/2002 12:29P
Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 21.00

**Owner:** Carla L. Thomas

Name: Carla L. Thomas
Title: Owner

**ZRE:** Andrew Young 12/16/02

Name: Andrew Young
Title: NW Development Director

**Owner:**

Name: _____
Title: _____

STATE OF Washington )
)
COUNTY OF Kittitas )

I certify that I know or have satisfactory evidence that Carla L. Thomas is/are the person(s) who appeared before me, acknowledged that they signed this instrument, and acknowledged it to be their free and voluntary act for the uses and purposes mentioned in this instrument.

Dated: December 5, 2002.

Jennifer L. Diaz
Notary Public
My Commission Expires: October 1, 2006

STATE OF Oregon )
)
COUNTY OF Multnomah

I certify that I know or have satisfactory evidence that Andrew Young is the person who appeared before me and acknowledged that the person signed this instrument; the person is authorized to sign this instrument on behalf of Zilkha Renewable Energy, LLC; and, the execution of this instrument was the free and voluntary act of the person and of Zilkha Renewable Energy, LLC.

Dated: December 16, 2002.

Notary Public
My Commission Expires: March 2, 2006

OFFICIAL SEAL
HILARY A. FOOTE
NOTARY PUBLIC-OREGON
COMMISSION NO. [illegible]
MY COMMISSION EXPIRES [illegible] 20, 2006

200212190012
Page: 3 of 3
12/19/2002 12:29P
Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 21.00

EXHIBIT "A"

Tract 1:

That portion of the Southwest one-Quarter (SW1/4), of Section 3 which lies West of the right of way of SR 131 as acquired by the State of Washington in Decree of Appropriation entered July 7, 1970 in Kittitas County Superior Court Cause No. 17205.

Tract 2:

That portion of the South one-half (S1/2) of the Northeast one-quarter NE1/4) and of the Southeast one-quarter (SE1/4) of Section 9, which lies East of the East boundary line of the right of way of the County Road (formerly SSH 2-I) as it existed December 1, 1966; EXCEPT that portion of the Northwest one-quarter (NW1/4) of the Southeast one-quarter (SE1/4) of Section 9 which is described as follows: Beginning at the Southeast corner of said Section 9; thence North 50°35'52" West 2368.16 feet to a point on the center line survey of Secondary State Highway No. 2-I, and in the Northwest one-quarter (NW1/4) of the Southeast one-quarter (SE1/4) of said Section and the point of beginning; thence North 47°00' East 254.15 feet; thence North 43°00' West 418.36; thence North 13°34' West 200.25 feet; thence South 73°26' West 345.91 feet; thence South 27°50' East 335.17 feet; thence South 49°03' East 425.62 feet to the point of beginning;

Tract 3:

That portion of Section 15 which lies North and East of the right of way of the County Road (formerly SSH-2-I) as it existed December 28, 1968, and West of the right of way of SR 131 (now known as 97) as acquired by the State of Washington in Decree of Appropriation entered July 7, 1970 in Kittitas County Superior Court Cause No. 17205.

All of the above is located within Township 19 North, Range 17 East, W.M., County of Kittitas, State of Washington.

200212190011
Page: 1 of 3
12/19/2002 12:29P
Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 21.00

When recorded, please return to:
Zilkha Renewable Energy, LLC
NW Region Office:
210 SW Morrison, Suite 310
Portland, OR 97204
Phone (503) 222-9400

REVIEWED BY
KITTITAS COUNTY TREASURER
DEPUTY K. Hill
DATE 12-19-02

# MEMORANDUM OF WIND OPTION AGREEMENT

**Grantor: Jeanice M. Vlasic, an unmarried person**

**Grantee:** Zilkha Renewable Energy, LLC, a Delaware limited liability company, its successors and assigns (collectively "ZRE")

**Legal Description (abbreviated): S1/2S1/2N1/2NW1/4 & N1/2N1/2S1/2NW1/4, Sec. 13, T. 19 N., R. 17 E., W.M.**

**Assessor's Tax Parcel ID Numbers:** 19-17-13000-0008

This is a memorandum of a Wind Option Agreement ("Option Agreement") dated May 7, 2002 ("Effective Date") between Jeanice M. Vlasic, their successors and assigns ("Owner"), as grantor, and Zilkha Renewable Energy, LLC, 1001 McKinney, Suite 1740, Houston, Texas 77002, Tel. 713-571-6640, its successors and assigns ("ZRE"), as grantee, pertaining to Owner's Property which is legally described on the attached copy of **Exhibit A** to the Option Agreement.

The term of the Option Agreement began on the Effective Date and will end four (4) years after the Effective Date. The Option is an exclusive option with respect to the Owner's Property for a Wind Farm Easement Agreement including turbine site, access, transmission facilities, overhang, construction, and wind non-obstruction easements.

200212190011
Page: 2 of 3
12/19/2002 12:29P
Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 21.00

**Owner:**

Jeanice M. Vlasic

Name: Jeanice M. Vlasic
Title: Owner

**ZRE:**

Andrew Young 12/16/02

Name: Andrew Young
Title: NW Development Director

**Owner:**

Name: _____
Title: _____

STATE OF Washington )
)
COUNTY OF King )

Notary Public
State of Washington
DIANNE E. AHO
My Appointment Expires Jun 2, 2004

I certify that I know or have satisfactory evidence that Jeanice M. Vlasic is/are the person(s) who appeared before me, acknowledged that they signed this instrument, and acknowledged it to be their free and voluntary act for the uses and purposes mentioned in this instrument.

Dated: November 19, 2002.

Notary Public Dianne E. Aho
My Commission Expires: 6/2/2004

STATE OF Oregon )
)
COUNTY OF Multnomah

I certify that I know or have satisfactory evidence that Andrew Young is the person who appeared before me and acknowledged that the person signed this instrument; the person is authorized to sign this instrument on behalf of Zilkha Renewable Energy, LLC; and, the execution of this instrument was the free and voluntary act of the person and of Zilkha Renewable Energy, LLC.

Dated: December 16, 2002.

OFFICIAL SEAL
HILARY A. FOOTE
NOTARY PUBLIC-OREGON
COMMISSION NO. 355939
MY COMMISSION EXPIRES MARCH 20, 2006

Notary Public
My Commission Expires: March 2, 2006

200212190011
Page: 3 of 3
12/19/2002 12:25P
Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 21.00

EXHIBIT "A"

The South one-half (S1/2) of the South one-half (S1/2) of the North one-half (N1/2) of the Northwest one-quarter (NW1/4), and the North one-half (N1/2) of the North one-half (N1/2) of the South one-half (S1/2) of the Northwest one-quarter (NW1/4) of Section 13, Township 19 North, Range 17 East, W.M., Kittitas County, State of Washington.

200212060010
Page: 1 of 3
12/06/2002 09:58A
Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 21.00

When recorded, please return to:
Zilkha Renewable Energy, LLC
NW Region Office:
210 SW Morrison, Suite 310
Portland, OR 97204
Phone (503) 222-9400

REVIEWED BY
KITTITAS COUNTY TREASURER
DEPUTY K. Bostick
DATE 12-06-02

# MEMORANDUM OF WIND OPTION AGREEMENT

**Grantor: Pautzke Bait Co., Inc., A Washington Corporation**

**Grantee:** Zilkha Renewable Energy, LLC, a Delaware limited liability company, its successors and assigns (collectively "ZRE")

**Legal Description (abbreviated): NE$1/4 & S1/2 Sec. 3, lying East St Hwy, E1/2E1/2 Sec. 10 & Sec. 15 lying East St Hwy, T. 19 N., R. 17 E., W.M. And S1/2SE1/4, Sec. 34, T. 20 N., R. 17 E., W.M.**

**Assessor's Tax Parcel ID Numbers**: 19-17-03000-0003, 19-17-10000-0001, 19-17-15000-0003 & 20-17-34000-0004

This is a memorandum of a Wind Option Agreement ("Option Agreement") dated October 18, 2001 ("Effective Date") between Pautzke Bait Co., Inc. A Washington Corporation, their successors and assigns ("Owner"), as grantor, and Zilkha Renewable Energy, LLC, 1001 McKinney, Suite 1740, Houston, Texas 77002, Tel. 713-571-6640, its successors and assigns ("ZRE"), as grantee, pertaining to Owner's Property which is legally described on the attached copy of **Exhibit A** to the Option Agreement.

The term of the Option Agreement began on the Effective Date and will end four (4) years after the Effective Date. The Option is an exclusive option with respect to the Owner's Property for a Wind Farm Easement Agreement including turbine site, access, transmission facilities, overhang, construction, and wind non-obstruction easements.

200212060010
Page: 2 of 3
12/06/2002 09:58A
Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 21.00

**Owner:**

Name: Gerry Williams
Title: President

**ZRE:**

Name: Andrew Young
Title: NW Development Director

**Owner:**

Name:
Title:

STATE OF Washington )
)
COUNTY OF KITTITAS )

JAMES A. RAY
COMMISSION EXPIRES
NOTARY PUBLIC
SEPTEMBER 23, 2006
STATE OF WASHINGTON

I certify that I know or have satisfactory evidence that Gerry Williams is/~~are~~ the person(~~s~~) who appeared before me, acknowledged that they signed this instrument, and acknowledged it to be their free and voluntary act for the uses and purposes mentioned in this instrument.

Dated: Nov. 4, 2002.

Notary Public
My Commission Expires: 9/23/2006

STATE OF Oregon )
)
COUNTY OF Multnomah )

I certify that I know or have satisfactory evidence that Andrew Young is the person who appeared before me and acknowledged that the person signed this instrument; the person is authorized to sign this instrument on behalf of Zilkha Renewable Energy, LLC; and, the execution of this instrument was the free and voluntary act of the person and of Zilkha Renewable Energy, LLC.

Dated: Dec. 02, 2002.

Notary Public
My Commission Expires: 3/20/06

OFFICIAL SEAL
HILARY A. FOOTE
NOTARY PUBLIC-OREGON
COMMISSION NO. 355939
MY COMMISSION EXPIRES MARCH 20, 2006

200212060010
Page: 3 of 3
12/06/2002 09:58A
Kittitas Co Auditor ZILKHA RENEWABLE ENE MEMO 21.00

EXHIBIT "A"

The Property consists of approximately 700 Acres of land located in Kittitas County, Washington State, and more particularly described as follows:

The Northeast one-quarter (NE1/4), and the South one-half (S1/2) of Section 3, which lies East of SR 131 as acquired by the State of Washington by Decree of Appropriation entered July 7, 1970, in Kittitas County Superior Court Cause No.17205;

The East one-half (E1/2) of the East one-half (E1/2) of Section 10;

That portion of Section15 lying East of SR 131 as acquired by the State of Washington by Decree of Appropriation entered July 7, 1970 in Kittitas County Superior Court Cause No. 17205.

All of the above is located within Township 19 North, Range 17 East, W.M., Kittitas County, and the State of Washington.

And together with the South one-half (S1/2) of the Southeast one-quarter (SE1/4) of Section 34, Township 20 North, Range 17 East, W.M., Kittitas County, State of Washington.

WASHINGTON STATE DEPARTMENT OF
**Natural Resources**

DOUG SUTHERLAND
*Commissioner of Public Lands*

December 12, 2002

Zilkha Renewable Energy LLC
Attn: Chris Taylor
221 E. 4th Street
Ellensburg WA 98926

RE: Proposed Wind Power Development Lease 60-074259

Dear Mr. Taylor:

The purpose of this letter is to communicate the current status of leasing process for the following lands in Kittitas County:

Government Lots 1 and 2 (N2NE4), S2NE4, SW4NW4, W2SW4, SE4SW4, SE4, Section 2; W2E2, W2, Section 10; All, Section 16; E2, N2NW4, SE4NW4, SW4SW4, Section 22; all in Township 19 North, Range 17 E. W. M, Kittitas County, Washington, containing 2,075.33 acres.

Zilkha Renewable Energy LLC currently has a land use license for wind power exploration for these lands with a term of December 1, 2004. Wind Power Development Lease No. 60-074259 for the same legal description has been advertised, and Zilkha Renewable Energy has notified the state of its interest in the lease. We also have grazing leases on these parcels. Our leases allow for other uses and cancellation for higher and better use. We anticipate accommodating both uses on these parcels without much trouble.

There is legal access via county roads to Section 10 and Section 16. The state has no legal access to Section 2 and Section 22. We understand that Zilkha Renewable Energy is in the process of obtaining legal access to these parcels.

The next step in the leasing process for Lease No. 60-074259 is to provide Zilkha Renewable Energy and other interested parties with a notice of leasing and sample lease. Thirty days after a public notice is published, the sealed bid public auction will be held. At the end of that time period, bids would be reviewed and a decision would be made on the successful bidder. At that time, a lease would be prepared between the state, as lessor and the successful bidder.

Sincerely,

Milton D. Johnston

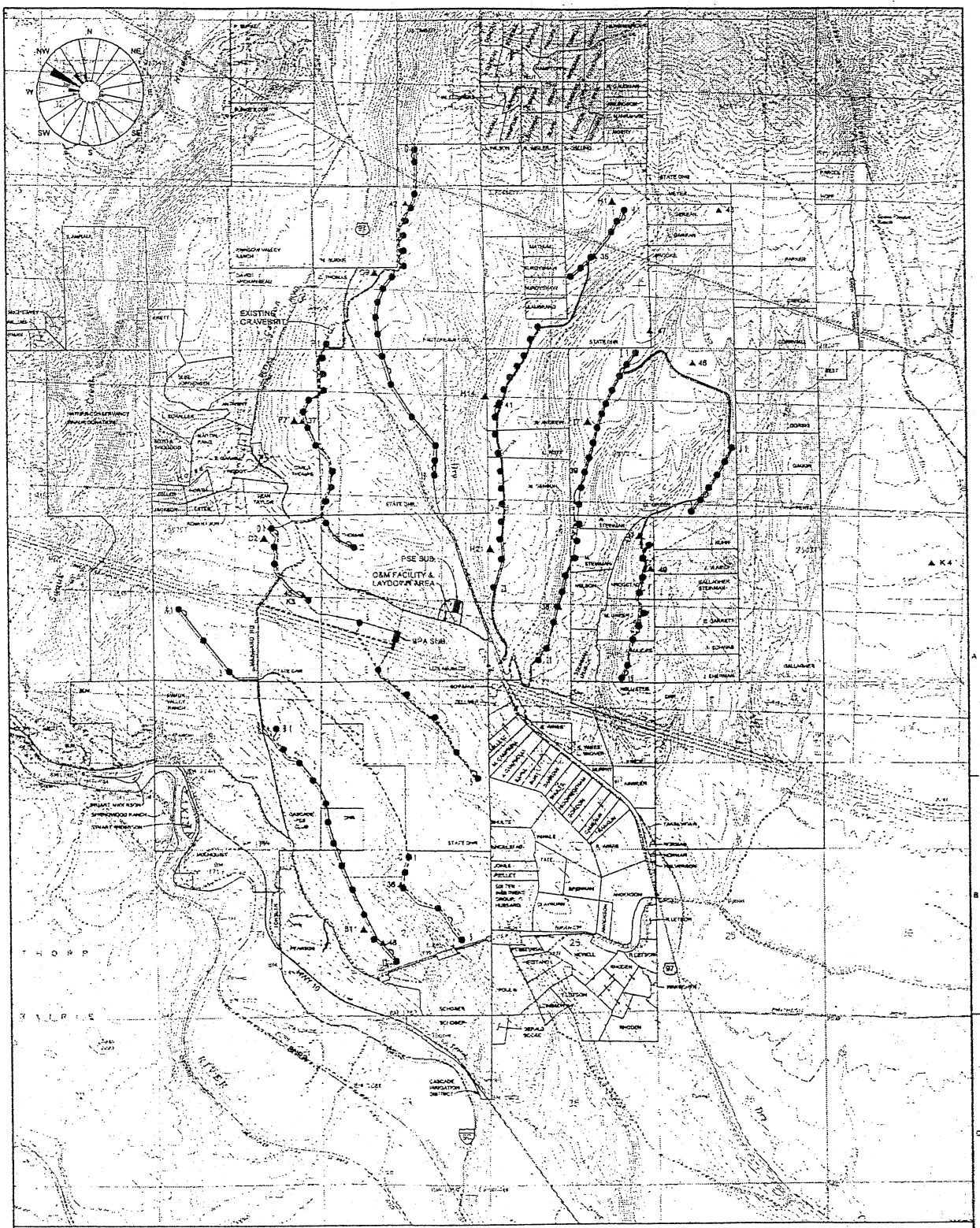
Milton D. Johnston
Assistant Region Manager

c: Jim Schwartz, AAG

SOUTHEAST REGION ▮ 713 BOWERS RD ▮ ELLENSBURG, WA 98926-9301
*TEL: (509) 925-8510 ▮ FAX: (509) 925-8522 ▮ TTY: (509) 925-8527*
Equal Opportunity/Affirmative Action Employer

RECYCLED PAPER

**Exhibit 2**




LEGEND:

- PROPOSED WTG LOCATION
- STRING NAME & TURBINE COUNT
- EXISTING ACCESS ROAD
- NEW ACCESS ROAD
- ROAD TURN-AROUND AREA
- UNDERGROUND ELECTRICAL
- OVERHEAD ELECTRICAL
- UGND AND/OR O.H. ELECTRICAL
- ▲ 43 MET TOWER - TEMPORARY
- ▲ N12 MET TOWER - PERMANENT

N

0 1500 3000 4500
Scale In Feet

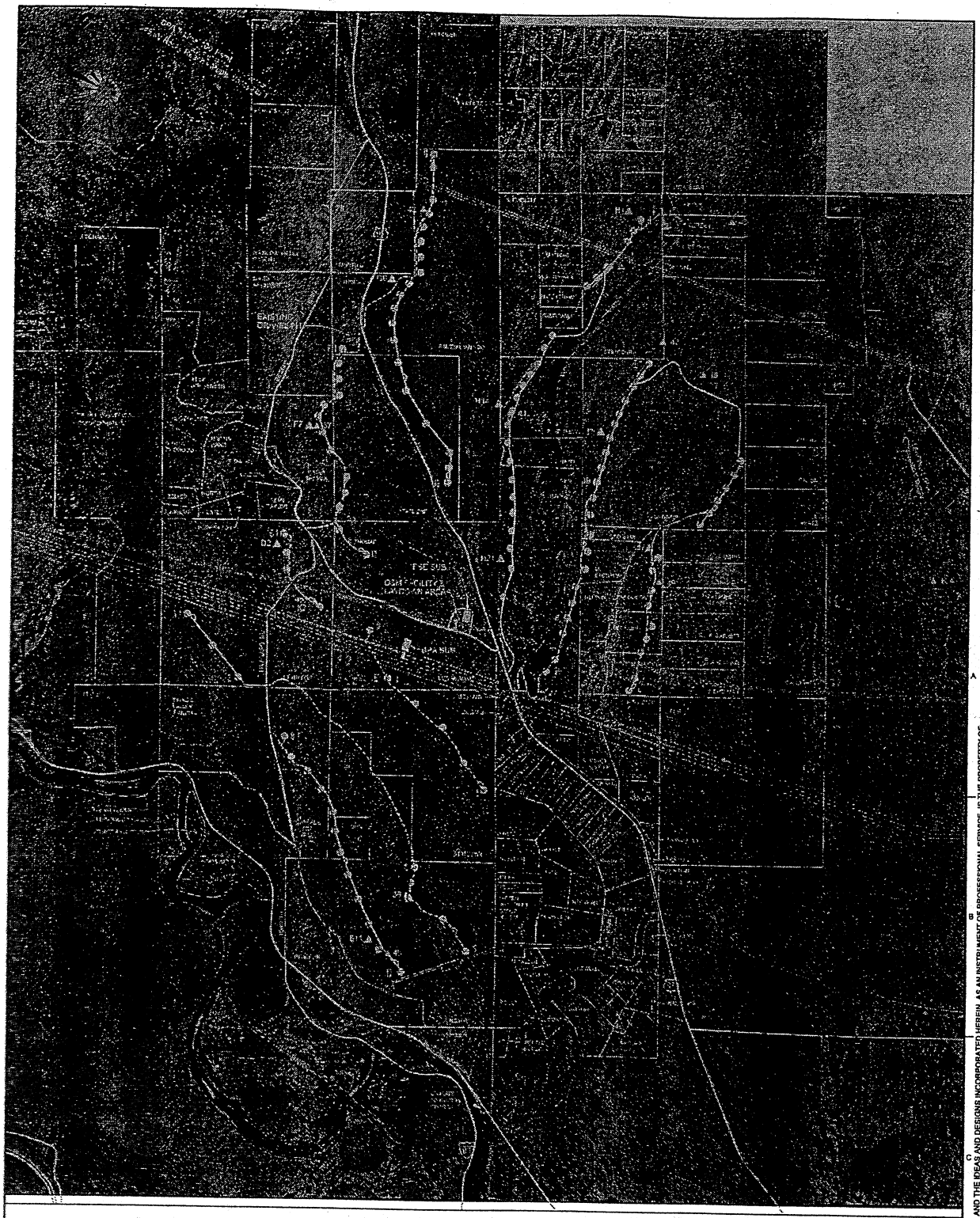
CONFIDENTIAL

| PRELIMINARY<br>NOT FOR CONSTRUCTION | CH2MHILL | Sagebrush Power Partners, LLC<br>Zilkha Renewable Energy | KITTITAS VALLEY WIND POWER PROJECT<br>EXHIBIT 1<br>PROJECT SITE LAYOUT | SHEET<br>DWG EXHIBIT 1<br>DATE JAN 2003<br>PROJ 170365 |
|---|---|---|---|---|

FILENAME kittitas113-layout.dgn PLOT DATE 10-JAN-2003 PLOT TIME 09:30:37

REUSE OF DOCUMENTS: THIS DOCUMENT, AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF CH2M HILL AND IS NOT TO BE USED, IN WHOLE OR IN PART, FOR ANY OTHER PROJECT WITHOUT THE WRITTEN AUTHORIZATION OF CH2M HILL. ©CH2M HILL

**Exhibit 3**



N

0 1500 3000 4500
Scale In Feet

**LEGEND:**

- PROPOSED WTG LOCATION
- STRING NAME & TURBINE COUNT
- EXISTING ACCESS ROAD
- NEW ACCESS ROAD
- ROAD TURN-AROUND AREA
- UNDERGROUND ELECTRICAL
- OVERHEAD ELECTRICAL
- UGND AND/OR O.H. ELECTRICAL
- MET TOWER - TEMPORARY
- MET TOWER - PERMANENT

CONFIDENTIAL

PRELIMINARY
NOT FOR CONSTRUCTION

CH2MHILL

Sagebrush Power Partners, LLC
Zilkha Renewable Energy
110 SW MORRISON
SUITE 3 M
PORTLAND, OR 97204
TEL: (503) 222-9435
FAX: (503) 222-9404

KITTITAS VALLEY WIND POWER PROJECT

EXHIBIT 2
AERIAL PHOTO WITH
PROJECT SITE LAYOUT

| | |
|---|---|
| SHEET | |
| DWG | EXHIBIT 2 |
| DATE | JAN 2003 |
| PROJ | 170365. |

FILENAME: z-fig110-photo.dgn PLOT DATE: 10-JAN-2003 PLOT TIME:

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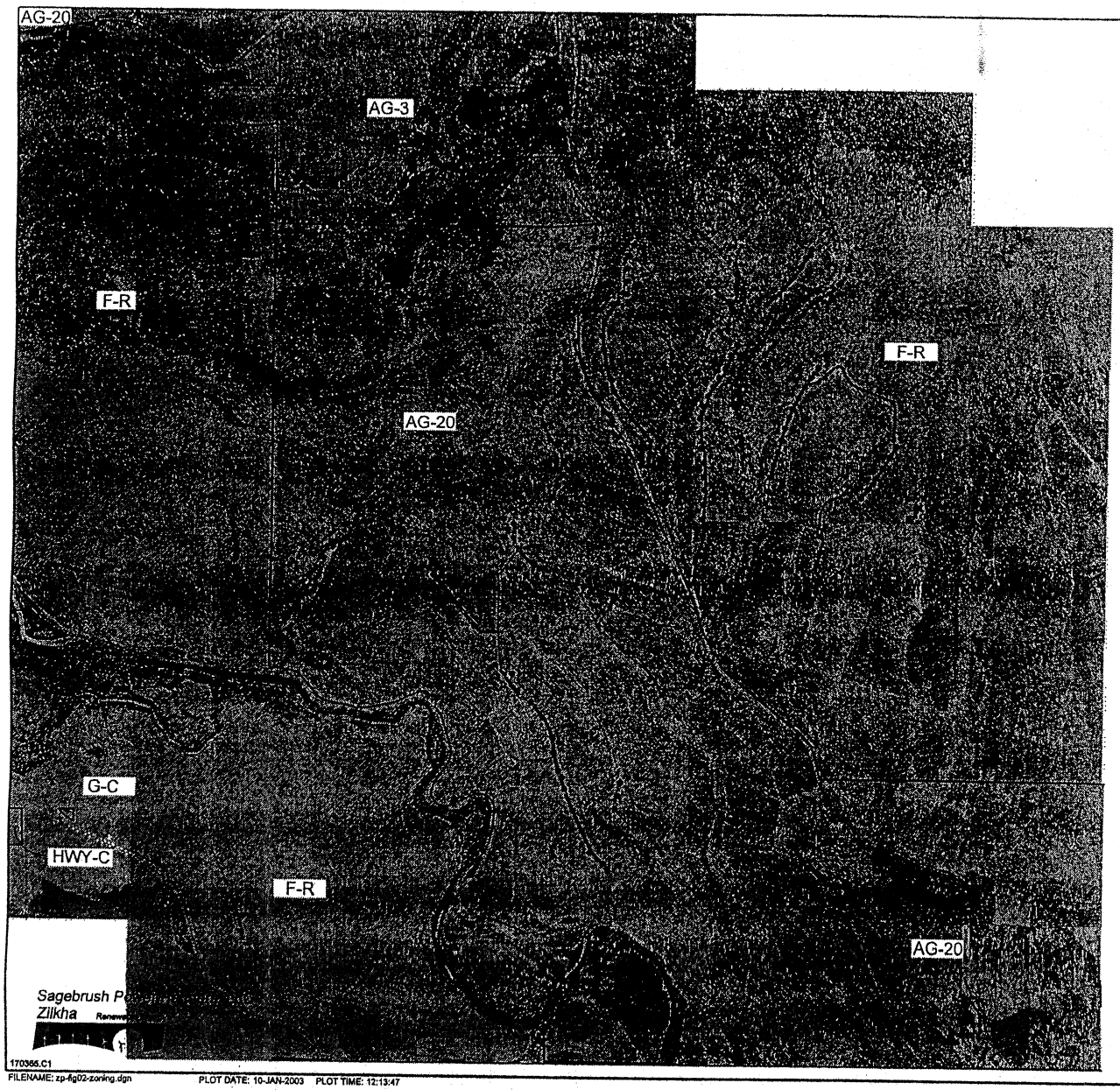
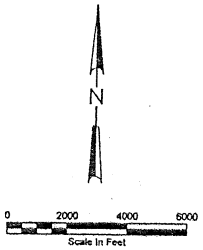
**Exhibit 4**




LEGEND:

- ZONING BOUNDARY
- PROPOSED WTG LOCATION
- STRING NAME & TURBINE COUNT
- EXISTING ACCESS ROAD
- NEW ACCESS ROAD
- UNDERGROUND ELECTRICAL
- OVERHEAD ELECTRICAL
- UGND AND/OR O.H. ELECTRICAL
- N12 MET TOWER - PERMANENT

ZONING CODES:

| | |
|---|---|
| AG-20 | AGRICULTURAL - 20 ACRE |
| AG-3 | AGRICULTURAL - 3 ACRE |
| C-F | COMMERCIAL FOREST |
| F-R | FOREST & RANGE |
| G-C | GENERAL COMMERCIAL |
| HWY-C | HIGHWAY - COMMERCIAL |

EXHIBIT 18
ZONING DESIGNATIONS &
PHOTOGRAPH OF EXISTING LAND USE

APPLICATION FOR SITE CERTIFICATE
KITTITAS VALLEY WIND POWER PROJECT
JANUARY 2003

CH2MHILL

170365.C1
FILENAME: zp-fig02-zoning.dgn PLOT DATE: 10-JAN-2003 PLOT TIME: 12:13:47

**Exhibit 5**

# Economic Impacts of Wind Power in Kittitas County

## Final Report

A Report for the

## Phoenix Economic Development Group

by

**ECONorthwest**
888 SW Fifth Ave, Suite 1460
Portland, OR 97204
(503) 222-6060

October 2002

# Acknowledgements

This report was prepared by ECONorthwest's Portland office and was paid for by the Phoenix Economic Development Group of Ellensburg, WA. Dr. Stephen Grover was the ECONorthwest project manager for this analysis and was the primary author of this report. Questions regarding this report should be directed to him at grover@portland.econw.com or by phoning the Portland office at (503) 222-6060. Dr. Grover was assisted in this project by Anne Fifield, Alec Josephson, and Bob Whelan.

# The Economic Impacts of A Proposed Wind Power Plant in Kittitas County, WA

## An Evaluation of Potential Impacts on Property Values, Tax Revenues, and the Local Economy

## I. Introduction and Summary

Two different wind energy companies are currently developing plans for constructing and operating wind power turbines in Kittitas County. The energy company Zilkha Renewable Energy has proposed a project with 110 wind turbines that have the combined potential to generate approximately 165 megawatts of electricity during peak wind periods. A second company enXco is proposing building 150 additional wind turbines with a total of 225 megawatts of generation potential. These two project combined would involve the construction and operation of 265 wind turbines with a potential generating capacity of 390 megawatts of electricity.

As part of the planning process for these projects, the Phoenix Economic Development Group has hired ECONorthwest to evaluate the potential economic impacts of constructing and operating the wind plants in Kittitas County. Specifically, ECONorthwest was asked to analyze and help quantify impacts in three key areas of interest:

- **Property Values.** Local residents have voiced concern that constructing numerous wind turbines in the valley will detract from views and ultimately reduce property values.

- **Economic Impacts.** The wind plants will create jobs and increase spending in the economy during the construction phase and during plant operations.

- **Tax Revenues.** The increase in jobs and local spending will also increase tax revenues for Kittitas County.

To research these issues, we utilized several different analysis techniques. We surveyed tax assessors in other counties with wind projects to determine the potential effects of wind farms on property values. We also conducted a review of the available academic literature for additional information on property value effects. Local economic impacts were estimated using an input-output model based on construction and operations data obtained from the two companies proposing wind projects in Kittitas County. Tax revenues were estimated from the input-output model results based on tax rate and spending information obtained from Kittitas County.

Our analysis in these areas has resulted in the following key findings:

- *Views of wind turbines will not negatively impact property values.* Based on a nation-wide survey conducted of tax assessors in other areas with wind power projects, we found no evidence supporting the claim that views of wind farms decrease property values.

- *Wind plant construction will have significant economic benefits.* The construction of over 250 turbines will create approximately 185 full and part time jobs in Kittitas County and will increase total income to the county by over $12 million during the construction period.

- *Wind plant operation will provide additional annual economic benefits.* The wind farm operations will require 53 additional jobs and will increase income to the county from salaries and operations expenses by over $4 million annually.

- *Property tax revenues will increase.* The construction of the wind farm will increase property tax revenues collected in the Kittitas County by approximately $2.8 million dollars annually -- an increase of 11 percent over current property tax revenues. The majority of this increase is due to the property tax paid on the wind turbines.

- *Tax revenues to Kittitas County Government will also increase.* Tax revenues accruing directly to Kittitas County Government will be approximately $693,000 annually. This increase results from the County's share of new property tax revenue and from increases in other taxes.

Details on the analysis underlying each of these results are presented in the remainder of this report.

## II. Property Value Impacts

One of the biggest concerns of the community is that the installation of numerous wind turbines will detract from the current viewscape in the Kittitas Valley and that the destruction of this view will ultimately reduce residential property values.

We conducted two separate analysis tasks to address this issue. First, we conducted a phone survey of tax assessors for counties that recently had wind turbines installed in their areas. In addition to interviewing tax assessors, we also reviewed the current literature for statistical studies that quantified the impact of wind turbines on property values. For comparison purposes, we also reviewed the literature on the impact that transmission lines have on property values.

### A. Tax Assessor Interviews

The first step in our survey of tax assessors was to develop an appropriate sample of sites for the analysis. These sites were chosen using the following criteria:

- *Projects constructed within the last 10 years.* Recently completed projects were used to ensure that reliable information was obtained from the assessor. Recent sites are also more likely to have the same turbine technology that is planned for Kittitas County.

- *View locations.* As much as possible, we attempted to find wind farms that could be seen from residences rather than focusing only on sites in remote or very rural locations.

- *Multiple turbines.* We focused on those areas where multiple turbines were installed to be comparable with the projects proposed for Kittitas County.

We applied these criteria to information obtained from the American Wind Energy Association website to locate candidate wind projects in areas throughout the U.S. Table 1 shows descriptive information on 19 projects we located using this method.

**Table 1: Location and Size of Wind Farms Used In Analysis**

| State | Location | County | Project Name | Year | MW | Turbine Manufacti | # of Turbines |
|---|---|---|---|---|---|---|---|
| WY | Carbon County | Carbon | Foote Creek Rim 4 | 2000 | 16.80 | NEG Micon | 28 |
| CA | San Gorgonio Pass | Riverside | Cabazon | 1999 | 39.75 | Zond Z-750 | 53 |
| CA | San Gorgonio Pass | Riverside | Westwind | 1999 | 46.50 | NEG Micon | 65* |
| CA | Tehachapi | Kern | Oak Creek Phase 2 | 1999 | 23.10 | NEG Micon-700 | 33 |
| CA | Tehachapi | Kern | Cameron Ridge | 1999 | 56.00 | NEG Micon | 80 |
| CA | Tehachapi | Kern | Pacific Crest | 1999 | 45.54 | Vestas V-47 | 69 |
| WY | Carbon County | Carbon | Foote Creek Rim 1 | 1999 | 41.40 | Mitsubishi | 69 |
| WY | Carbon County | Carbon | Foote Creek Rim 3 | 1999 | 24.75 | NEG Micon | 33 |
| TX | Culberson County | Culberson | American Nat. Wind Power/ Orion Energy | 1999 | 30.00 | Zond | 40 |
| TX | Big Spring I | Howard | Howard County | 1999 | 27.72 | Vestas V-47 | 42 |
| TX | Crockett County | Crockett | Southwest Mesa Wind Farm | 1999 | 74.90 | NEG Micon (107) | 107 |
| MN | Pipestone County | Lincoln | Lake Benton - 2 | 1999 | 103.50 | Zond | 138 |
| IA | Storm Lake | Buena Vista | Storm Lake | 1999 | 112.50 | Zond - 50 (150) | 150 |
| IA | Storm Lake | Buena Vista | Storm Lake | 1999 | 80.25 | Zond - 50 (150) | 107* |
| OR | Helix | Umatilla | 1. Vansycle Ridge | 1998 | 25.10 | Vestas V-47 | 38 |
| MN | Pipestone County | Lincoln | Lake Benton - I | 1998 | 107.25 | Zond | 143 |
| TX | Culberson County | Culberson | Lower Colorado River Authority | 1995 | 35.00 | Kenetech | 112 |
| MN | Buffalo Ridge | Nobles | Kenetech Windpower | 1994 | 25.00 | Kenetech | 73 |
| CA | Tehachapi | Kern | Sky River | 1993 | 76.95 | Vestas V-27 | 342 |

**Note:** * Number of turbines estimated by ECONorthwest based on reported MW capacity.

In addition to the sites shown in Table 1, we also added projects in Alameda County, California, Walla Walla County, Washington, and the Town of Lincoln, Wisconsin as they all contain wind projects that are similar to that proposed for Kittitas County. The final sample included 22 wind projects located in 13 different counties throughout the country.

Once the sample was determined, the next step was to interview tax assessors within each county to determine the effect these projects had on residential property values. We chose to interview assessors as they are required to provide objective assessments of property values. If assessments are perceived to be too high by the landowners, the assessed value may be challenged in court. Unlike real estate agents, who have a financial stake in the market values of properties they sell, tax assessors do not have an incentive to inflate property values or to exaggerate the possible effects of wind turbines. For these reasons, we chose to interview tax assessors as they are the best available source for unbiased information on the effects of wind turbines on property values.

From our initial target sample, we were able to interview assessors from all thirteen counties. Based on these interviews, we found no evidence indicating that views of wind turbines decreased property values. Of the counties we interviewed, six contain residential properties with views of the wind turbines, and six counties lack residences with a view of the turbines. One county reported that the wind farm is too new for the assessor's office to know if nearby property values have been affected.

Six counties reported that residential properties have views of the wind turbines, but the turbines have not altered the value of those properties. Responses from assessors in these counties were similar:

- Kern, California—Residents are able to see the turbines from many locations within the town of Tehachapi. The views of the wind turbines have not affected the assessed values of these residences.
- Lincoln, Minnesota—The turbines are located about two miles outside of town. The turbines do not block the view of any particular feature, but residents can see them if they look for them. The assessor hasn't heard anyone complain about the turbines' appearance. Some residences located in the rural parts of the county have closer views of the turbines, but the turbines have not impacted their land values.
- Buena Vista, Iowa—Many residences in the towns of Alta and Storm Lake have views of the turbines. The turbines are easily seen from town, they are located a couple of miles outside of town, and sit on a high ridge. There has been no impact on land values.
- Howard, Texas—There are no homes within two miles of the wind turbines, but because the terrain is so flat, the turbines are visible from as far as 25 miles away. Appraised land values have not declined because of views of the turbines. The appraiser reported that their office expected property owners to complain about lowered property values caused by a diminished view, but so far they have received no complaints.
- Walla Walla County, WA—The turbines are on a high cliff that has a lot of wind and low land values. The unincorporated town of Touchet lies about 8 miles from the turbines and some residents do not like the views of the turbines as it affects their view of the sunset. This factor has not translated into lower land values according to the assessor. Touchet's tax base rose from just over $100 million to $265 million with the addition of the wind farm and resulted in the addition of 20 to 25 permanent local jobs according to the assessor.
- Town of Lincoln, Wisconsin—The assessor reported that when the turbines were first installed, residents complained about the diminished view. However, in the three years since installation, residents have become used to them, and no one complains now. One homeowner had claimed that the assessed value of his property should be reduced because of the wind turbines. The County asked him to show that the value of sales of properties near the turbines had diminished, and he was unable to do so.

  To investigate further the potential impacts on property values, Lincoln's assessor compared the 2001 assessed value to actual sales (for arms-length transactions of residential properties) and found that the ratio of assessed values to actual sales prices for properties less than one mile from the wind turbines was no greater than for properties more than a mile from the wind turbines. The assessor noted that the wind turbines had negatively impacted television reception for nearby properties, but the utility company provided the impacted homes with better antennas or a satellite dish to bring reception back to previous levels.

The wind farms have had no impact on neighboring property values in five counties as neighboring properties are in agricultural production. Assessors' offices in Alameda, California, Carbon, Wyoming, Crockett and Culberson in Texas, and Umatilla, Oregon reported that no residential properties have views of the wind farms. The neighboring properties are grazing land, and the value of the land is determined by its productivity, not its views. For Riverside County, California, the wind farm was built along the freeway with a buffer zone to separate it from residences. Consequently, very few homes have a view of the turbines in that county and the assessor reports that there has been no impact on property values. Nobles County, Minnesota reported that the wind farm in the county was installed in the past year, and it is too early to determine if they have affected neighboring property values.

One county reported that land parcels with wind turbines located on them have changed in value. Kern County, California reported that property eligible for a wind turbine greatly increases in value. The first step to siting a wind turbine is to change the land from a grazing zone to a "wind-energy" zone. By changing the zone, the land value increases from about $300 to about $1000 per acre. No other county reported such an impact to land values.

Wind farms in two counties, Howard in Texas and Umatilla in Oregon, have added to the tax base. The assessors' offices reported that the wind turbines are large capital improvements, and they have contributed to the tax base. This was not a specific question in the interview, and these two counties volunteered the information. The same is likely true in other counties, but the issue was not pursued during the assessor interviews.

Representatives from three assessors' officers reported that community members like the appearance of the wind turbines. The appraiser in Kern County speculated that residents like the appearance of the wind turbines as long as the turbines are functioning. The turbines that were built in the early 1980s had a high failure rate, and many of the turbines just sat on the property in disrepair. That experience led many to feel that wind farms are an eyesore. The newer turbines have a very low failure rate, and residents can see the turbines are operating and creating an economic good, which positively impacts their perceptions of the turbines.

In Kern County, some residents located on rural properties complained about the plan to locate wind turbines near their properties. They argued that they had bought their properties with the expectation of a view of grazing land, not a wind farm. To solve the problem, the wind developer paid them for the property and the people moved. The wind developer then sold the property, although the property values did not decrease.

### B. Literature Review

The results of the tax assessor interview show that views of wind turbines do not negatively impact property values. In addition to these interviews, we also conducted a literature review to determine if other studies had found credible evidence of a negative impact on property values. We restricted our literature review to academic journals that only publish articles that have been subjected to a peer review process. References for the articles we reviewed are included in Appendix B of this report.

We found only one study that specifically addressed the potential impact of wind turbines on property values and this study was based on residential property in Denmark. The hedonic study showed that house values were 94 Danish kroners (about $17 per home in 1995 U.S. dollars) lower close to wind farms than other houses located further away but with otherwise similar characteristics. This result was based on a small sample of homes, however, and was not statistically significant.

One of the likely reasons that wind turbines do not diminish property values is that not all people agree that views of wind turbine are undesirable. As reported by the tax assessors, some residents find views the wind turbines attractive. If a homeowner dislikes having a view of the wind farm, they may move and sell their house to someone who likes the view. In this case, property values would not be diminished.

We also reviewed the academic literature addressing transmission lines and their impact on property values. Unlike wind turbines, transmission lines are almost universally considered unattractive. There is also widespread belief that living near transmission lines is a health hazard. For these reasons, there is a much clearer case that transmission lines will negatively affect property values.
Legal cases have agreed that the public perception of danger or health risk can impact property value, regardless of the reasonableness of the public's fear (Rikon 1996).

It is important to emphasize the purpose of reviewing the literature on transmission lines for this analysis. Our review of the literature on transmission lines was done solely to provide an indication of the maximum negative effect views of wind turbines might have on property values *if such a negative impact exists*. As we have indicated from our assessor interviews and literature review, we have not found any evidence that views of wind turbines have any effect on property values. Nevertheless, the information from the literature on power lines is informative.

The evidence from the literature on transmission lines shows that their effect on property values is small and relatively short-lived. The maximum impact on adjacent properties due to transmission lines is about a 10 percent reduction in value. Many studies use hedonic estimation techniques to measure the impact transmission lines have on property values while controlling for other features of the homes. The most recent study (Des Rosiers 2002) found a severe visual encumbrance due to a direct view on a transmission line pylon does exert a negative impact on property prices. Overall, the price reduction stands at roughly 10 percent of average house value. However, being adjacent to the easement will not necessarily cause a house to depreciate. It may even increase its value where proximity advantages (enlarged visual field, increased privacy) exceed drawbacks. Additionally, findings for the non-adjacent properties that have views of the power lines translates in most cases into higher values, due to the improved visual clearance.

Some earlier studies agree that transmission lines have a slight negative impact on property values. Hamilton (1995) found that properties adjacent to a line lose 6.3 percent of their value due to proximity and the visual impact. Properties more distant from transmission lines are scarcely affected, losing roughly 1 percent of their value. Delaney and Timmons (1992) found that, generally, real estate appraisers believe that transmission lines reduce the value of nearby residential properties by 10 percent. The authors' survey found that 84 percent of the surveyed appraisers believed transmission line have a negative impact, 10 percent believed that there is no impact, and 6 percent

believed that there was a positive impact on property values. Colwell (1990) found that properties within 50 feet of an HTVL have a 6 percent to 9 percent lower value than comparable properties, but that drop in value lessens over time and tends to fade away.

As the literature indicates, the negative effect on property values due to transmission lines is 10 percent or less, with this effect diminishing over time. This is reported only for comparison purposes for the case of wind turbines. Again, information from tax assessors and the literature indicate that views of wind turbines do not negatively affect property values.

## III. Local Economy

A second component of our analysis addressed the economic impact of the wind turbines on the Kittitas County economy. We interviewed representatives from both Zilkha and enXco to determine the amount of spending and employment for the proposed projects. Using this information, we used a regional 'input-output' model with data specific to Kittitas County to estimate the economic impacts of the project. We used our model to estimate the economic impacts for both the construction phase and the operations phase of this project. Details on both these phases are reported below.

### A. Construction

The construction of 265 individual wind turbines will involve a significant amount of employment and spending during the construction period. We have talked to representatives from both Zilkha and enXco to determine the likely employment and construction spending. Based on these conversations and our experience analyzing similar projects we developed estimates for use in our model. Our input parameters for the construction phase included:

- 85 full and part time local construction jobs
- 10 full and part time jobs for wind company and utility personnel to manage the plant construction phase
- $6,400,000 in local spending on construction materials (i.e., gravel, concrete)
- $886,000 in spending on food and lodging for non-local labor brought to Kittitas County for the construction period

Based on these and other input parameters, we estimated the impacts to the local economy for a construction period predicted to last approximately one year.

For the input-output model, economic impacts are grouped into three different categories:

- **Direct economic impacts.** Businesses directly purchase goods and services in their local economies. An increase in spending, therefore, affects the economy directly through increased purchases.

- **Indirect economic impacts.** Businesses also indirectly affect local economies, as those firms that provide direct services to the wind project must also purchase materials and supplies themselves. For instance, a construction contractor working on this project will lease some equipment or purchase supplies locally. Increased purchases of "intermediate" goods and services will also promote additional economic activity.

- **Induced economic impacts.** The direct and indirect effects of employment and income affect overall economy purchasing power, thereby affecting further consumption spending. For instance, wind plant employees who use their income to buy groceries or take their family to the movies generate economic impacts for workers and businesses in those sectors. These individuals will, in turn, spend their income much like the wind plant employees do. This cycle continues until the spending eventually leaks out of the local economy as a result of taxes, savings, or purchases of non-locally produced goods and services or "imports."

In addition to these categories, economic impacts are also divided into different income effects. In the following tables, the impact on *Wages* reflects the increase in wage income for all workers as a result of the project. Similarly, *Business Income* is the increase in income to local business as a result of spending associated with the wind plant. *Personal Income* is the sum of wages and business income. The *Other Income* category is used to capture additional income that results from other sources due to the project, such as rents to land owners leasing land for wind turbines. Finally, *Jobs* reflects the number of full and part time jobs that result directly from the project and from the increase in spending in other sectors of the economy.

Additional technical detail on the input-output model is included in Appendix A of this report.

The following tables show the economic impacts for the construction period.

**Table 2: Construction Phase Economic Impacts for Kittitas County**

| Impact type | Wages | Business Income | Personal Income | Other Income | Jobs |
|---|---|---|---|---|---|
| Direct | $8,420,000 | $1,027,000 | $9,447,000 | $388,000 | 95.2 |
| Indirect | 732,000 | 139,000 | 871,000 | 242,000 | 30.3 |
| Induced | 1,050,000 | 225,000 | 1,275,000 | 234,000 | 60.0 |
| Total | $10,202,000 | $1,391,000 | $11,593,000 | $864,000 | 185.5 |

As shown in Table 2, the construction phase of the project will result in approximately 95 full and part time jobs. Spending from this project on labor and materials will result in an additional 90 jobs for a total of approximately 185 full and part time jobs during the construction period. Wages during this period will be $10,202,000 due to the hiring of local construction workers and the increases in services needed to support the construction work. Similarly, business incomes will increase by $1,391,000 due to spending on local materials and other items such as food and lodging for non-local labor hired for the project. Taken together, personal income is estimated to increase by $11,593,000 in Kittitas County due to spending during the construction phase. When the income of $864,000 from other sources is considered, the increase in income to the county totals $12,457,000.

Table 3 provides the same information broken out by industry sector. Most of the spending during this phase occurs in the Construction sector. Sectors that will support this sector such as the Wholesale and Retail Trade and Services sectors will also see a significant increase in spending.

**Table 3: Construction Phase Economic Impacts by Industry**

| Industry | Wages | Business Income | Personal Income | Other Income | Jobs |
|---|---|---|---|---|---|
| Agriculture, Forestry, and Fisheries | $37,000 | $7,000 | $44,000 | $15,000 | 1.7 |
| Construction | 7,978,000 | $1,044,000 | $9,022,000 | $389,000 | 90.4 |
| Manufacturing | 42,000 | $4,000 | $46,000 | $16,000 | 1.4 |
| Trans., Comm., & Utilities | 778,000 | $34,000 | $812,000 | $57,000 | 9.7 |
| Wholesale and Retail Trade | 611,000 | $56,000 | $667,000 | $90,000 | 36.2 |
| Finance, Insurance, & Real Estate | 66,000 | $29,000 | $95,000 | $120,000 | 3.5 |
| Services | 618,000 | $218,000 | $836,000 | $146,000 | 41.2 |
| Government | 71,000 | $0 | 71,000 | $31,000 | 1.3 |
| Total | $10,202,000 | $1,391,000 | $11,593,000 | $864,000 | 185.5 |

## B. Operations

Spending will continue in the local economy during the operation of the wind turbines once the construction phase has ended. During the operations phase, spending will consist of primarily:

- 22 employees hired to operate and manage the wind power plants
- Spending on equipment, maintenance and materials to operate the wind turbines
- Income to property owners that rent land for the wind turbines ($4,500 per turbine.)

The impact to the local economy due to the wind plant operations was modeled based on these factors. As during the construction phase, there is a direct effect from these factors as well as an indirect effect that results from the spending due to the increases in income from the new jobs and from the rental income. These impacts are summarized in Table 4 and Table 5.

Table 4 shows the effect on incomes due to continued operations of the wind turbines. The operations will require 22 full and part time jobs, and the spending on these jobs and plant equipment will create approximately 31 additional jobs in businesses that support the wind plants. The combined effect of direct and indirect spending will result in approximately 53 additional new and part time jobs in Kittitas County. Similarly, spending on these jobs will increase annual wages by $2,728,000 and yearly business income by $351,000. Income from other sources is estimated at $1,188,000 annually and will consist primarily of rental fees paid to land owners where the wind turbines are situated. Taken together, the wind turbines operations will increase income to the county by $4,267,000 annually.

**Table 4: Wind Plant Operations Annual Economic Impacts for Kittitas County**

| Impact type | Wages | Business Income | Personal Income | Other Income | Jobs |
|---|---|---|---|---|---|
| Direct | $2,165,000 | $216,000 | $2,381,000 | $819,000 | 22.0 |
| Indirect | 77,000 | 30,000 | 107,000 | 22,000 | 3.1 |
| Induced | 486,000 | 105,000 | 591,000 | 347,000 | 28.2 |
| Total | $2,728,000 | $351,000 | $3,079,000 | $1,188,000 | 53.3 |

Table 5 shows the economic impacts resulting from wind turbine operations broken out by industry sector. Most of the impacts will be in the Transportation, Communications, and Utilities sector. The Real Estate and Service sectors will also see increased economic activity due to the continued operation of the wind farm.

**Table 5: Annual Wind Plant Operation Impacts by Industry**

| Industry | Wages | Business Income | Personal Income | Other Income | Jobs |
|---|---|---|---|---|---|
| Agriculture, Forestry, and Fisheries | $10,000 | $1,000 | $11,000 | $4,000 | 0.5 |
| Construction | 63,000 | 29,000 | 92,000 | 4,000 | 2.6 |
| Manufacturing | 11,000 | 1,000 | 12,000 | 5,000 | 0.4 |
| Trans., Comm., & Utilities | 2,190,000 | 226,000 | 2,416,000 | 27,000 | 22.7 |
| Wholesale and Retail Trade | 211,000 | 19,000 | 230,000 | 76,000 | 13.3 |
| Finance, Insurance, & Real Estate | 29,000 | 12,000 | 41,000 | 1,012,000 | 1.5 |
| Services | 185,000 | 64,000 | 249,000 | 35,000 | 11.8 |
| Government | 29,000 | 0 | 29,000 | 25,000 | 0.5 |
| Total | $2,728,000 | $351,000 | $3,079,000 | $1,188,000 | 53.3 |

## IV. Tax Revenues

The overall increase in economic activity from the wind power plant will increase tax revenues for Kittitas County. ECONorthwest was asked to estimate the impact on tax revenues for the major sources of tax income for the county. Note that we did not attempt to estimate the increases in costs or the provision of county services (i.e., fire, sheriff) that the wind power plant might require.

Based on our review of Kittitas County budgets and spending and our evaluation of the proposed wind power facility, we have estimated the potential revenue impacts for the Kittitas County. Table 6 shows the estimated increases in revenue for the major tax revenue sources.

As shown in Table 6, the primary increase in tax revenues is from property taxes on the wind turbines themselves. For this calculation, we have used the value of $750,000 per turbine, which is consistent with our experience in other wind projects and with the information provided to us by the wind companies involved with the Kittitas County project. The property tax rate used for the calculation is the 1.35 percent for Kittitas County. Using this tax rate and property value for the 265 turbines results in new property tax revenues of $2,683,125 annually.

The development of this project will also have an effect of increasing the value of other properties due to the increase in wages and overall economic activity in Kittitas County. This results in an additional $201,971 in property tax revenues annually due to increases in other property values.

When the property tax revenues from both sources are combined, the additional tax revenue collected within Kittitas County totals $2,885,096 annually.[1] For comparison, property tax revenues from all sources in Kittitas County totaled $25,223,948 for the 2001-02 budget year.[2] The increase in property tax revenues due to the wind farm amounts to an increase of 11 percent over these levels.

**Table 6: Increases in Annual Property Tax Revenues in Kittitas County**

| Revenue Source | Amount |
|---|---|
| Property taxes on wind farms | $2,683,125 |
| Taxes from higher values on other properties | 201,971 |
| **Total** | **$2,885,096** |

A complicating factor in these revenue estimates is the recently passed Initiative 747 (I-747) in Washington State, which limits increases in tax levies to 1 percent a year. From our conversations with the Kittitas County assessor and from information provided by Washington State, it appears that most of the value of a wind turbine ($500,000) would be considered personal property and as such would be subjected to this limit. For Kittitas County, total personal property is assessed at $2,355.4 million. The addition of 265 windmills with a personal property value of $500,000 each would add $132.5 million to the total property value of the county - an increase of 5.6 percent. Since this increase is greater than 1 percent, it is possible that taxes in other areas would need to be reduced in order to comply with I-747. This might involve decreases in personal property tax rates and/or bond levies. It should be stressed that ECONorthwest is not an accounting firm, and the implication of I-747 is discussed here only as one possible scenario based on preliminary tax estimates. However, the tax revenue estimates provided here should be viewed with I-747 in mind, as actual revenues may ultimately be reduced in the County in order to comply with the initiative.

Table 7 shows the likely distribution of the new tax revenues based on the spending allocations reported in the 2002 Kittitas County Budget. This information is also presented graphically in Figure 1.

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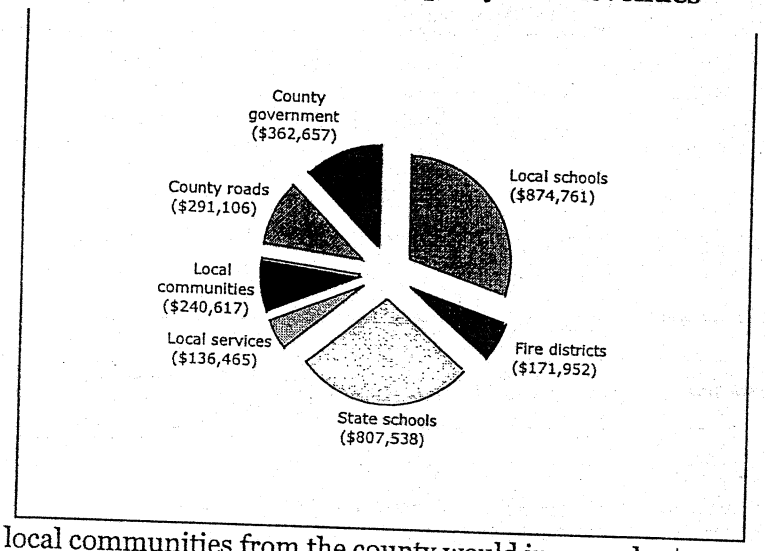
[1] Approximately 30 percent of the turbines are to be built on land managed by the Washington Department of Natural Resources rather than on private land. For these turbines, the rental fee for land will be paid to the State, which then returns these funds to schools throughout the state based on district need. At the annual rental rate of $4,500 per turbine, this amounts to an additional $351,000.

[2] *Kittitas County Assessor's Report 2001 Assessed Valuations Levies and Taxes to be Collected 2002*, page 4.

**Table 7: Allocation of Property Tax Revenues**

| Spending Category | Amount |
|---|---|
| Local schools | $874,761 |
| State schools | $807,538 |
| Fire districts | $171,952 |
| Local communities | $240,617 |
| County roads | $291,106 |
| County government | $362,657 |
| Hospitals and other local services | $136,465 |
| **Total** | **$2,885,096** |

**Figure 1: Allocation of Property Tax Revenues**




Based on current spending patterns, local schools receive the largest share of the tax revenue increase at $874,761 annually. Following the local schools, state schools would receive the next largest share of revenues at $807,538 annually. The local county government budget would receive $362,657 annually, local county roads revenues would increase by $291,106 annually, and annual funds going to local communities from the county would increase by $240,617. Finally, annual spending for local fire districts would increase by $171,952 and funds allocated to hospitals and other services in the county would increase by $136,465.

The property tax revenue estimates reflect funds that are spent in a variety of sectors, both inside and outside Kittitas County. In addition to these property taxes, we estimated the tax revenue that will accrue to the Kittitas County Government. This was done by comparing the current tax revenues as a fraction of total economic output for Kittitas County with and without the wind farm. Using the results from our input-output model, we estimated the total increase in economic output from the proposed wind plant. Given the increase of output with the project, we estimated the increase in tax revenues assuming that tax rates remained constant. For each individual tax, the increases were generally on the order of 0.2 percent annually.

The estimated increase in annual revenue for the Kittitas County Government from these taxes is shown in Table 8. The majority of these additional tax revenues are the property taxes collected for county government and roads. Other sources include smaller taxes such as those collected for fees and services as well as revenue returned to the county by the State. Together, these tax revenues total $693,777. Given the Kittitas County Government expenditures of $44,312,102 planned for 2002, the additional revenue generated by the wind farm represents an increase of almost 2 percent over the budgeted amount.[3]

**Table 8: Additional Kittitas County Government Tax Revenues**

| Spending Category | Amount |
|---|---|
| Property taxes – County government and roads | $653,763 |
| Sales and use taxes | $7,103 |
| All other taxes | $2,927 |
| Licenses and permits | $2,094 |
| Charges for services | $8,509 |
| Fines and forfeits | $2,138 |
| State collected taxes distributed to County | $17,244 |
| **Total** | **$693,777** |

[3] *Kittitas County 2002 Annual Budget*, page 15.

## V. Alternative Uses

A final analysis issue was to assess the types of additional costs Kittitas County would likely occur with a new residential development. Our understanding is that a residential development as has been suggested as an alternative to building the wind farm, although it is unlikely that such a development would utilize all the land that is currently being considered for the wind project.

For this task, we did not attempt to estimate these costs or the amount of tax revenue that might be generated from such a development. Rather, we are listing areas of increased costs to the County based on our experiences conducting fiscal impact analyses for other jurisdictions.

With a new residential development, additional costs will be incurred for extending utilities and roads to the development, with road construction likely comprising the highest share of costs. Utility-related costs include extending water lines, sewer, phone lines, and power lines to the new development. The utility-related costs are usually paid for by system development charges and if the charges are properly constructed, these services will be cost neutral to the County as they will be paid for entirely by the fees collected. Maintenance of items such as roads, however, will likely increase costs for the County.

Additional cost considerations for Kittitas County will be the extension of all county services to a new development. Affected service areas include fire, sheriff, hospital, libraries, and other community services funded by the County. In order to maintain current levels of service to the new county residences in these areas, additional staff may need to be hired.

If the new residential development is large enough, it may also require that additional Kittitas County government officials be hired to handle the increased workloads in all government areas. For example, the addition of a large residential development may require hiring more staff in the assessor's office or possibly additional teachers for that particular school district.

## Appendix A: Modeling Process

Expenditure in the utility sectors and construction sectors affect the Washington economy *directly*, through the purchases of goods and services in this state, and *indirectly*, as those purchases, in turn, generate purchases of intermediate goods and services from other, related sectors of the economy. In addition, the direct and indirect increases in employment and income enhance overall economy purchasing power, thereby *inducing* further consumption- and investment- driven stimulus.

The economic modeling framework that best captures these direct, indirect, and induced effects is called input-output modeling. Input-output models provide an empirical representation of the economy and its inter-sectoral relationships, enabling the user to trace out the effects (economic impacts) of a change in the demand for commodities (goods and services).

Because input-output models generally are not available for state and regional economies, special data techniques have been developed to estimate the necessary empirical relationships from a combination of national technological relationships and county-level measures of economic activity. This modeling framework, called IMPLAN (for IMpact Analysis for PLANning), is the technique that ECONorthwest has applied to the estimation of impacts.[4]

The IMPLAN model reports the following economic impacts:

- Total Industrial Output (output) is the value of production by industries for a specified period of time. Output can be also thought of as the value of sales including reductions or increases in business inventories.

- Personal income consists of the wages and salaries received by households (employee compensation) and the payments received by small-business owners or self-employed individuals (proprietary income). Employee compensation includes workers' wages and salaries, as well as other benefits such as health and life insurance, and retirement payments. Proprietary income, for example, would include income received by private business owners, doctors, accountants, lawyers, etc.

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[4] IMPLAN was developed by the Forest Service of the US Department of Agriculture in cooperation with the Federal Emergency Management Agency and the Bureau of Land Management of the US Department of the Interior to assist federal agencies in their land and resource management planning. Applications of IMPLAN by the US Government, public agencies and private firms span a wide range of projects, from broad, resource management strategies to individual projects, such as proposals for developing ski areas, coal mines, and transportation facilities, and harvesting timber or other resources. ECONorthwest has applied the model to a variety of public and private sector energy projects including a major US/Canada gas pipeline project and the proposed purchase of Portland General Electric by local counties.

- Other property type income (other income) in the IMPLAN model includes payments to individuals in the form of rents received on properties, royalties from contracts, dividends paid by corporations, and corporate profits earned by corporations.
- Job impacts include both full and part time employment.
- Tax revenues for various federal, state and local taxing jurisdictions.

Ideally, expenditures for the proposed wind farm would be available and specific enough to allocate to each of the 528 industry sectors contained in the IMPLAN model. In addition, the expenditures should be delineated between local and non-local providers, as purchases of goods and services from out-of-state vendors will have no economic impact on Washington employees and businesses.

In absence of this detailed information, ECONorthwest opted to use the production function data for the utility and government sectors contained in the IMPLAN modeling software. From an input-output modeling perspective, this is a standard modeling approach in the absence of detailed primary source data. Indeed, IMPLAN's production function data contains information, called regional purchase coefficients that describe the proportion of a given commodity that will be provided by Washington producers. Our previous modeling experience has shown that the data contained in the IMPLAN modeling system for the various sectors is sufficient to permit an accurate rendering of impacts.

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**Exhibit 6**

*Data Report*

# Geotech Data Report Kittitas Valley Wind Power Project

Prepared for

**Zilkha Renewable Energy**

November 2002

**CH2MHILL**
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Boise, ID 83712

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Project Area and Test Pit Location Map

# Introduction

## Purpose and Scope

This geotechnical exploration was conducted to evaluate general subsurface conditions in the proposed project area, to support the Energy Facility Site Evaluation Council (EFSEC) permit application. This phase of permit exploration is only preliminary, and is intended to gain general geotechnical information. Additional exploration and evaluation is necessary to provide geotechnical design information. The work was authorized October 9, 2002, in Task Order No. 3 between CH2M HILL and Zilkha Renewable Energy. The scope of the geotechnical exploration included the following:

- Review geologic and available subsurface information
- Perform a site reconnaissance to identify geology, potential geologic hazards, and proposed test pit locations
- Conduct an exploration of subsurface conditions consisting of nine test pit excavations
- Conduct laboratory testing of selected soil samples
- Prepare this data report summarizing the findings

## Project Description

The proposed Kittitas Valley Wind Power Project is located within the Kittitas Valley area of Kittitas County in south central Washington. The Project is located east of the Cascade Range, north of the Yakima River. The project area lies on both sides of State Highway 97, near Bettas Road, approximately 19 kilometers (km) (12 miles) northeast of Ellensburg, Washington (see the Project Area and Test Pit Location Map at the end of this report).

The proposed Kittitas Valley Wind Power Project includes the construction of 10 strings of wind turbines (labeled A through J) along ridges that generally run north to south from the Wenatchee Mountains to the north of the project. Each different string contains between 4 and 27 wind turbines, and range in length from 0.8 to 4.1 km (0.5 to 2.6 miles). Turbines within a string are identified by their sequential number in a string, such as $A_1$, $A_2$, and so forth. Individual turbines are connected by an underground electrical conduit, and all strings are linked back to the proposed project substation through either underground or overhead transmission lines. The proposed strings that are part of the project are shown on the map provided at the end of this report.

In general, the wind turbines proposed for this project are 3-bladed rotors with a radius of 30 to 45 meters (100 to 150 feet). The rotors and machine house (nacelle) sit atop a mast that is 60 to 76 meters (200 to 250 feet) high. Mast diameters are commonly 4 to 5 meters. Turbines are typically supported by spread footings with foundation anchoring.

The project area is a 3 by 7 kilometer (2 by 4.5 mile) portion of land that consists primarily of long, north-south trending ridges. Between the ridges are ephemeral and perennial creeks that flow into the Yakima River, which is located just south of the Project area. Slopes within the project area generally range from 5 to 20 degrees, but can reach 40 degrees or more in the transverse direction to the ridges. Elevations in the project area and adjacent lands range from approximately 660 to 1050 meters (2165 to 3445 feet) above sea level. The majority of the project area is open range with minimal vegetation. The vegetation is dominated by native bunchgrass and low shrubs, such as bitterbrush and stiff sage. Most of the ridgetops proposed for development consist of dry, rocky grassland.

## Limitations

This report has been prepared for the exclusive use of Zilkha Renewable Energy for specific application to the Kittitas Valley Wind Power Project. This report has been prepared in accordance with generally accepted geotechnical engineering practice. No other warranty, express or implied, is made.

The information contained in this report is based on data obtained from test pit logs that depict subsurface conditions only at the specific locations and times indicated, and only to the depths penetrated. Subsurface conditions and water levels at other locations may differ from conditions at these locations.

CH2M HILL is not responsible for any claims, damages, or liability associated with interpretation of subsurface data or reuse of the subsurface data without the express written authorization of CH2M HILL.

# Technical Data

## Field Exploration

The field exploration was completed on October 30 and 31, and November 1, 2002. Initially, 12 test pits were planned at the project area. However, after one turbine string was eliminated, 9 total test pits were excavated at various locations along the string lines during the exploration (ZG-03 through ZG-10, and ZG-12).

Test pits were excavated by Fulleton-Pacific Construction, Inc., of Ellensburg, Washington, using a John Deere 310D rubber-tired backhoe, and a 0.3-meter (12-inch) bucket. Subsurface conditions were observed and logged by a CH2M HILL geotechnical engineer. Field copies of test pit logs are presented in Appendix A. Soil samples were examined in the field and visually classified in general accordance with ASTM D2488—Description and Identification of Soils (Visual-Manual Procedure). The field classifications are shown on the test pit logs in Appendix A. Test pits were located after completion in the field with a hand-held Global Positioning System (GPS). The accuracy of the locations using this type of GPS is approximately within 6 m. All locations and elevations are based on the North American Datum (NAD 1983). Coordinates given for horizontal location are based on the Universal Transverse Mercator (UTM) grid. Table 1 presents a summary of the test pit locations and depths.

**TABLE 1**
Test Pit Summary

| Test Pit | UTM Northing | UTM Easting | Elevation (m) | Nearest String Position | Depth (m) |
|---|---|---|---|---|---|
| ZG-03 | 5,222,328 | 673,162 | 741.9 (2,434 feet) | $A_3$ | 3.0 (10 feet) |
| ZG-04 | 5,219,707 | 674,532 | 691.3 (2,268 feet) | $B_{10}$ | 2.7 (9 feet) |
| ZG-05 | 5,220,284 | 674,748 | 695.2 (2,281 feet) | $C_3$ | 2.7 (9 feet) |
| ZG-06 | 5,225,504 | 673,673 | 825.1 (2,707 feet) | $F_1$ | 1.2 (4 feet) |
| ZG-07 | 5,227,887 | 674,596 | 978.4 (3,210 feet) | $G_1$ | 2.4 (8 feet) |
| ZG-08 | 5,224,802 | 674,715 | 770.2 (2,527 feet) | $G_{17}$ | 2.7 (9 feet) |
| ZG-09 | 5,226,329 | 676,126 | 860.4 (2,823 feet) | $H_7$ | 1.5 (5 feet) |
| ZG-10 | 5,222,774 | 675,921 | 740.4 (2,429 feet) | $I_{14}$ | 3.4 (11 feet) |
| ZG-12 | 5,222,179 | 674,705 | 744.0 (2,441 feet) | $E_2$ | 2.7 (9 feet) |

Note: Test pits ZG-01, ZG-02, and ZG-11 were not excavated.
All locations and elevations are based on NAD 83. UTM coordinates are zone 10T, NAD 83, meters.

## Laboratory Testing

Samples collected during the preliminary field exploration were delivered to a laboratory for testing of index parameters and for verifying field classifications. Laboratory testing was conducted by Strata, Inc., of Boise, Idaho. Testing included the following:

- ASTM D2216: Laboratory Determination of Water (Moisture) Content of Soil and Rock
- ASTM D4318: Liquid Limit, Plastic Limit, and Plasticity Index of Soils
- ASTM D422: Particle-Size Analysis of Soils

The laboratory test results are summarized in Table 2. Complete geotechnical laboratory test results are provided in Appendix B.

TABLE 2
Laboratory Test Result Summary

| Test Pit | Sample Type | Sample Depth Interval (m) | Soil Type ASTM D 2488 | Moisture Content (%) | Atterberg Limits (%) | | | % Passing 75 μm Sieve |
|---|---|---|---|---|---|---|---|---|
| | | | | | LL | PL | PI | |
| ZG-03 | Bulk | 0.3-1.5 | SM | | | | | 34 |
| | Bag | 0.6 | SP | 15.6 | | | | |
| | Bag | 1.5 | SC | 24.1 | | | | |
| | Bag | 2.7 | ML | 21.9 | 26 | 22 | 4 | |
| ZG-05 | Bulk | 1.5-2.7 | GP-GM | | | | | 8 |
| | Bag | 1.5 | SP-SM | 8.0 | | | | |
| ZG-06 | Bulk | 0.3-1.2 | GP-GM | | | | | 6 |
| | Bag | 0.6 | SP | 12.2 | | | | |
| | Bag | 0.9 | SP | 9.7 | | | | |
| ZG-07 | Bag | 0.9 | GP | 23.2 | | | | |
| ZG-08 | Bulk | 0.6-2.4 | GM | | | | | 36 |
| | Bag | 0.9 | CL | 19.2 | | | | 88 |
| | Bag | 1.5 | CL | 22.6 | 43 | 23 | 20 | |
| | Bag | 2.4 | ML | 21.1 | | | | 52 |
| ZG-09 | Bag | 0.6 | SM | 10.5 | | | | |
| | Bag | 1.5 | SM | 22.1 | | | | |
| ZG-10 | Bulk | 0.6-2.1 | SP-SM | | | | | 9 |
| | Bag | 0.9 | SANDSTONE | 9.8 | | | | |
| | Bag | 1.8 | SP | 11.1 | | | | |
| | Bag | 3.4 | SP-SM | 10.8 | | | | 12 |
| ZG-12 | Bag | 0.6 | SP | 10.3 | | | | |
| | Bag | 1.2 | SP-SM | 20.2 | | | | 12 |
| | Bag | 2.4 | SP-SC | 13.0 | | | | 12 |

LL = Liquid Limit.
PL = Plastic Limit.
PI = Plasticity Index.
GP = Poorly graded gravel with sand.
GP-GM = Poorly graded gravel with silt and sand.
GM = Silty gravel.
ML = Silt, silt with sand/gravel, and sandy/gravelly silt
SM = Silty sand.
SC = Clayey sand.
CL = Lean clay.
SP = Poorly graded sand with gravel.
SP-SM = Poorly graded sand with silt and gravel.

# Interpretation

## Geologic Conditions

The project is located in the upper Kittitas Valley, between the Kittitas Valley Syncline and the Naneum Ridge Anticline. The project lies in the Columbia Intermontane physiographic province (Freeman et al. 1945), located on the western edge of the Columbia River Plateau, bordering the Cascade Range. The general geologic conditions are characterized by a mantle of cemented gravel and cobble alluvium overlying both the Grande Ronde Basalt formation and the Ellensburg formation (Tabor et al., 1982).

***Mainstream and Sidestream Alluvium Formations.*** These formations consist of Pliocene-age epiclastic rocks, derived from the Grande Ronde Basalt formation, the Ellensburg formation, and other rock types including quartz, quartzite, opal, and chert. Near the project, this alluvium is weakly cemented and comprised mainly of well-rounded cobble and boulder clasts of the Grande Ronde Basalt, with surface material characterized by thick rinds and spheroidal weathering. The material ranges from a few meters up to 15 meters in thickness.

***Grande Ronde Basalt.*** This material forms the predominant bedrock unit in the area, and consists of multiple basalt flows that are sometimes interbedded with the Ellensburg formation. This formation is a subgroup of the Columbia River Basalt Group, and has been described to have a thickness up to 300 meters, although the thickness in the project vicinity is not known.

***Ellensburg Formation.*** This formation is made up of sandstone, siltstone, and conglomerate derived from volcanism in the Cascade Range. The material is weakly lithified, and is interbedded with the Grande Ronde Basalt formation. Exposures of this formation in the project vicinity were found to be highly weathered and were typically extremely weak. The thickness of the Ellensburg formation is not known.

## Seismicity

The project area lies within seismic Zone 2B, based on the 1997 Uniform Building Code (UBC 1997). Seismic sources include the Cascadia Subduction Zone (CSZ), intraslab, and crustal (local fault) sources (Geomatrix 1995). Each of these events has different causes, and therefore, produces earthquakes with different characteristics (that is, peak ground accelerations, response spectra, and duration of strong shaking). The two source mechanisms associated with the CSZ are currently thought to be capable of producing moment magnitudes of approximately 9.0 and 7.5, respectively (Geomatrix 1995).

A single fault is mapped in the project area, trending east-west near the intersection of Highway 97 and Bettas Road. This fault is a high-angle fault with its north side downthrown, and crosses Highway 97 approximately 760 meters (2493 feet) north of Bettas Road. Running east, the fault is inferred in a location that intersects the H, I, and J turbine strings. The fault location underlies the southernmost turbine in string H ($H_{25}$). It passes

approximately between turbines $I_{12}$ and $I_{13}$ on the I-string, and approximately between turbines $J_9$ and $J_{10}$ on the J-string. The fault is estimated to have last been active during the Miocene epoch. The total length of the fault is approximately 4 kilometers (2.5 miles). The approximate location of this fault is shown on the map attached at the end of this report.

The peak ground acceleration (PGA) at the site corresponding to a 10 percent probability of exceedance in 50 years (approximately 500-year return period) is between 0.119 g and 0.121 g at the bedrock surface, according to USGS seismic hazard mapping. This value of PGA on rock is an average representation of the acceleration most likely to occur at the site for all seismic events (crustal, intraplate, or subduction) for the 500-year return period.

## Subsurface Conditions

The predominant subsurface conditions for the project consist of dry to moist, weak to moderately cemented gravels and cobbles overlying basalt bedrock. At other locations (ZG-03 and ZG-10), cemented silt and sandstone was encountered. At one test pit location excavated in a drainage swale (ZG-08), the subsurface consisted of fine-grained alluvium that exhibited only slight cementation. At all locations, the upper 0.1 to 0.3 meter (4 to 12 inches) was dry to moist silt, vegetated sparsely by grasses and brush.

***Cemented Gravels and Cobbles.*** This is the predominant subsurface material across the site, consisting of rounded to well-rounded epiclastic gravels and cobbles, with varying percentages of sand and silt. The material was typically moderately cemented within the upper 2 to 5 feet, with local variations. Cementation is silicic, not carbonateous. Natural moisture contents ranged from 8 to 23 percent, and the material was tested to contain between 6 and 12 percent fines (silt and clay). The majority of the material ranged in size from 0.08 to 0.25 meter in diameter (3 to 10 inches), although some boulders were encountered, up to 1.2 meters (4 feet) in diameter.

During excavation of test pits, dry and dusty conditions were common, with moisture increasing with depth. Discussions with contractors suggests that in the spring and early summer months, this material is saturated and often difficult to drive equipment on. The material is fairly easy to excavate at this time of year, whereas in the late summer, fall, and winter, excavation can be extremely difficult, particularly in the cemented zone. Stability of excavation walls in this material ranged from poor to good, depending on the size of cobbles and degree of cementation. This material is interpreted to be part of the Mainstream and Sidestream Alluvium formations (Tabor et al., 1982).

***Cemented Silt and Sandstone.*** In test pit ZG-03, a highly cemented silt was encountered from 0.3 to 0.9 meter (1 to 3 feet) below ground surface. This test pit was located in a small, relatively flat area that showed signs of seasonal ponding in the vicinity. It is believed that this material is a fine-grained alluvium and loess (wind-blown silt and sand) that has become cemented. The moisture content of this material ranged from 16 to 24 percent, and contained a varying percentage of fine sand. The gravels and cobbles described previously were encountered below this material, at an approximate depth of 2.7 meters (9 feet). This material was extremely difficult to excavate in the cemented zone, although excavation stability was excellent.

In test pit ZG-10, a weak sandstone was encountered for the entire depth of the excavation. This material was cemented from 0.6 to 2.1 meters (2 to 7 feet). Natural moisture content ranged from 10 to 11 percent, and contained between 9 and 12 percent fines. Excavation was the easiest in this material, and excavation stability was moderate to good. This material is believed to be part of the Ellensburg formation (Tabor et al., 1982).

***Fine-Grained Alluvium.*** Test pit ZG-08 was excavated in a small drainage tributary to Dry Creek. At this location, approximately 2.4 meters (8 feet) of lean clay and silt was encountered above the cemented gravels and cobbles described previously. Natural moisture content of this material ranged from 19 to 23 percent, and contained between 12 and 48 percent sand and coarse-grained materials. A single Atterberg Limits test in this material resulted in a liquid limit of 43 percent, and a plasticity index of 20 percent. The consistency of this material was hard, according to pocket penetrometer measurements. Excavation in this material was fairly easy, and excavation walls showed good stability.

## Groundwater Conditions

Groundwater was not observed in any of the test pits excavated at the project area. However, in some of the swales and small drainages, groundwater is anticipated to be present seasonally, following periods of precipitation and snowmelt. Groundwater is not anticipated on the ridges where most of the strings are located. However, localized pockets of saturated subsurface soils are anticipated to be encountered on ridges in places where surface water infiltrates the subsurface and collects above zones of cementation. Cemented soils have lower porosity and permeability, and were found in the upper 1 to 7 feet at the project area.

# References

Freeman, O.W. Forrester, J.O., and Lupher, R.I., 1945. Physiographic divisions of the Columbia Intermountane Province. Annual Association American Geographer, v. 35, no. 2, p. 50-75.

Geomatrix. 1995. *Final Report, Seismic Design Mapping, State of Oregon*. Report prepared for the Oregon Department of Transportation, Project No. 2442.

Tabor, R.W., Waitt, Jr., R.B., Frizzell, V.A., Swanson, D.A., Byerly, G.R., and Bentley, R.D. 1982. Geologic Map of the Wenatchee 1:100,000 Quadrangle, Central Washington. Department of the Interior, United States Geologic Survey, Miscellaneous Investigations Series, Map I-1311.

Uniform Building Code. 1997.

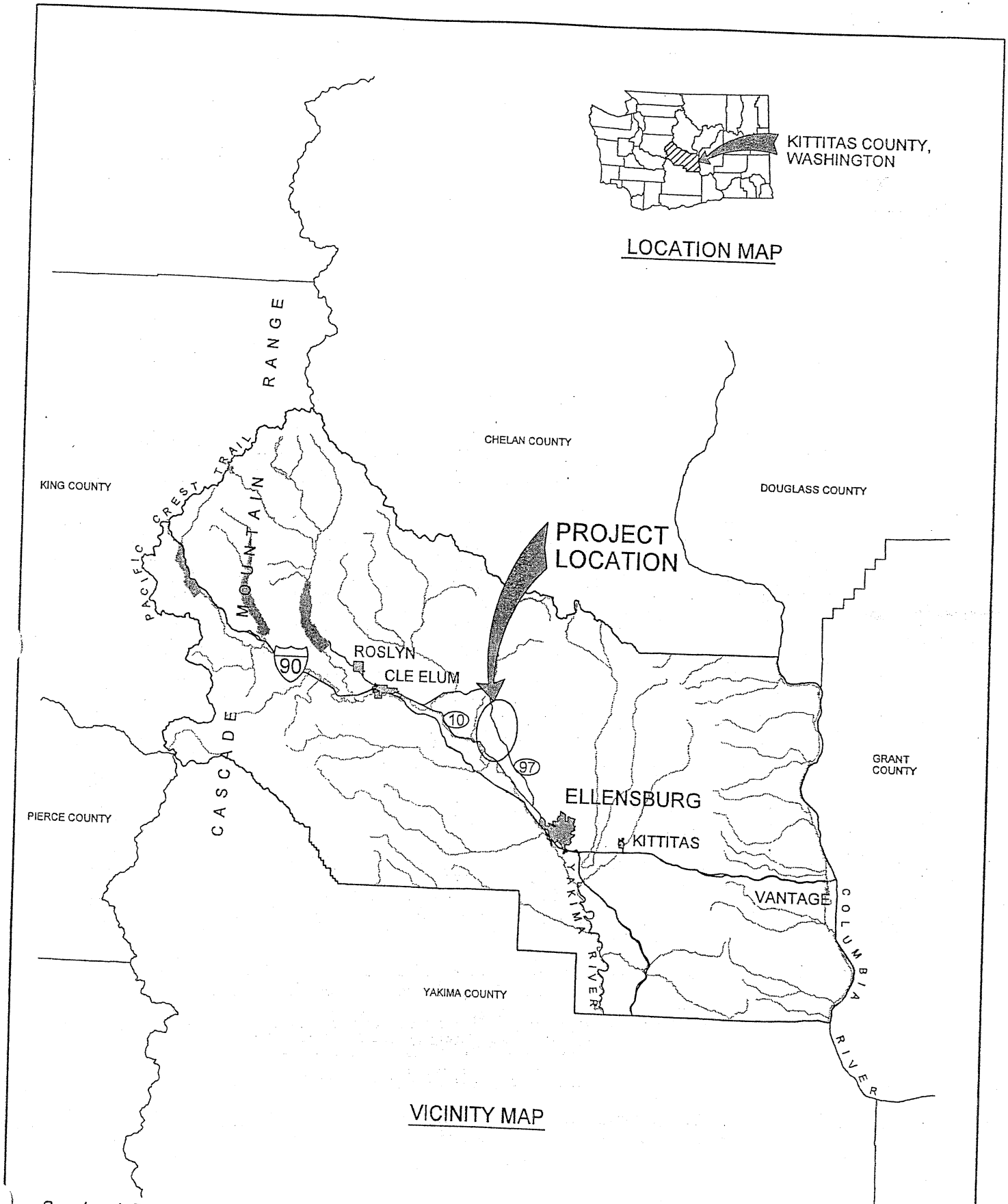
Insert Project Area and Test Pit Location Map (11x17)

Appendix A

# Test Pit Logs

Appendix B

# Laboratory Test Results

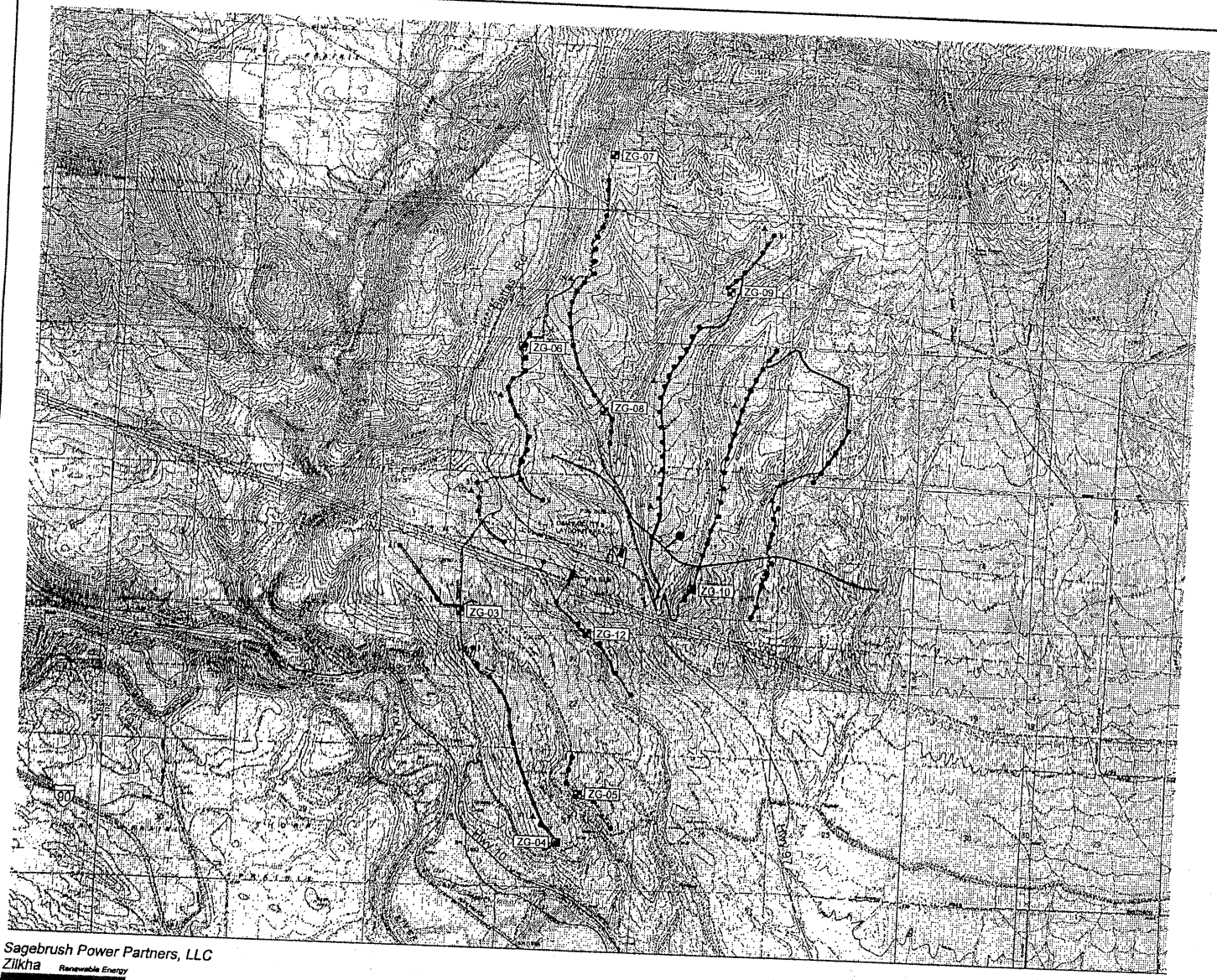



Sagebrush Power Partners, LLC
Zilkha Renewable Energy

VICINITY AND LOCATION MAP
APPLICATION FOR SITE CERTIFICATE
KITTITAS VALLEY WIND POWER PROJECT
JANUARY 2003

zp-fig12-geo.dgn 10-JAN-2003 11:35:11

CH2MHILL




N

0 2000 4000 6000
Scale In Feet

LEGEND:

- ZG-10 TEST PIT LOCATION
- PROPOSED WTG LOCATION
- N 1 STRING NAME & TURBINE COUNT
- EXISTING ACCESS ROAD
- NEW ACCESS ROAD
- UNDERGROUND ELECTRICAL
- OVERHEAD ELECTRICAL
- UGND AND/OR O.H. ELECTRICAL
- N12 MET TOWER - PERMANENT
- DOWNTHROWN SIDE OF LOCAL HIGH-ANGLE FAULT (TABOR ET AL., 1982) LOCATION IS APPROXIMATE

Sagebrush Power Partners, LLC
Zilkha Renewable Energy

70385.C1
LENAME: zp-fig04-geo.dgn PLOT DATE: 10-JAN-2003 PLOT TIME: 11:40:49

PROJECT AREA TOPOGRAPHY
GEOTECHNICAL TEST PIT
AND FAULT LOCATIONS
APPLICATION FOR SITE CERTIFICATE
KITTITAS VALLEY WIND POWER PROJECT
JANUARY 2003

CH2MHILL

**Exhibit 7**

WASHINGTON STATE DEPARTMENT OF ECOLOGY

Application for General Permit to Discharge Stormwater Associated with

# Construction Activity

(Notice of Intent)

☐ Change of Information

Permit # SO3 - _____

(Please print in ink or type)

Please Read NOI Instructions Before Filling Out This Form

## I. Contact Person

| Contact Name | Phone No. |
|---|---|
| Andrew H. Young | 503-222-9400 x2 |
| Company: Zilkha Renewable Energy | |
| Mailing Address: 210 SW Morrison St, Suite 310 | |
| City: Portland | State: OR / Zip + 4: 97204-3151 |

## II. Owner/Representative of Site

(All correspondence will be mailed here)

| Owner's Name | Phone No. |
|---|---|
| Sagebrush Power Partners, LLC & | 503-222-9400 |
| Company Name: Zilkha Renewable Energy | |
| Mailing Address: 1001 McKinney St, Suite 1740 | |
| City: Houston | State: TX / Zip + 4: 77002 |

## III. Site Location/Address

| | |
|---|---|
| Site Name: Kitttias Valley Wind Power Project Site | |
| Street Address (or Location Description): NW Corner of Bettas Road & Highway 97 | |
| City (or nearest city): Ellensburg | Zip + 4: 99826-9477 |
| County: Kittitas | |
| Provide legal description if no address for site (attach separate sheet if necessary) | |

## IV. Billing Address

| | |
|---|---|
| Contact Name: Andrew H. Young | Phone No.: 503-222-9400 |
| Company Name: Zilkha Renewable Energy | |
| Mailing Address: 210 SW Morrison St., Suite 310 | |
| City: Portland | State: OR / Zip + 4: 97204-3151 |

## V. Receiving Water Information (check all that apply)

A. Does your construction site discharge stormwater to:

1. ☐ Storm drain system - Owner of storm drain system (name) N/A
2. ☐ Indirectly or directly to surface waters (☐ River ☐ Lake ☐ Creek ☐ Estuary ☐ Ocean ☐ Wetland)
3. ☒ Directly to ground waters of Washington state. ☐ Dry Well ☐ Drainfield ☒ Other (drainage to porous soils)

B. Name(s) of receiving water(s) N/A

Initial discharge is to an unnamed receiving water? ☐ Yes ☒ No

C. **Location of discharges** (Use any of the following to most accurately identify location of discharge. Attach a supplemental sheet if more than one discharge point and/or numerous receiving waters.):

1. Map enclosed (Mark discharge point on map and provide distance from receiving water.) (see Exhibit 1 – Project Site Layout for locations of roadways and other Project facilities)
2. Township 19N Range 17E Sections 2,3, 9,10,11,12, 13,14,15,16, 21, 22, 27
   Township 20N Range 17E Section 34, S ½ , SE ¼

   (Specify degrees, minutes, and seconds.)
3. Latitude 47°-08'-25.64" N Longitude 120°-41'-08.17" W (NAD 27) (Approx. Center of Project Site Area)

## VI. Construction Activity Information

1. Total size of site 90 acres (perm. footprint) Total area to be disturbed 390 Acres (300 ac. temp. disturbed) How many phases? 1
2. Will any portion of the project be sold to private developers? ☐ Yes ☒ No
3. Projected startup date 10/2003 (month/year) Proposed completion date 12/2004 (month/year)
4. Will there be dewatering activity? ☐ Yes ☒ No If yes, give brief description of location of such activity and how water will be disposed of: _____
5. Check all construction (soil disturbing activities) that apply. Attach a supplemental sheet if necessary.

| | | | | |
|---|---|---|---|---|
| ☒ Clearing | ☒ Utilities | ☒ Landscaping | Homes (How many?) | ☒ Other 121 Wind turbines |
| ☒ Grading | ☐ Stormwater Facilities | ☐ Trails | ☐ Single-family _____ | ☐ Other _____ |
| ☐ Demolition | ☒ Roads/Streets | ☐ Parks | ☐ Multi-family _____ | ☐ Other _____ |
| ☒ Importing Soil | ☐ Retaining Walls | Industrial Buildings | ☐ Townhomes _____ | ☐ Other _____ |
| ☒ Exporting Soil | ☐ Piping Systems | Type O&M Barn Bldg | ☐ Condominiums _____ | ☐ Other _____ |
| ☒ Stockpiling | ☐ Filling Wetland | Site NW Corner of Hwy. 97 & Bettas Road | | |

## VII. Stormwater Pollution Prevention Plan (SWPPP)

A. **Best Management Practices (BMPs)** (Check all that apply.) Attach supplemental list if needed to include other BMPs.

| | | | |
|---|---|---|---|
| ☒ Silt Fencing | ☐ Wheel Wash Area | ☐ Riprap Channel Lining | ☐ Slope Reduction |
| ☐ Vegetated Strips | ☐ Nets and Blankets | ☒ Interceptor Trenches/Ditches | ☐ Chemical Treatment (Polyacrylamides) |
| ☒ Straw Bales | ☒ Swale | ☒ Culverts | ☐ Kiln Dust |
| ☒ Mulching | ☒ Diverted Flows | ☐ Pipes | ☒ Dust Control |
| ☐ Hydroseed | ☐ Dikes | ☒ Berms | ☐ Other _____ |
| ☒ Plastic Covering | ☒ Check Dams | ☐ Terracing | ☐ Other _____ |

B. **Stormwater Pollution Prevention Plan (SWPPP)**

Has a SWPPP been developed that includes a narrative and drawings? ☐ Yes ☒ No

If NO, will a plan be developed prior to the start of construction? ☒ Yes ☐ No

If you answered "NO" to the above question, notify Ecology in writing when a final Plan has been developed. A permit will not be issued until a confirmation letter has been received by Ecology. The SWPPP is to be implemented when construction activity commences on your project.

## VIII. State Environmental Policy Act (SEPA)

If the SEPA process has not been completed at the time of NOI submittal, a follow-up letter must be sent to Ecology with the following information prior to Ecology granting permit coverage.

Has a SEPA review been completed? ☐ Yes ☒ No ☐ Exempt

Type of SEPA document ☐ DNS ☒ Final EIS ☐ MDNS

Agency issuing DNS, Final EIS, or Exemption EFSEC ; Date currently under review

Are you aware of an appeal of the adequancy of the SEPA document? ☐ Yes ☒ No
(If yes, please attach explanatory letter.)

**SEPA requirements must be complied with prior to permit issuance.**

## IX. Public Notice

The public notice must be published at least once each week for 2 consecutive weeks, in a single newspaper which has general circulation in the county in which the construction is to take place. See the NOI instructions for the public notice language requirements. Permit coverage will not be granted sooner than 31 days after the date of the second public notice. ***Note: This NOI must be submitted to Ecology on or before the date of the first public notice.***

**PUBLIC NOTICE**

Sagebrush Power Partners, LLC, care of Zilkha Renewable Energy, LLC of 210 SW Morrison St., Suite 310, Portland, OR 97204-3151is seeking coverage under the Washington Department of Ecology's NPDES General Permit for Stormwater Discharges Associated with Construction Activities.

The proposed 90 *acre* project, known as the Kittitas Valley Wind Power Project is located at the NW corner of Highway and Bettas Road in Ellensburg, WA. Approximately 390 acres will be disturbed for construction of the wind turbines, substation, gravel roads, gravel crane pads, fied access ways, O&M building, laydown areas, underground cable and overhead power lines for the project.

Stormwater will originate from the roadways and graveled areas around on the project site. Stormwater shedding will be controlled through the implementation of a stowm water pollution prevention plan (SWPPP) both on the project construction grading plan and construction specifications. The SWPPP shall incorporate measures as lited above in section VII.

Any person desiring to present their views to the Department of Ecology concerning this application, may notify Ecology in writing within 30 days from the last date of publication of this notice. Comments may be submitted to: Dept. of Ecology, Stormwater Unit, PO Box 47696, Olympia, WA 98504-7696

Provide the exact dates (mm/dd/yy) that the first and second public notices will appear in the newspaper:

Date of the first notice _____ / _____ / _____ ;

Date of second notice _____ / _____ / _____ – Dates yet to be determined

Name of the newspaper which will run the public notices Ellensburg Daily Record

*Ecology is no longer requiring the submittal of the affidavit of publication.*

**Complete the above public notice information or provide a copy of the notice to be published.**

## X. Regulatory Status

| | |
|---|---|
| A. ☐ NPDES Permit (e.g., industrial stormwater)<br>Permit No. _____ | C. ☐ Air Notice of Construction, Permit, or Order<br>Agency _____ |
| B. ☐ State Waste Discharge Permit<br>Permit No. _____ | D. ☐ State/USEPA Hazardous Waste ID No.<br>_____ |

## XI. Certification of Permittee(s)

*"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."*

Andrew H. Young
Owner/Representative's Printed Name

NW Development Director, Zilkha Renewable Energy, LLC
Title

Owner/Representative's Signature

Date

Sign and return this document to the following address; for questions call (360) 407-6437: Washington Department of Ecology, Water Quality Program, Stormwater Unit, PO Box 47696, Olympia, WA 98504-7696

*The Department of Ecology is an equal opportunity agency and does not discriminate on the basis of race, creed, color, disability, age, religion, national origin, sex, marital status, disabled veteran's status, Vietnam Era veteran's status, or sexual orientation.*

(Rev. 3/01)

# Exhibit 8

## EXHIBIT 8: FOSSIL FUEL EMISSIONS

*According to the US Environmental Protection Agency, air emissions from fossil fuel combustion for electricity production is a leading source of air pollution nationally, accounting for:*

- *67% of sulfur dioxide emissions*
- *28% of nitrogen oxide emissions*
- *36% of carbon dioxide*
- *3% of mercury*

*The most likely alternative to wind energy generated by the Project would be electricity generated from the combustion of fossil fuels. Fuel combustion from electric utilities generated 417,000 tons of carbon monoxide and 6.1 million tons of nitrogen oxides in 1998. Total fossil fuel combustion produced 1,500 million metric tons carbon-equivalent of carbon dioxide in 1997. It is assumed that if the Project were not built, the power produced by the Project would be replaced by a natural gas-fired gas turbine sized to generate an average of 60 MW.*

*The following analysis of anticipated air quality impacts associated with a gas-fired turbine sized to generate an average of 60 MW is calculated based on the analysis presented in the Final SEPA EIS for FPL Energy's Stateline Wind Project, Section 1.1.4.*

*In the analysis conducted for the Stateline EIS, CH2M HILL air quality engineers reviewed permits of two facilities currently in operation in the Boardman, Oregon, area: the PGE Coyote Springs plant, and the Hermiston Generating plant. Each of these plants currently operates two gas-fired turbines of approximately 250 MW each. Using EPA's standard emission factor document Compilation of Air Pollutant Emission Factors, Fifth Edition, Section 1.4 CO2 emissions are estimated at 120,000 lbs per million cubic feet of gas burned. Using this emission factor, the information in the operating permit for each facility, and scaling down to a 60-MW plant, CO2 emissions would be in excess of 2,000,000 tons per year. Similarly, nitrogen dioxide emissions would be in excess of 30 tons per year. Carbon monoxide emissions would be in excess of 50 tons per year. It should be noted, however, that in addition to the emissions from generation itself, a gas turbine generation facility also would have emissions of sulfur oxides, nitrogen oxides, and particulates associated with the extraction and transportation of natural gas. Therefore, as the energy produced by the Project displaces the need for other energy produced by fossil fuel combustion, operation of the Project will have a positive effect on air quality and climate change by reducing overall air emissions.*

**Exhibit 9**

# Extended Map Legend

## *Current Vegetation Types of the Kittitas Valley Wind Power Project*

**December 4, 2002**

The attached current vegetation map for the Kittitas Valley Wind Power Project delineates the generalized plant cover types present within the project area as proposed through November 15, 2002. Cover types were delineated within a buffer area extending at least 300 meters (m) from proposed project facilities. In total, 25,131 hectares (ha) were included in the 300 m buffer corridor. In addition, lithosolic (shallow-soiled) plant communities were broken out within a smaller corridor, extending 50 m from the proposed facilities. It should be noted that proposed facilities locations were revised late in 2002. The 300 m buffer area on this version of the map was reduced in overall extent to reflect areas dropped from consideration. Due to slight changes in proposed alignments, the 50 m corridor, in which lithosols were broken out, may not exactly reflect current proposed facilities locations.

It is also important to note that the lithosol areas most often occurred in a mosaic pattern, alternating with deeper-soiled habitats. At the project scale, it was not possible to break out each small inclusion of lithosol. Therefore, a 50% threshold was used: *i.e.* when a polygon contained a total areal lithosol extent of 50% or greater, the polygon was typed as lithosol; and when the lithosol areas made up less than 50% of the mosaic, the polygon was typed as the deeper-soiled habitat.

The initial cover type mapping was accomplished using orthorectified, low altitude, digital true-color aerial photos obtained from Kittitas County. Cover types were delineated visually from these photos, and digitized directly into the project Geographic Information System (GIS) using the ArcView® 3.2a GIS application. Large scale preliminary field maps were then produced showing the vegetation polygons.

The initial vegetation typing was then field verified at the site in July of 2002 by two botanists. Using the preliminary field maps, the botanists visually surveyed the majority of ground within the 300 m buffer corridor to confirm the typing and boundaries of the preliminary map. In addition, they walked or drove the entire 50 m buffer corridor and broke out areas of lithosolic plant communities within the corridor. The lithosols were not distinguishable on the photos from the Grassland and Low Sagebrush cover types, so it was necessary to perform this delineation in the field.

Revisions were made to the current vegetation theme in the GIS based on the data gathered during the field verification process. This theme was then projected onto a USGS topographic base map, and output at a 1:12500 scale for the final version. The cover types delineated are described more fully below.

**Wetlands (WE):** This cover type includes emergent, scrub-shrub, and forested wetlands. These were typed based on current vegetation and hydrology present in July of 2002. No attempt was made to formally delineate these wetlands, and actual jurisdictional extent may be greater or lesser than shown. In addition, wetlands too small to be delineated from the aerial photos are not

shown on this map. A total of 1.6 ha were typed as wetlands, which is 0.01% of the 300 m buffer corridor.

**Riparian (RI):** The Riparian cover type was used to describe non-forested areas of riparian vegetation along drainages. Many of the drainages within the project area contained only dryland vegetation, and were therefore not typed in this category. In total, 55 ha of land fell into the Riparian category, or 0.2% of the 300 m buffer corridor.

**Riparian Trees (RT):** This cover type includes areas within riparian zones dominated by trees. Primarily this includes hydrophytic species such as cottonwoods (*Populus balsamifera* ssp. *trichocarpa*), but conifers are also present in some riparian areas. 279 total hectares were typed as Riparian Tree, which is 1.1% of the 300 m buffer corridor.

**Dense Conifers (CF1) and Sparse Conifers (CF2):** Upland areas dominated by coniferous trees were typed as either Dense or Sparse Conifers depending on the relative spatial density of the trees. In total 174 ha of land were typed as Conifers (0.7% of the 300 m buffer corridor) with 146 ha in the Dense category and 26 ha in the Sparse category.

**Deciduous Shrub Thicket (TH):** This cover type was used to describe upland areas dominated by deciduous shrubs. These tend to be located on more mesic sites than the Shrub-Steppe cover type (described below). Typical shrub species for this cover type include chokecherry (*Prunus virginiana*), bittercherry (*Prunus emarginata*), oceanspray (*Holodiscus discolor*), common snowberry (*Symphoricarpos albus*), and serviceberry (*Amelanchier alnifolia*). The Deciduous Shrub Thicket cover type is present on a total of 611 ha, or 2.4% of the 300 m buffer corridor.

**Dense Shrub-Steppe (ST1), Moderate Shrub-Steppe (ST2), and Sparse Shrub-Steppe (ST3):** Upland areas dominated by tall shrubs, primarily bitterbrush (*Purshia tridentata*), and which contained an understory of bunchgrasses (or in disturbed areas cheatgrass [*Bromus tectorum*]), were classed as Shrub-Steppe. The category was further broken down based on the relative spatial density of the shrub layer. Shrub-Steppe vegetation is typically found on drier sites than Deciduous Shrub Thicket types. Overall, the Shrub-Steppe category was present on 12,858 ha of land (51.2% of the 300 m buffer corridor), with 595 ha categorized as Dense, 6054 ha as Moderate, and 6209 ha categorized as Sparse.

**Low Sagebrush (SL):** The Low Sagebrush category was used to describe shallow-soiled areas dominated by low sagebrushes; primarily rigid sagebrush (*Artemisia rigida*). These areas are typically rockier and contain less biomass than the Shrub-Steppe category. Within the 50 m buffer corridor, the Low Sagebrush category was usually broken out as a Lithosolic Plant Community (see below). A total of 1,014 ha (or 4.0% of the 300 m buffer corridor) were typed as Low Sagebrush, however, that figure does not include the Low Sagebrush areas broken out as Lithosolic Plant Communities.

**Grassland (GR):** This cover type includes a variety of plant associations, all dominated by grass species. In most cases these are bunchgrasses, such as Sandberg's bluegrass (*Poa secunda*) or bluebunch wheatgrass (*Pseudoroegnaria spicata*), but disturbed areas are sometimes dominated by cheatgrass or bulbous bluegrass (*Poa bulbosa*). Some of the Grassland areas are former

Shrub-Steppe habitats that have lost their shrub component due to fire or other disturbance. Most of the Lithosolic Plant Communities (see below) broken out of the 50 m buffer corridor came out of the Grassland category. A total of 7919 ha of ground (31.5% of the 300 m buffer corridor) were typed as Grassland, although this does not include the Grassland areas that were broken out as Lithosolic Plant Communities within the 50 m buffer corridor.

**Lithosolic Plant Communities (LI):** This cover type is actually a sub-category of two other cover types (Low Sagebrush and Grassland). It is characterized by a layer of low shrubs (rigid sagebrush) and/or low shrubby forbs (various buckwheats [*Eriogonum* spp.]), over a uniform layer of Sandberg's bluegrass. By definition, this cover type occurs on shallow, rocky soils. Because delineation of the lithosolic plant communities was only possible through on-site inspection, this sub-category was only broken out from the Low Sagebrush and Grassland types within the 50 m buffer corridor. It should be noted that in many parts of the project area, lithosols occur as small inclusions in deeper-soiled habitats. These inclusions are typically too small and numerous to map, even at the large scale presented here. For this reason, a 50% threshold was used in delineating the lithosols: *i.e.* where lithosols comprised 50% or more (as estimated visually) of the ground within a mapping unit, it was classed as a Lithosolic Plant Community. This results in some lithosolic polygons with significant inclusions of deeper-soiled habitats, and some non-lithosolic polygons that contain numerous shallow-soiled areas. In total, 1,836 ha were classed as lithosol, which is 39.0% of the 50 m buffer corridor.

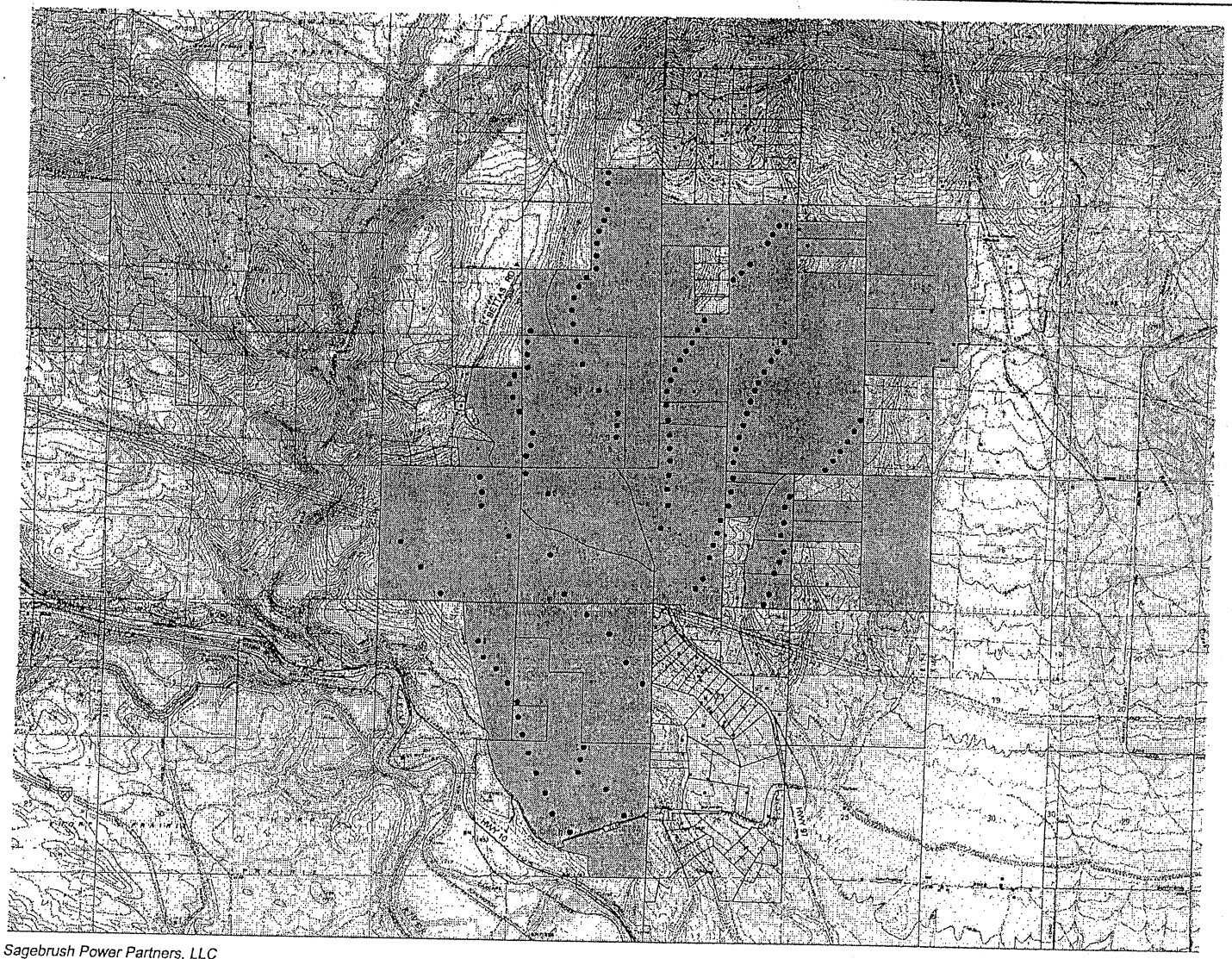
**Surface Water (WA):** This category includes rivers, streams, and stock watering ponds. 12 ha were classified as Surface Water, which is 0.05% of the 300 m buffer corridor.

**Talus (TA):** The Talus cover type includes slopes comprised primarily of smaller rocks and boulders. This is a primarily non-vegetated type, although scattered trees, shrubs, and forbs may be present. A total of 50 ha of Talus were identified, which is 0.2% of the 300 m buffer corridor.

**Developed (DE):** This type includes residential homes, paved roads, farm buildings and yards, urban areas, and industrial/commercial land. It includes areas where human disturbance has removed or altered most or all of the vegetation. A total of 322 ha of Developed land were delineated, which is 1.3% of the 300 m buffer corridor.

Current Vegetation Types of the
Kittitas Valley Wind Power Project
Vegetation Type
Wetland
Riparian
Riparian Trees
Dense Conifers
Sparse Conifers
Deciduous Shrub Thickat
Dense Shrub-steppe
Moderate Shrub-steppe
Sparse Shrub-steppe
Low Sagebrush
Grassland
Lithosolic Plant Community
Other Features
Surface Water
Talus
Developed
50 m Lithosol Survey Corridor
300 m Buffer Corridor
Turbine Locations and String Name
Scale 1:12500
Contour Interval 40 ft.
500 0 500 1000 Meters
EAGLE CLIF CONSULTING

**Exhibit 10**




N

0 2000 4000 6000
Scale In Feet

LEGEND:

- PARTICIPATING LAND OWNER
- PROPOSED WTG LOCATION
- $N_1$ NAME & TURBINE COUNT
- EXISTING HOUSES/BLDGS

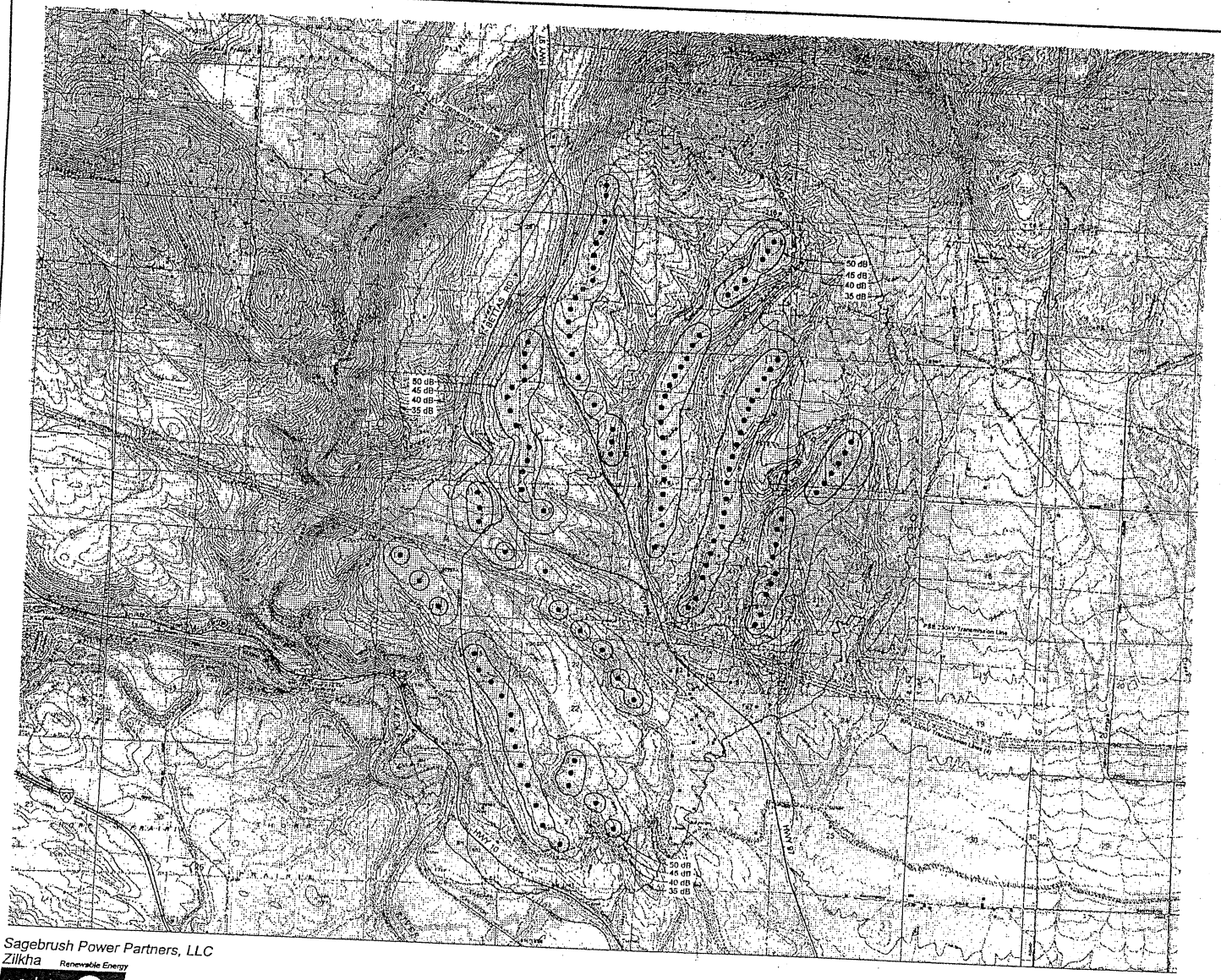
Sagebrush Power Partners, LLC
Zilkha Renewable Energy

EXHIBIT 21-1
HOUSE AND WTG LOCATIONS
APPLICATION FOR SITE CERTIFICATE
KITTITAS VALLEY WIND POWER PROJECT
JANUARY 2003

CH2MHILL

170365.C1
FILENAME: zp-fig08-noise.dgn PLOT DATE: 10-JAN-2003 PLOT TIME: 12:37:24

**Exhibit 11**




Sagebrush Power Partners, LLC
Zilkha Renewable Energy

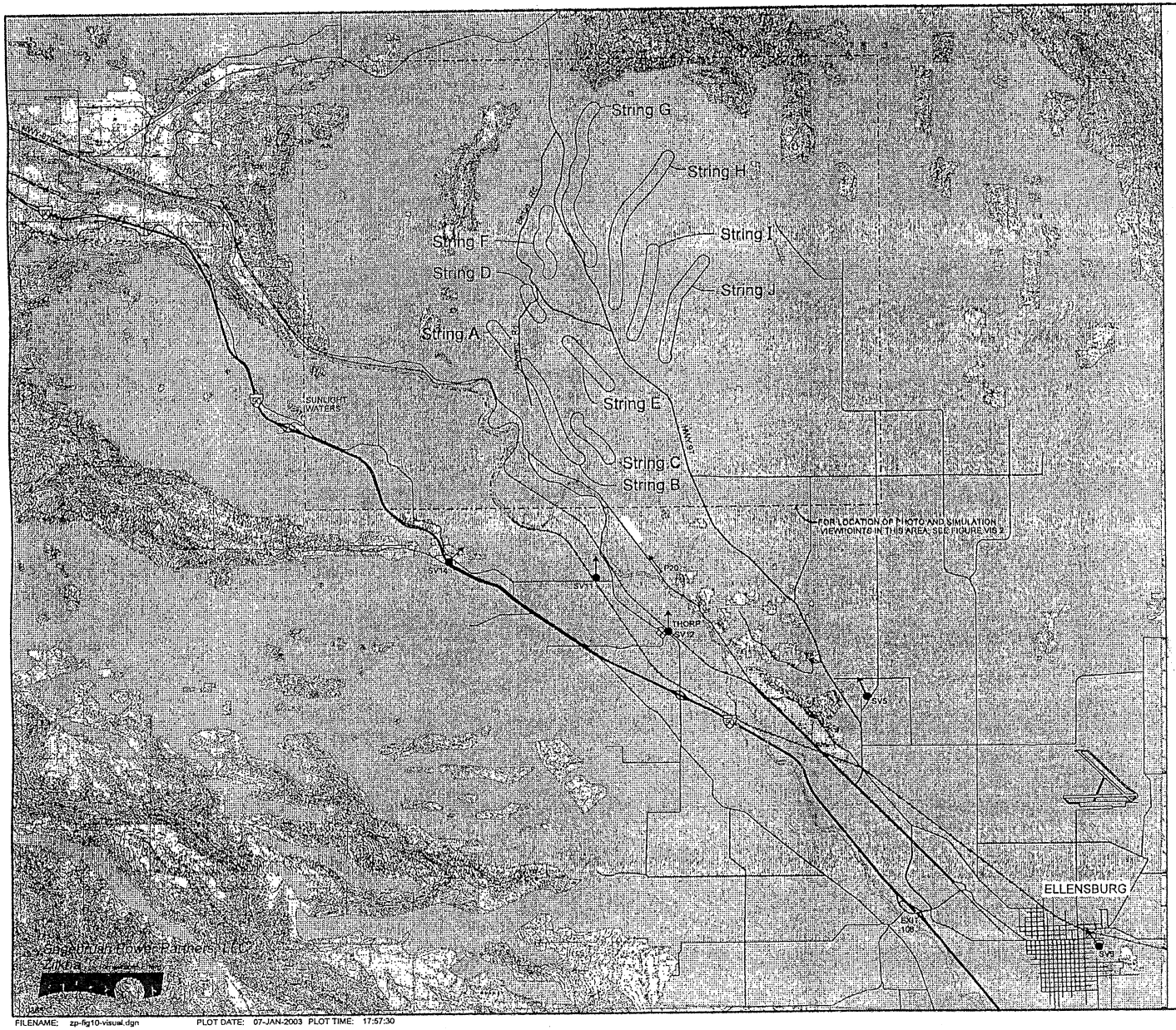
170365.C1

FILENAME: zp-fig09-noise.dgn PLOT DATE: 10-JAN-2003 PLOT TIME: 12:43:19

EXHIBIT 21-2
NOISE IMPACT ZONES
APPLICATION FOR SITE CERTIFICATE
KITTITAS VALLEY WIND POWER PROJECT
JANUARY 2003

CH2MHILL

**Exhibit 12**




N

0 1 2 3
Scale In Miles

LEGEND:

- MAJOR ROADWAYS IN THE PROJECT AREA
- PROPOSED WTG STRING LOCATION
- AREAS WITHIN THE REGION WHERE TURBINES HAVE THE POTENTIAL TO BE SEEN
- P20 LOCATION OF PHOTO
- SV11 LOCATION OF VIEW USED AS THE BASIS FOR THE PREPARATION OF A VISUAL SIMULATION
- JOHN WAYNE TRAIL

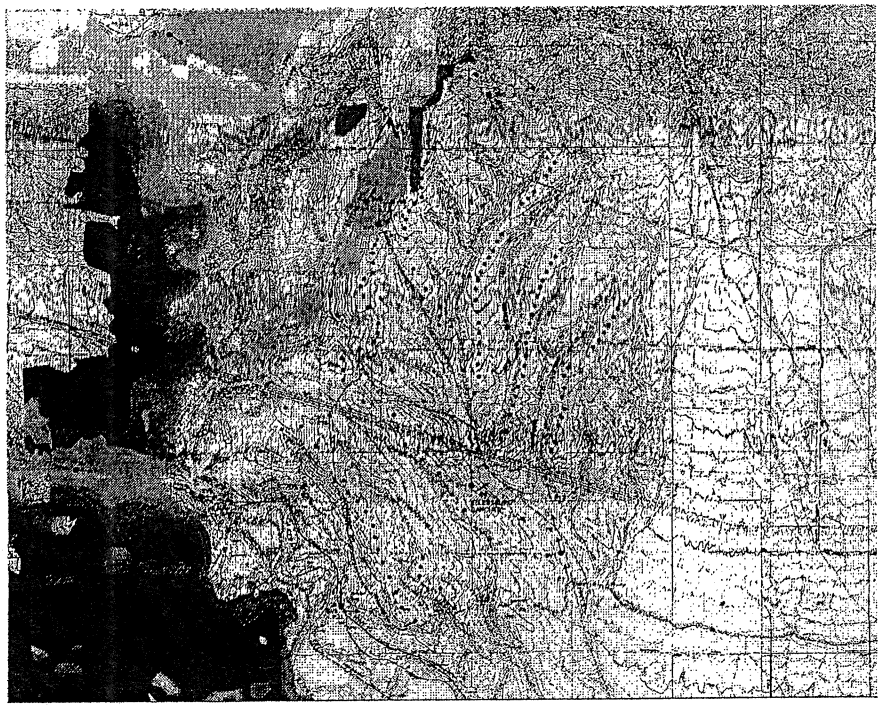
FIGURE X
TITLE
APPLICATION FOR SITE CERTIFICATE
KITTITAS VALLEY WIND POWER PROJECT
JANUARY 2003

CH2MHILL

FILENAME: zp-fig10-visual.dgn PLOT DATE: 07-JAN-2003 PLOT TIME: 17:57:30

**Exhibit 13**

FIRE DISTRICT 7 (CLE ELUM)



N

0 2000 4000 8000
Scale in Feet

LEGEND:

- PROPOSED WTG LOCATION
- STRING NAME & TURBINE COUNT
- EARTHEN ACCESS ROAD
- NEW ACCESS ROAD
- UNDERGROUND ELECTRICAL
- OVERHEAD ELECTRICAL
- USING AND/OR O.H. ELECTRICAL
- M11 MET TOWER - PERMANENT
- P20 PHOTO VIEWPOINT
- SV11 SIMULATION VIEWPOINT

NUMBER OF TURBINES POTENTIALLY VISIBLE

- 1 - 9
- 7 - 12
- 13 - 24
- 25 - 36
- 37 - 60
- 61 - 84
- 85 - 110

Sagebrush Power Partners, LLC
Zilkha Renewable Energy

EXHIBIT 22-2
VISUAL SIMULATION PHOTO
AND VIEWPOINT LOCATIONS
APPLICATION FOR SITE CERTIFICATE
KITTITAS VALLEY WIND POWER PROJECT
JANUARY 2003

CH2MHILL

110366.01
FILENAME: sp-fig10-visual.dgn PLOT DATE: 10-JAN-2003 PLOT TIME: 12:42:32

**Exhibit 14**

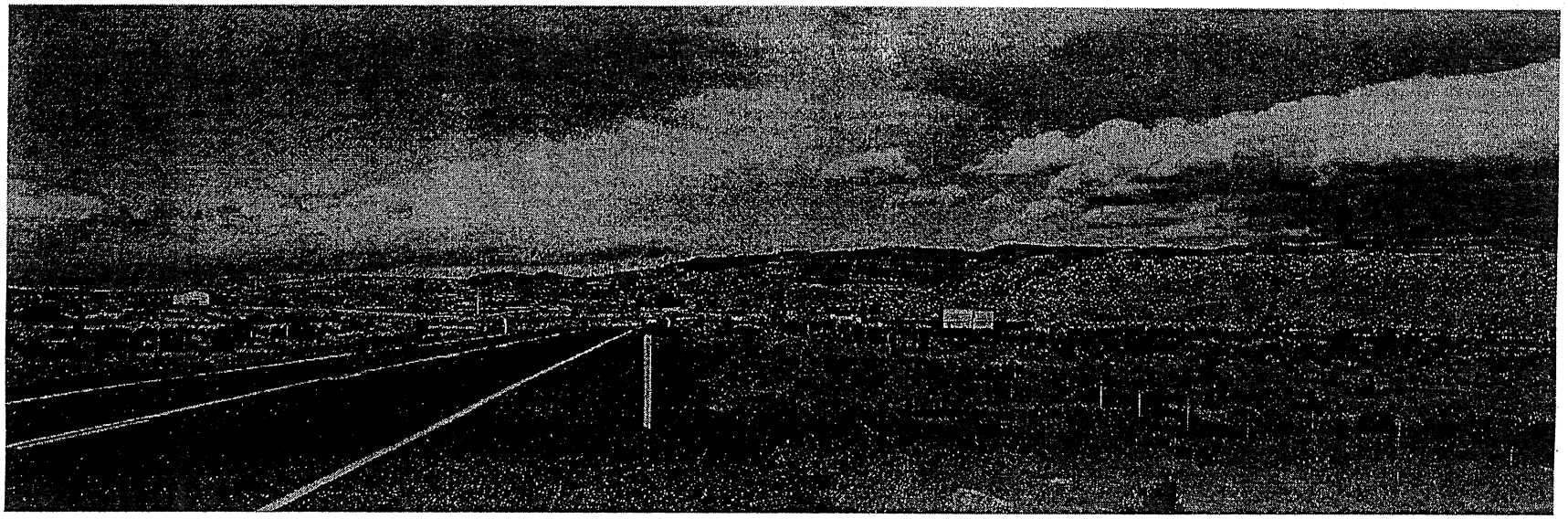


Photo 1. Highway 97 at North Branch Canal – view looking north.

Photo 2. Highway 97 at northern end of Nacho Lane – view looking north.

**FIGURE XXX**
**KITTITAS VALLEY WIND ENERGY PROJECT**

**CH2M**HILL

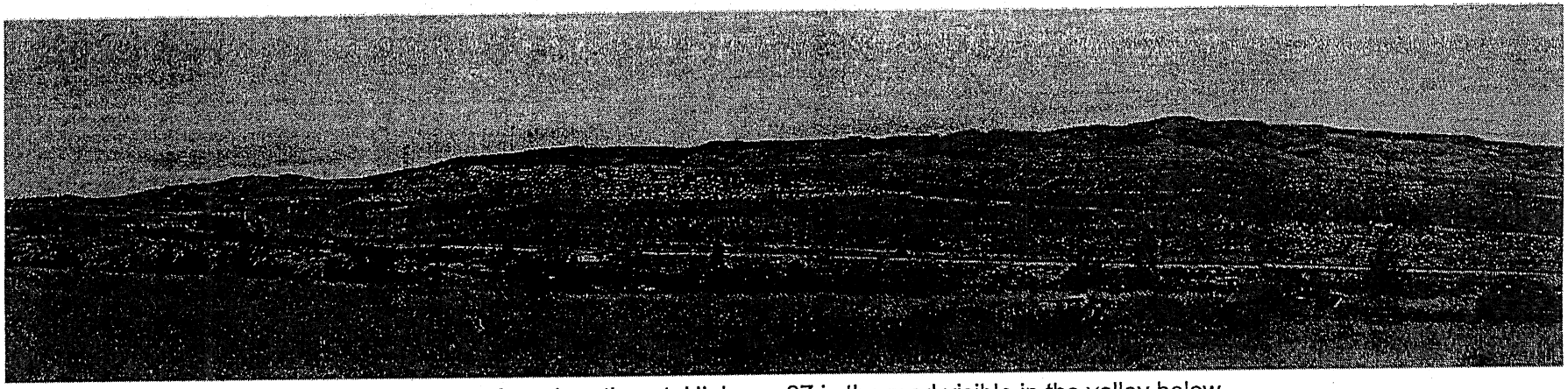


Photo 3. Sagebrush Lane - view looking north and northeast. Highway 97 is the road visible in the valley below.

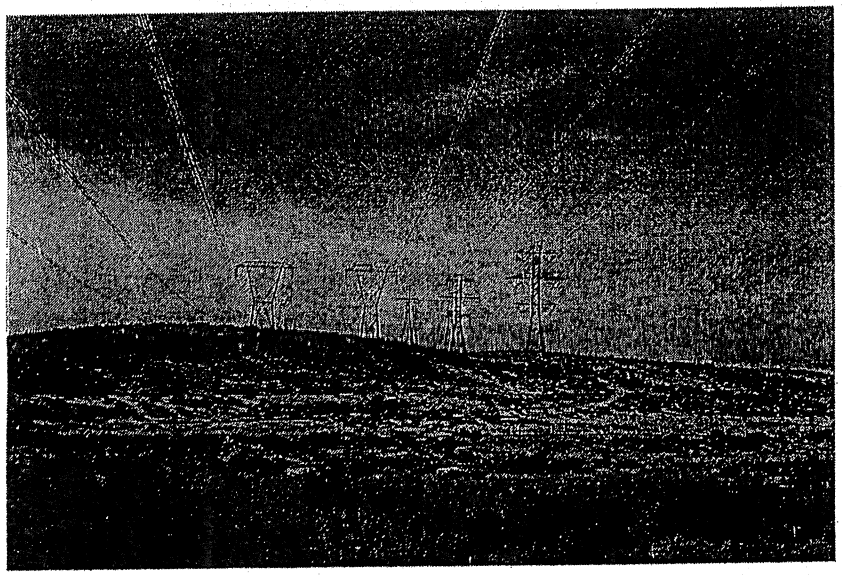


Photo 4. Highway 97 - view looking west along Bonneville Power Authority (BPA) transmission corridor.

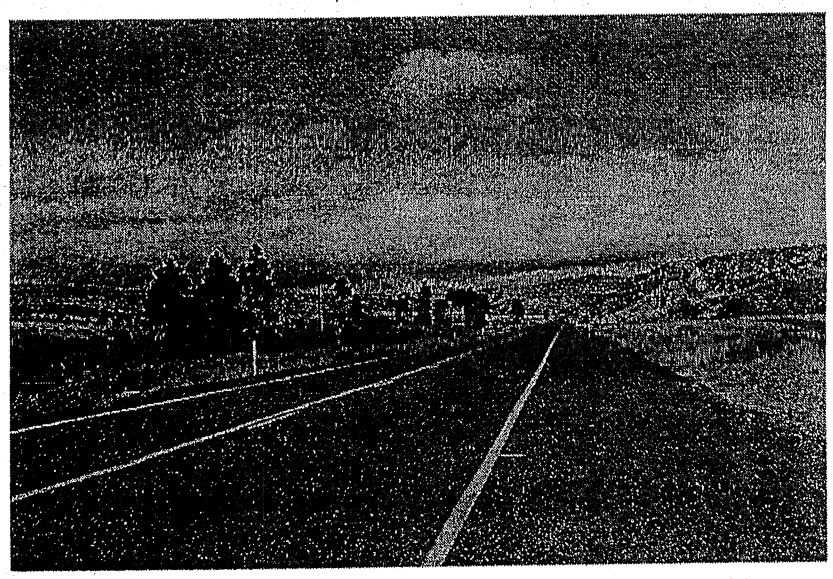


Photo 5. Highway 97 at crossing of BPA transmission corridor

**FIGURE XXX**
**KITTITAS VALLEY WIND ENERGY PROJECT**

**CH2M**HILL

Photo 6. Highway 97 at Bettas Road. View looking north northwest toward proposed site of project operation and maintenance facility and substation.

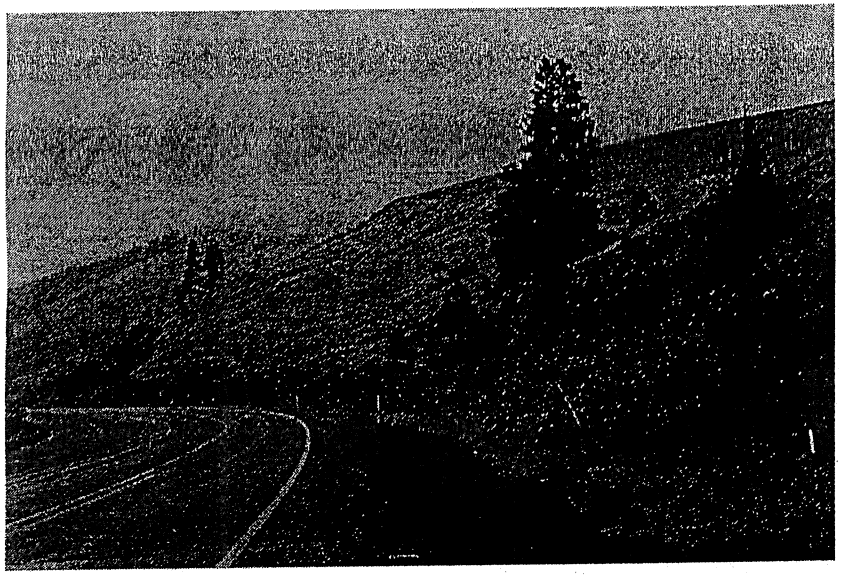


Photo 7. Highway 97 just north of gravel pit. View looking north as road begins to travel down slope.

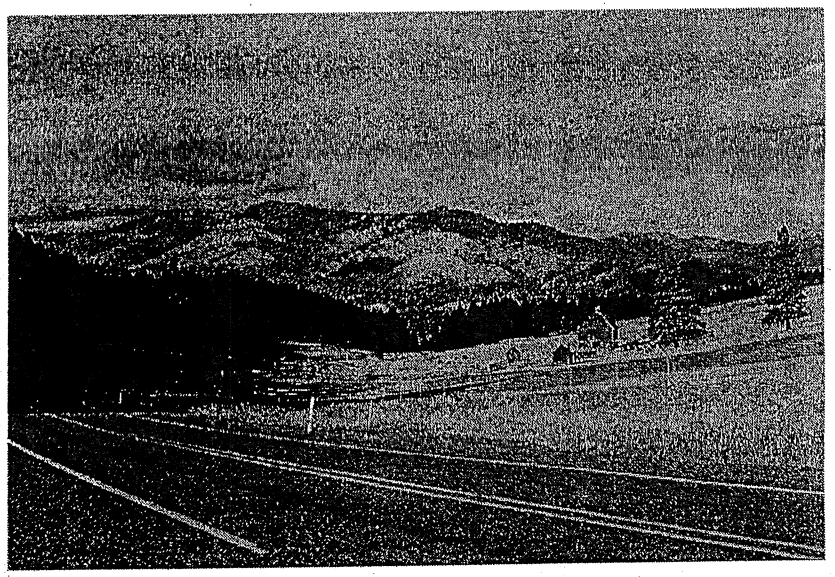


Photo 8. Highway 97 at intersection with northern end of Bettas Road.

**FIGURE XXX**
**KITTITAS VALLEY WIND ENERGY PROJECT**

**CH2M**HILL

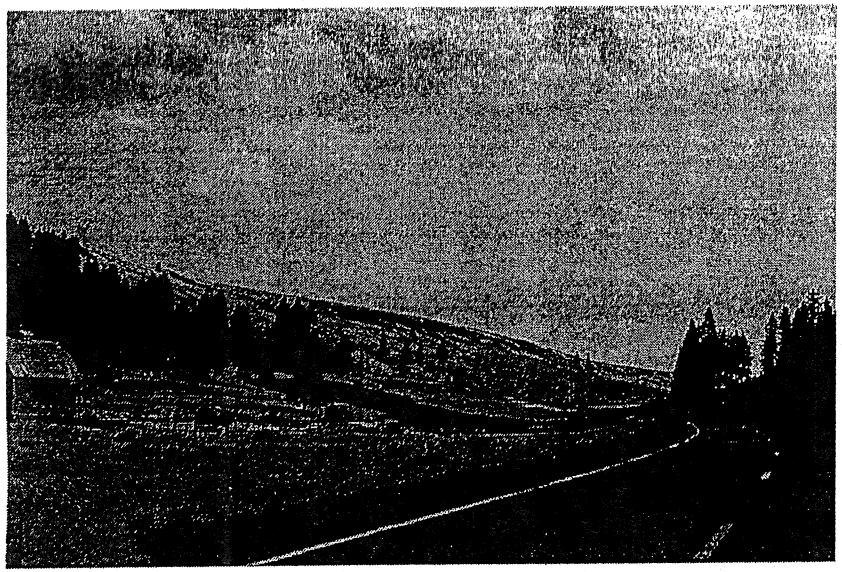


Photo 9. Highway 97 between Highway 97 and northern end of Bettas Road. View looking south.

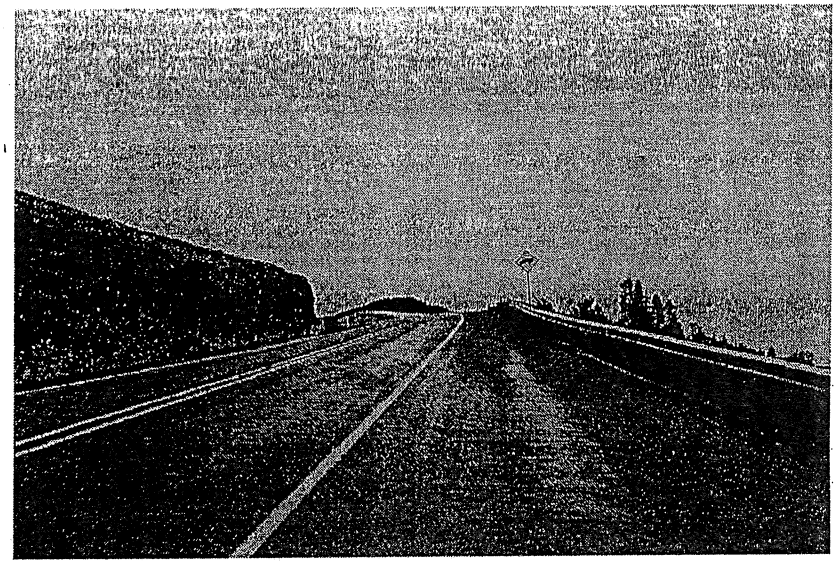


Photo 10. Highway 97 just north of gravel pit – view looking south.

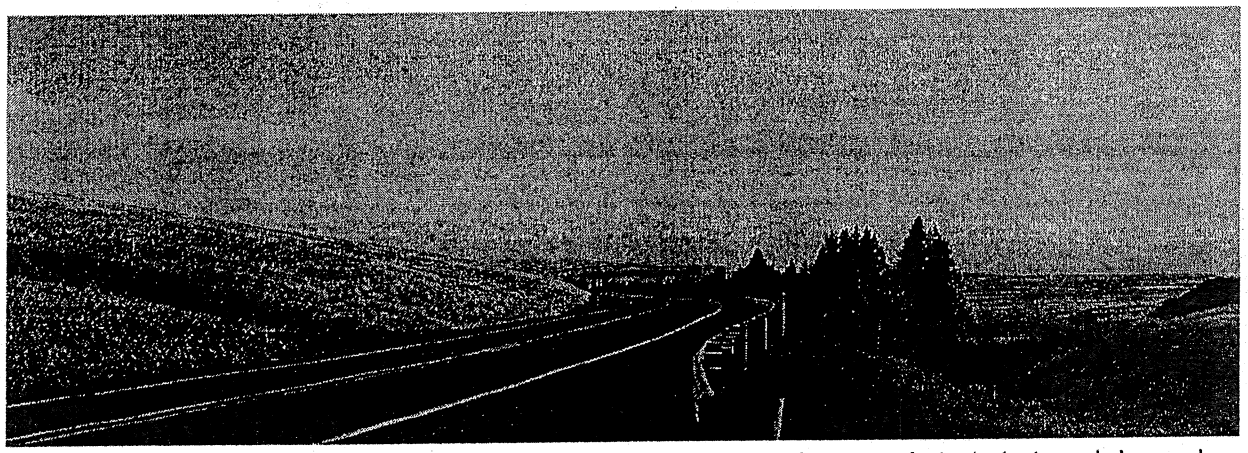


Photo 11. Highway 97 just south of gravel pit. View looking south as road starts to travel down slope.

**FIGURE XXX**
**KITTITAS VALLEY WIND ENERGY PROJECT**

**CH2M**HILL

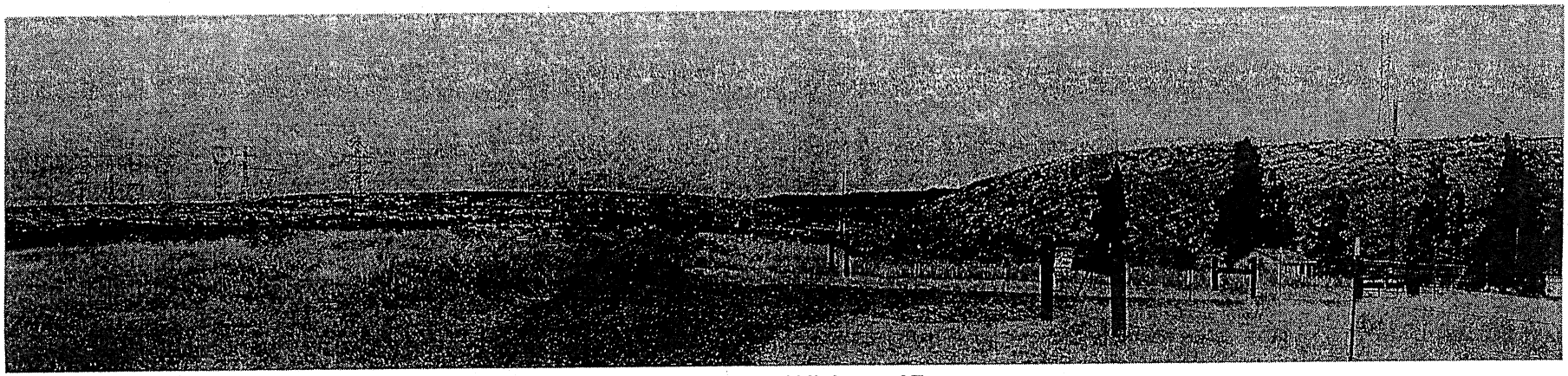


Photo 12. Cricklewood Lane – view looking north into ridge area east of Highway 97.

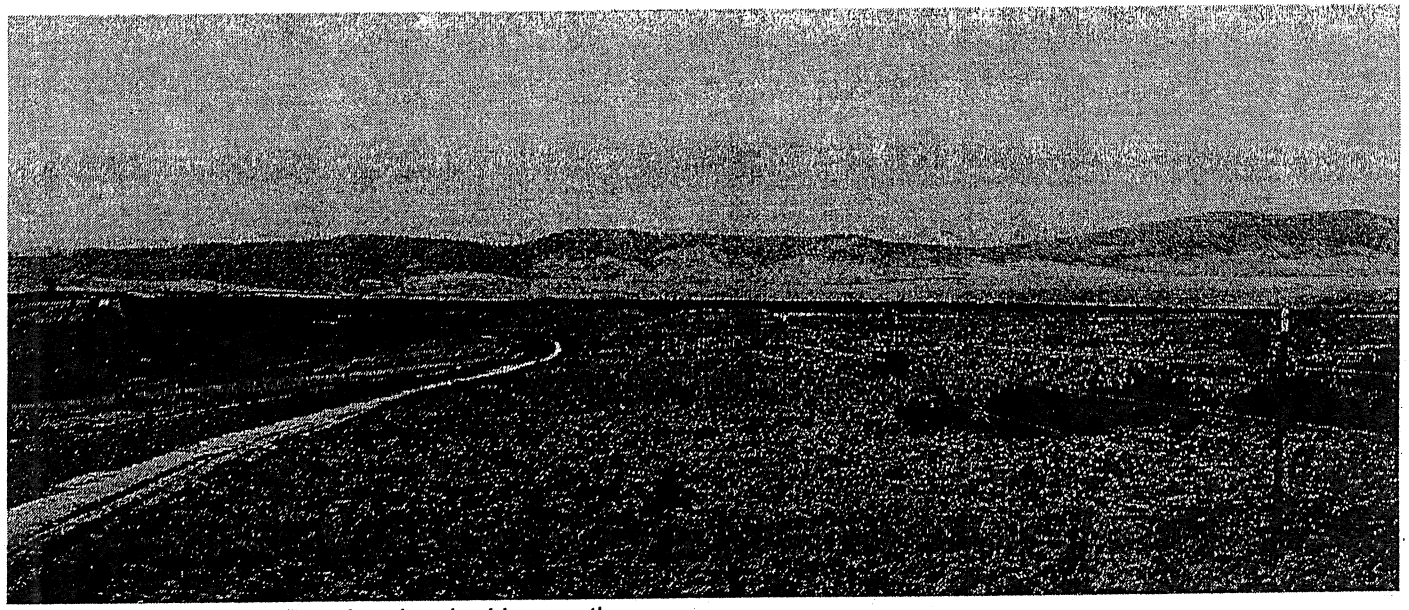


Photo 13. Elk Springs Road – view looking north.

Zilkha Renewable Energy

FIGURE XXX
KITTITAS VALLEY WIND ENERGY PROJECT

CH2MHILL

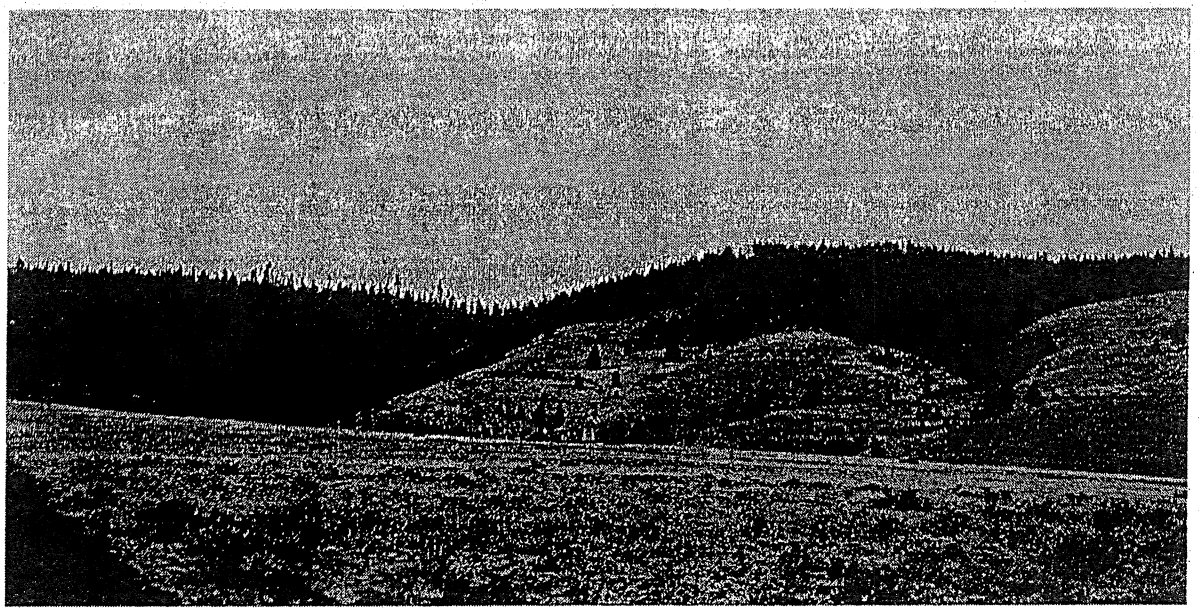


Photo 14. Northern portion of Elk Springs Road –view looking north toward Section 35.

Photo 15. Bettas Road at Hayward Road – view looking north.

**FIGURE XXX**
**KITTITAS VALLEY WIND ENERGY PROJECT**

**CH2M**HILL

Photo 16. Bettas Road - view looking north.

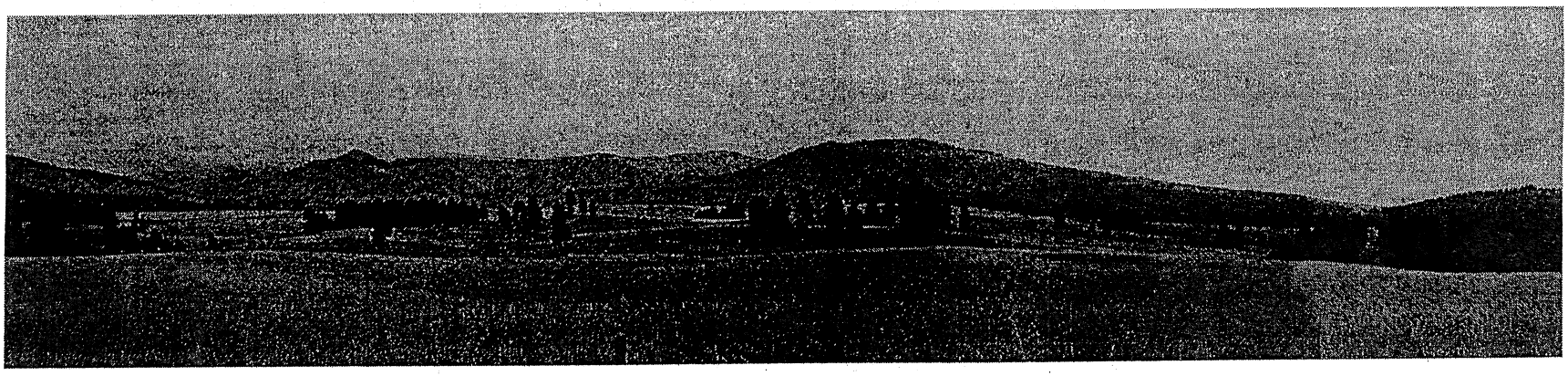


Photo 17. Hidden Valley Road – view looking east.

**FIGURE XXX**
**KITTITAS VALLEY WIND ENERGY PROJECT**

**CH2M**HILL

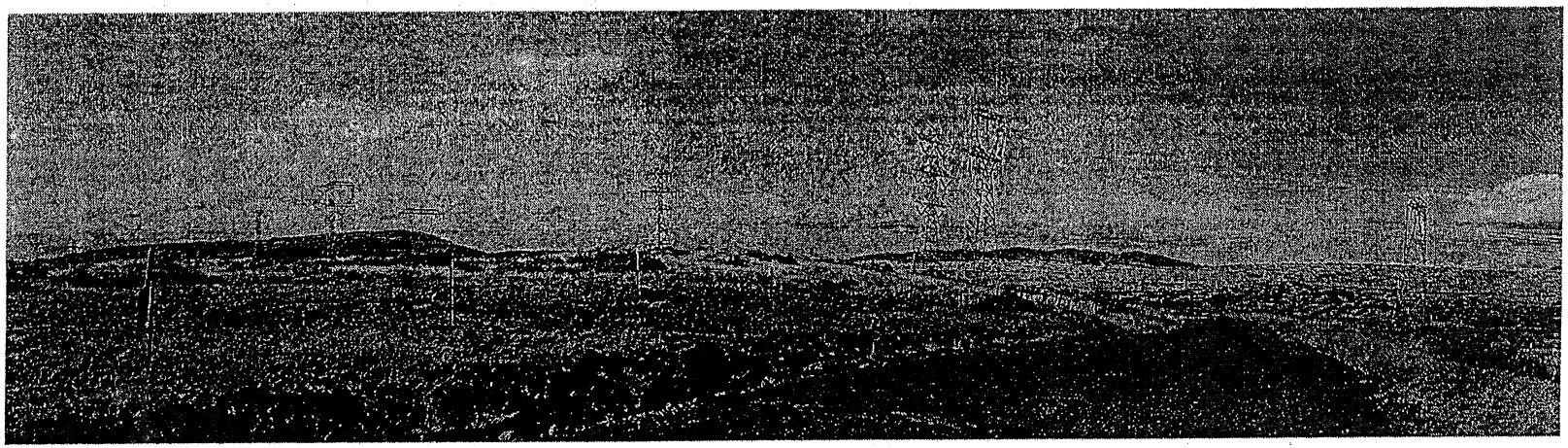


Photo 18. Hayward Road – view looking north.the culvert to use as a landmark to compare with Photo A.

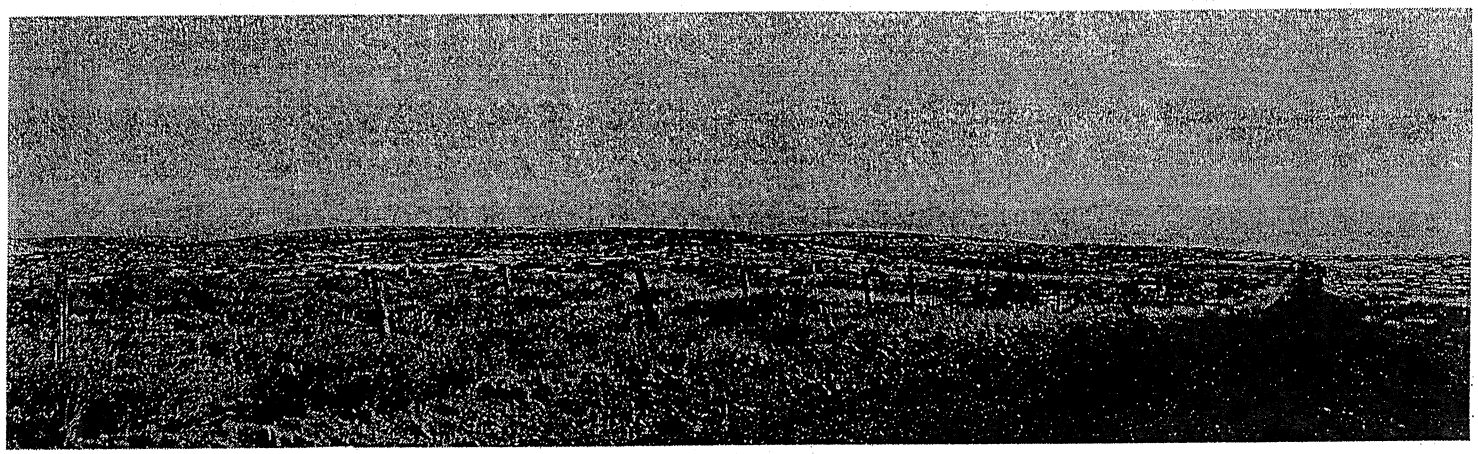


Photo 19. Hayward Road – view looking south.

FIGURE XXX
KITTITAS VALLEY WIND ENERGY PROJECT

CH2MHILL

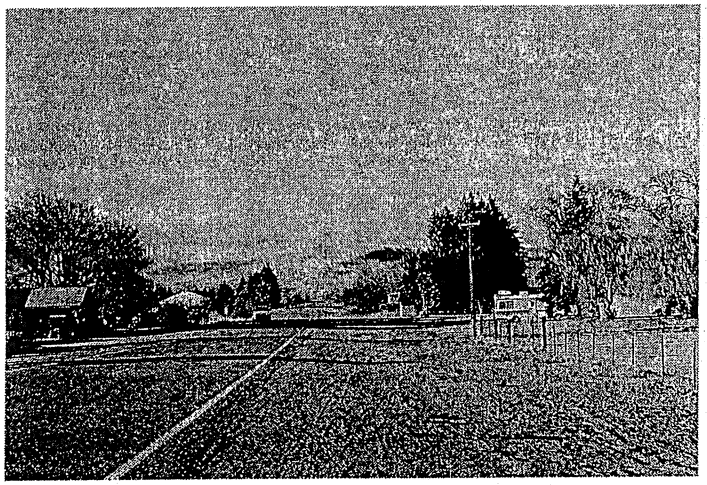


Photo 20. Highway 10 at Fire District 1 fire station. View looking northwest.

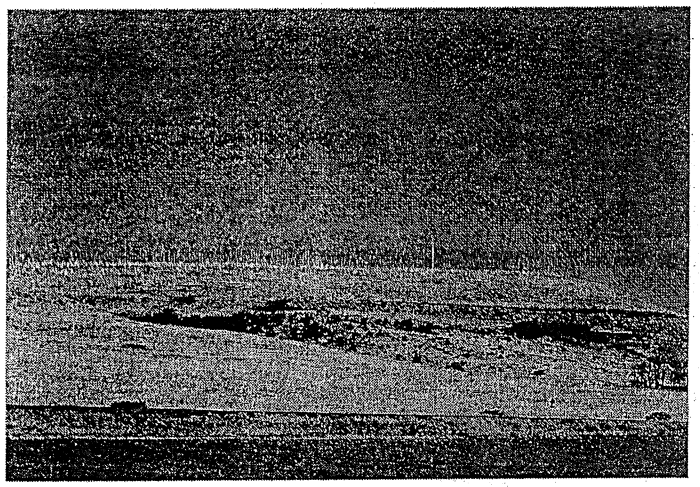


Photo 21. Thorp Highway at Highway 10 – view looking east.

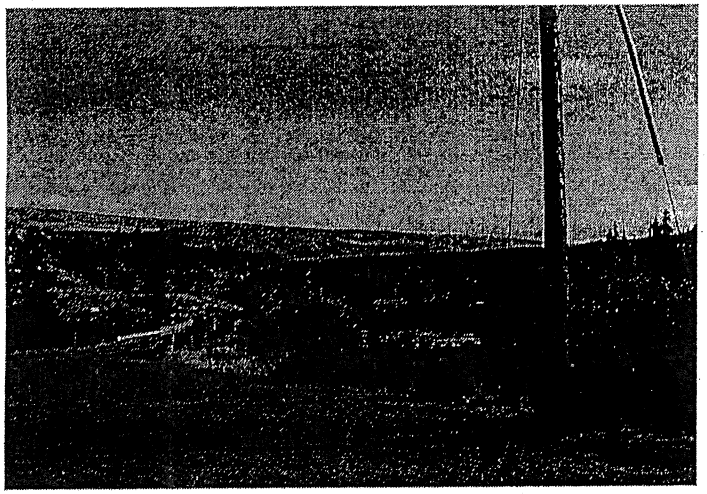


Photo 22. Highway 10 west of Swauk Creek – view looking east.

Photo 23. Highway 10 3.8 miles west of Thorp Highway – view looking east.

**FIGURE XXX**
**KITTITAS VALLEY WIND ENERGY PROJECT**

**CH2M**HILL

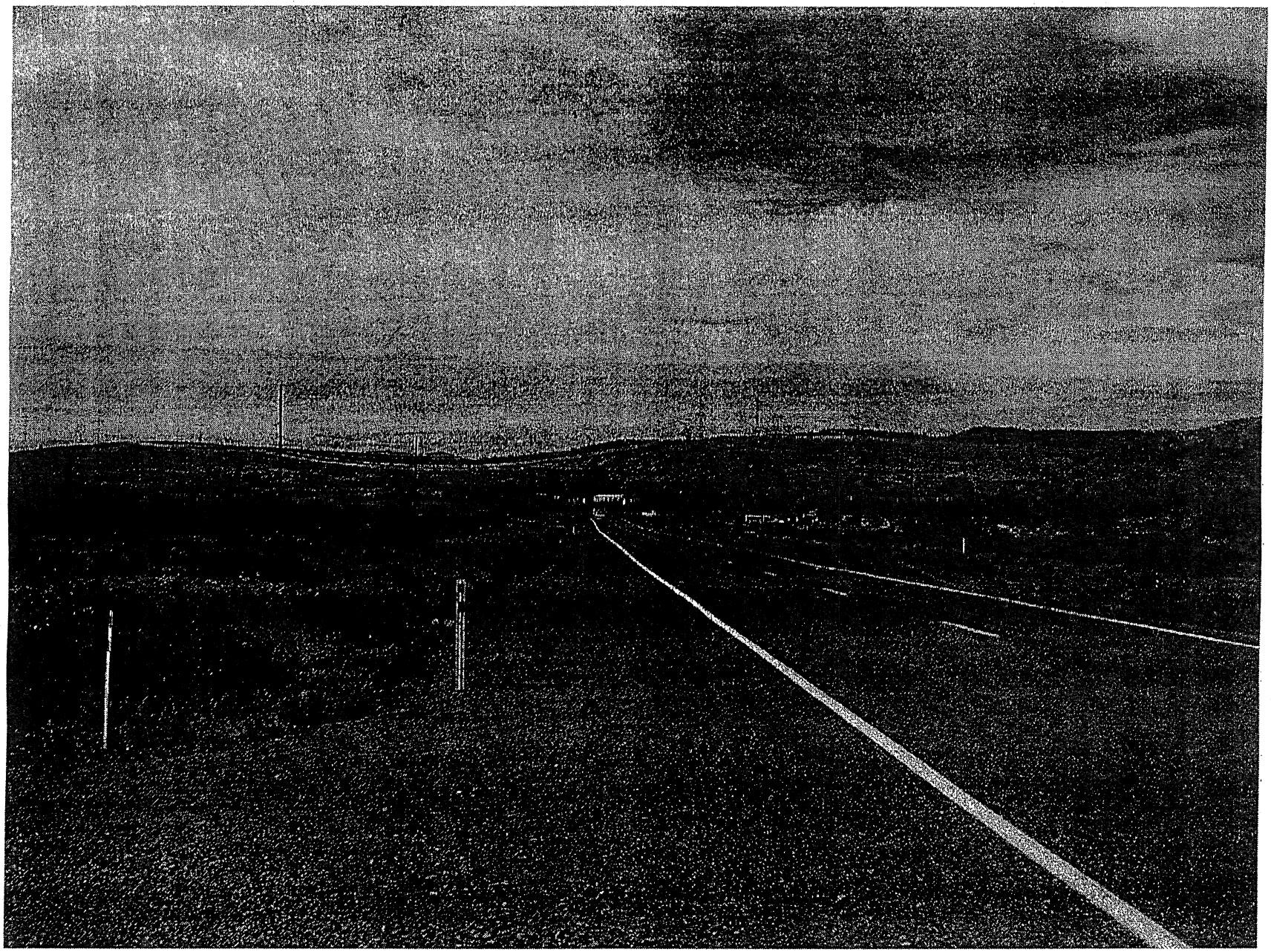


Figure Vis 4a - Simulation View 1: Existing view from Highway 97 at Eburg Ranches Road looking north

KITTITAS VALLEY WIND ENERGY PROJECT

CH2MHILL

170365.C1.01_E112002002SFO•KVWEP photo SIMS•12/3/02•ccc

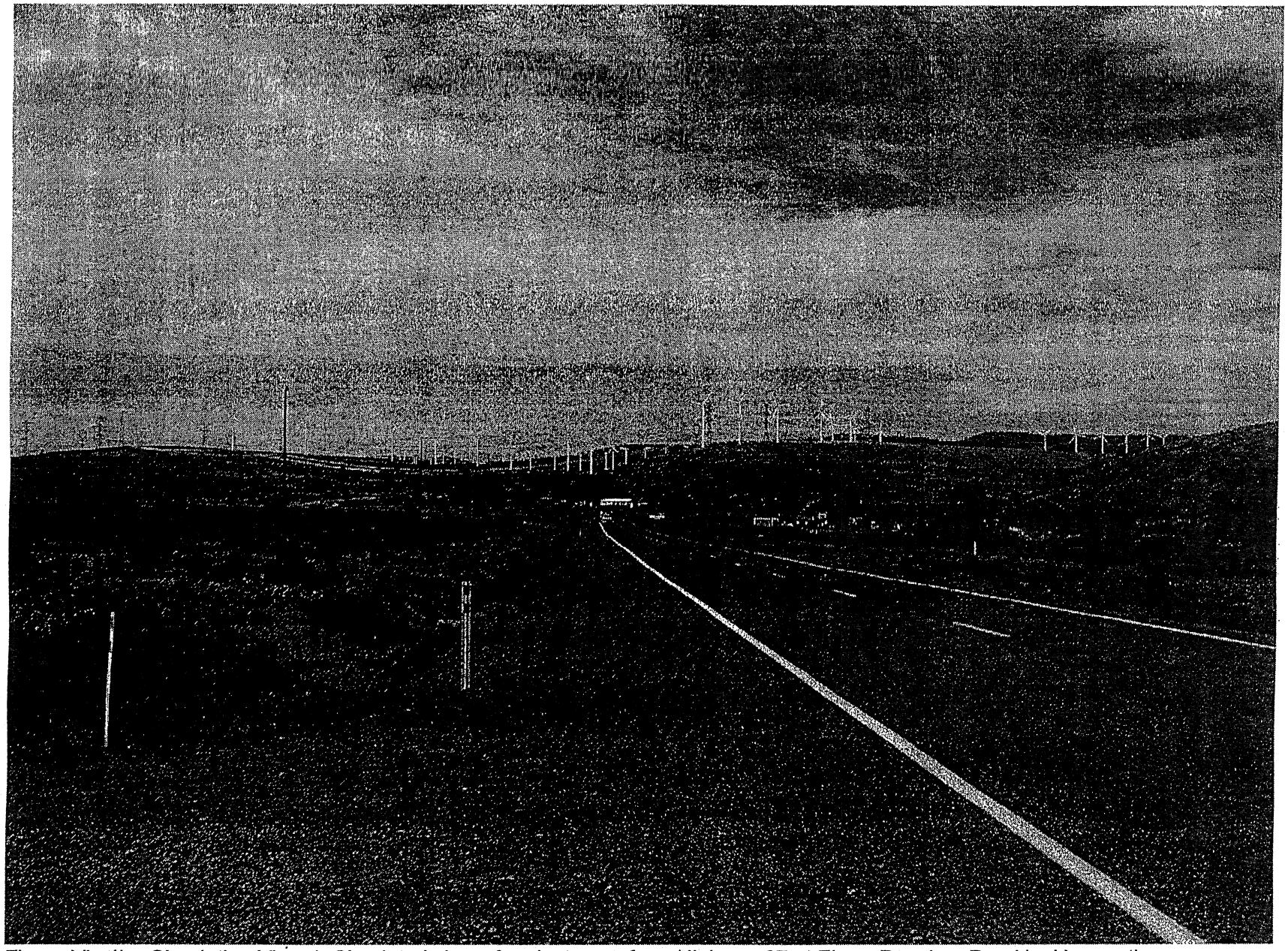


Figure Vis 4b - Simulation View 1: Simulated view of project seen from Highway 97 at Eburg Ranches Road looking north

KITTITAS VALLEY WIND ENERGY PROJECT

CH2MHILL

170365.C1.01_E112002002SFO•KVWEP photo SIMS•1/8/03•ccc

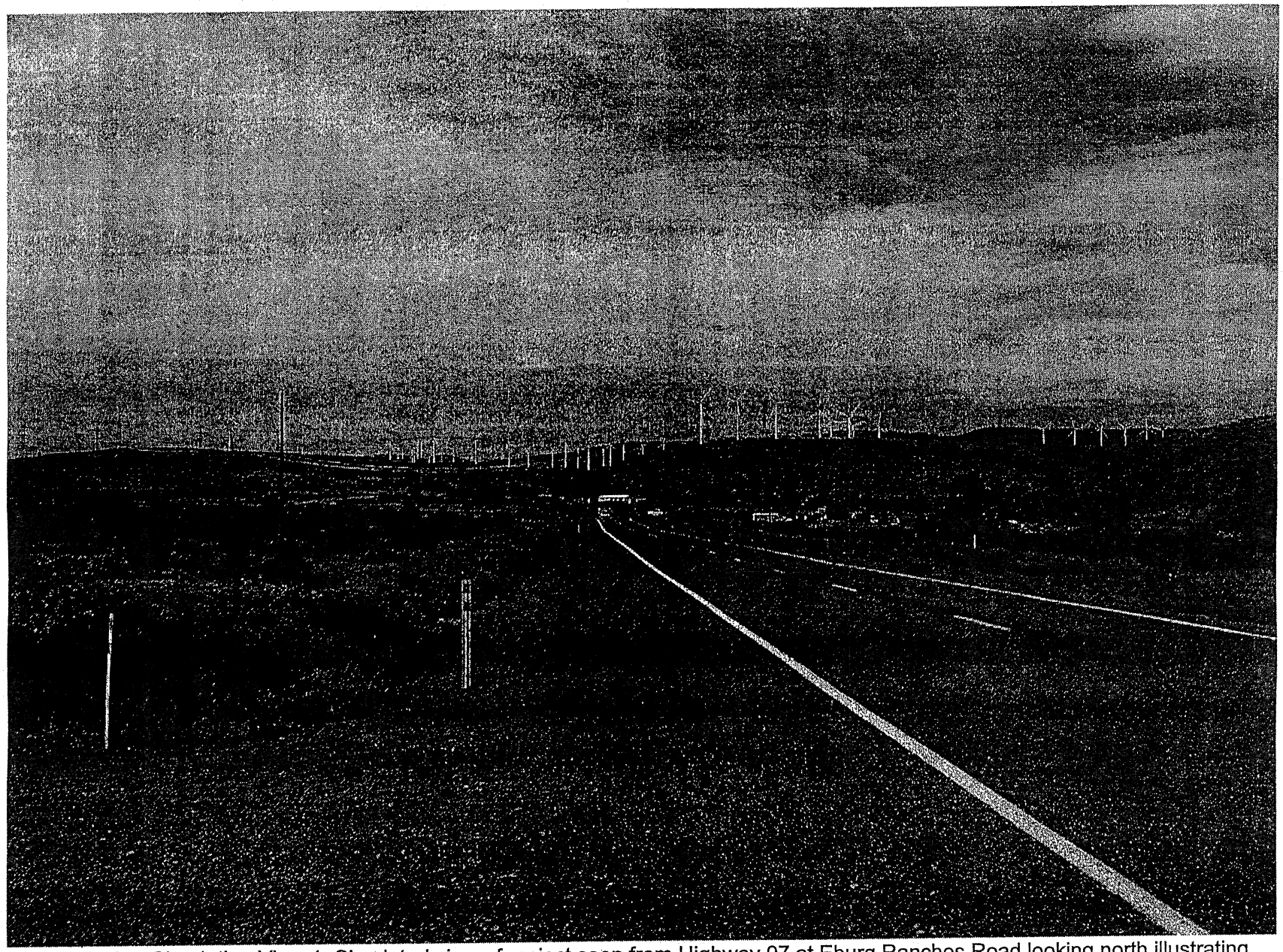


Figure Vis 4c - Simulation View 1: Simulated view of project seen from Highway 97 at Eburg Ranches Road looking north illustrating the appearance of larger turbines

KITTITAS VALLEY WIND ENERGY PROJECT

CH2MHILL

170365.C1.01_E112002002SFO•KVWEP photo SIMS•1/8/03•ccc

Figure Vis 5a - Simulation View 2: Existing view from Highway 97 north of gravel pit looking north

KITTITAS VALLEY WIND ENERGY PROJECT

CH2MHILL

170365.C1.01_E112002002SFO•KVWEP photo SIMS•12/3/02•ccc

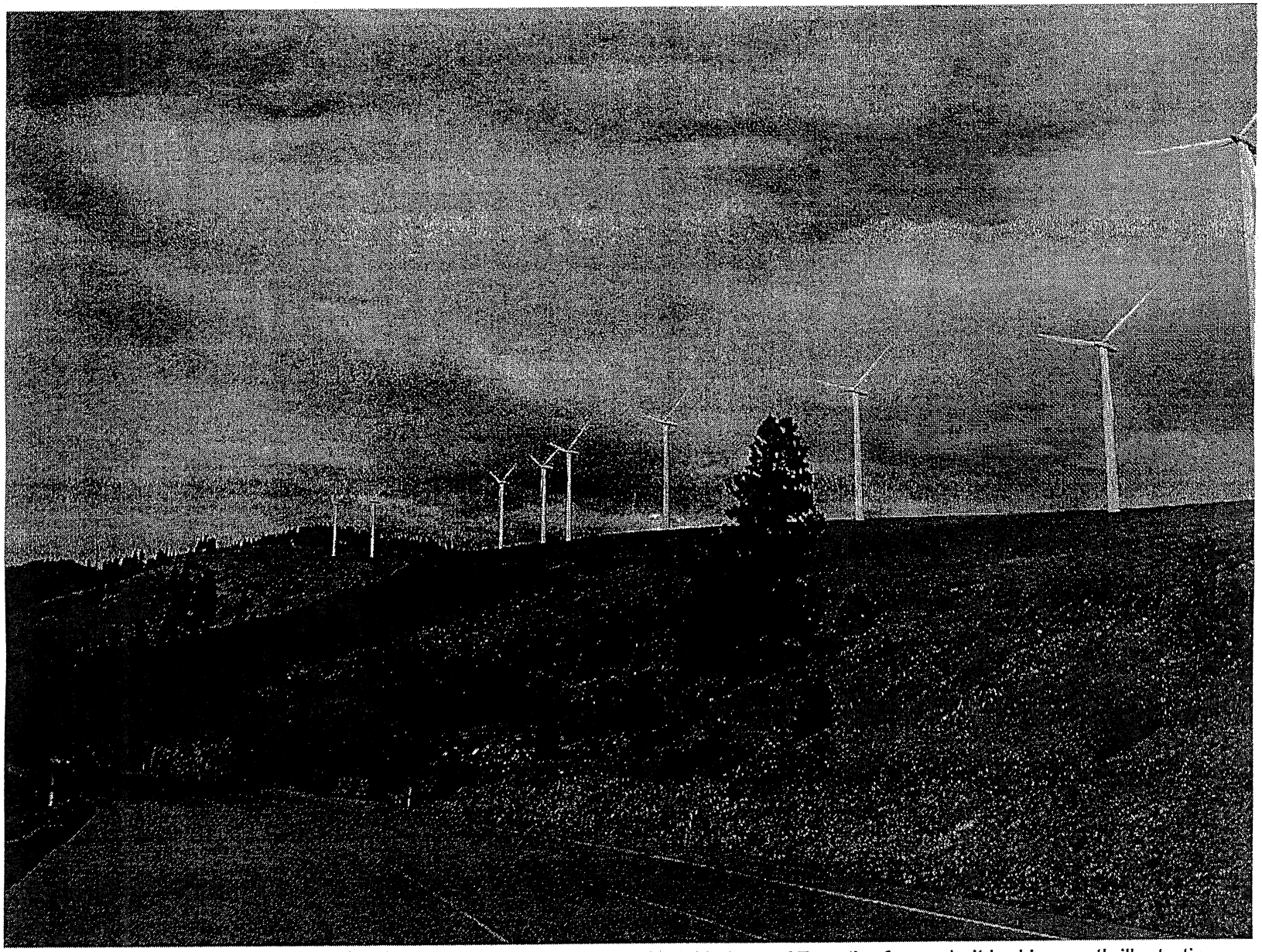


Figure Vis 5b - Simulation View 2: Simulated view of project seen from Highway 97 north of gravel pit looking north illustrating appearance of gray turbine structures

KITTITAS VALLEY WIND ENERGY PROJECT

CH2MHILL

170365.C1.01_E112002002SFO•KVWEP photo SIMS•12/3/02•ccc

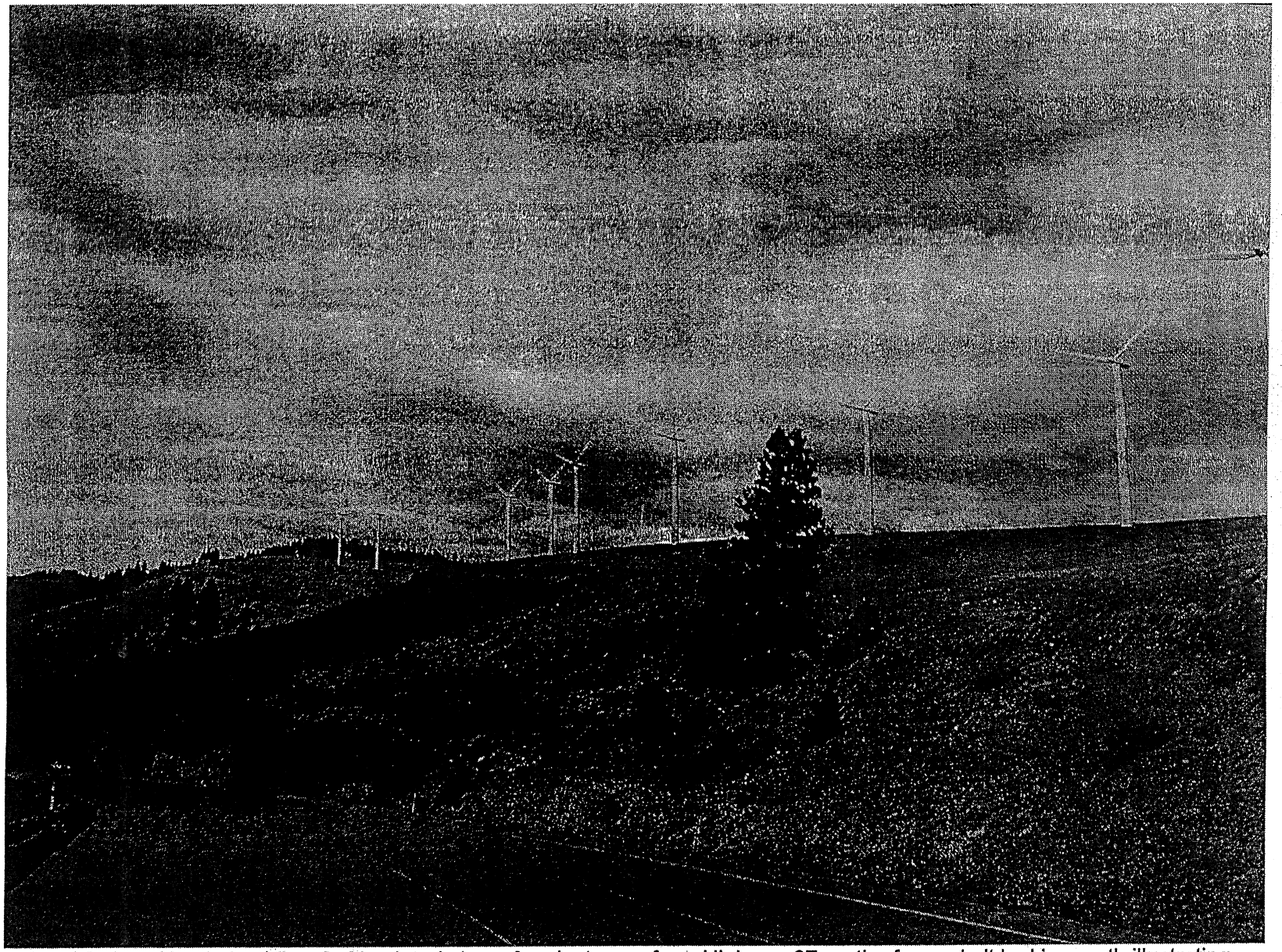


Figure Vis 5c - Simulation View 2: Simulated view of project seen from Highway 97 north of gravel pit looking north illustrating appearance of brown turbine structures

KITTITAS VALLEY WIND ENERGY PROJECT

CH2MHILL

170365.C1.01_E112002002SFO•KVWEP photo SIMS•12/3/02•ccc

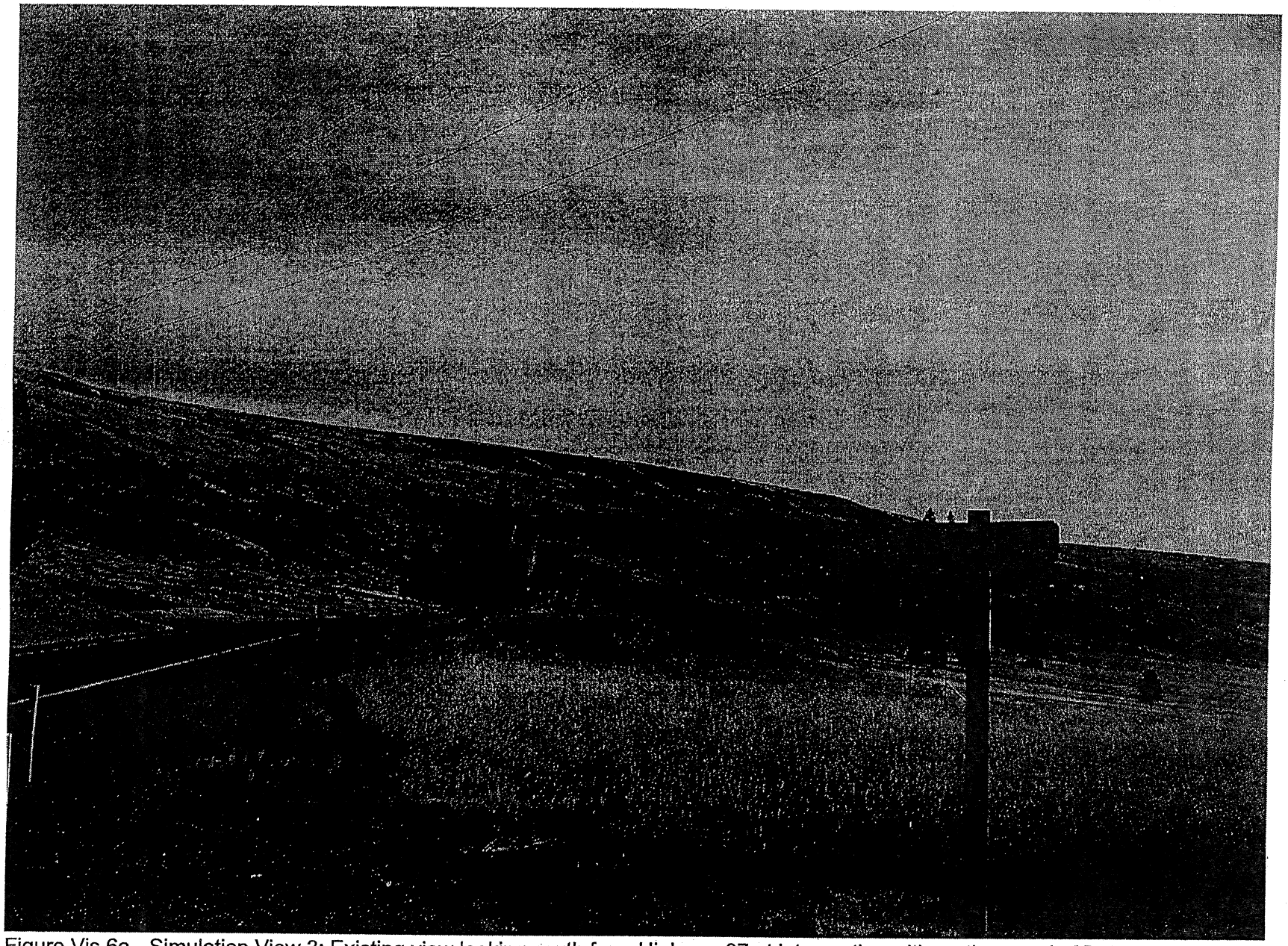


Figure Vis 6a - Simulation View 3: Existing view looking south from Highway 97 at intersection with northern end of Bettas Road

KITTITAS VALLEY WIND ENERGY PROJECT

CH2MHILL

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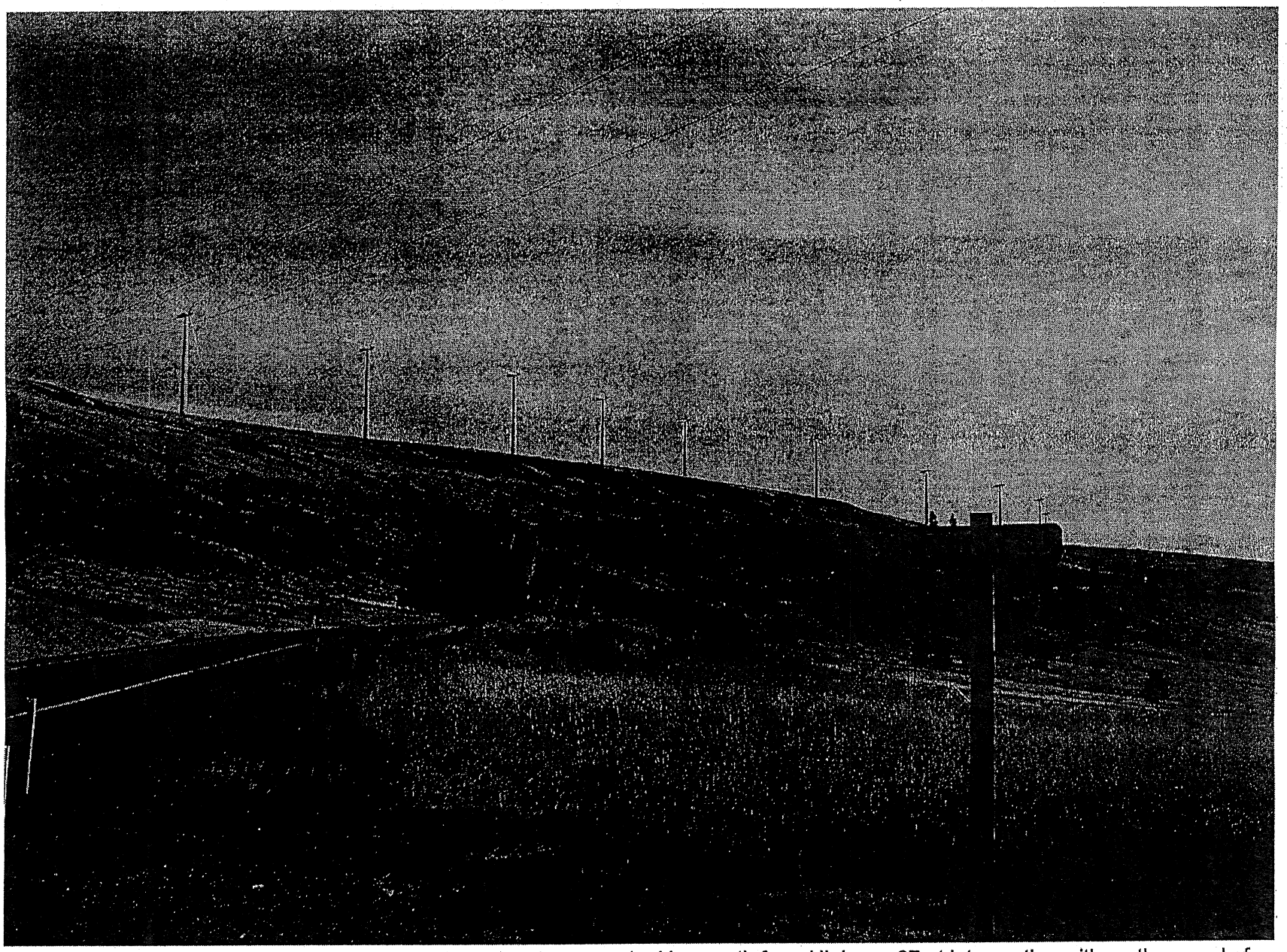

Figure Vis 6b - Simulation View 3: Simulated view of project seen looking south from Highway 97 at intersection with northern end of Bettas Road

KITTITAS VALLEY WIND ENERGY PROJECT

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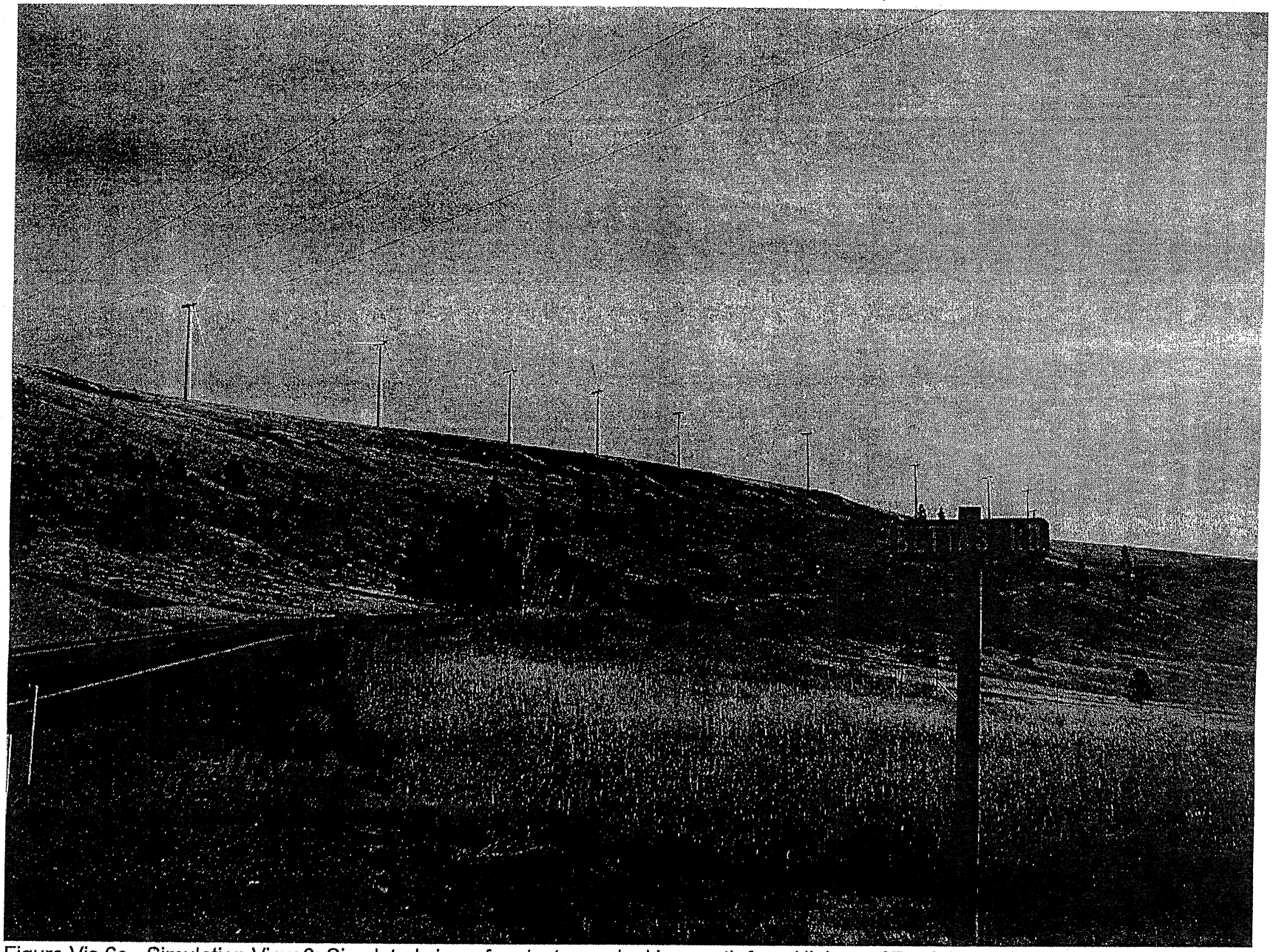

Figure Vis 6c - Simulation View 3: Simulated view of project seen looking south from Highway 97 at intersection with the northern end of Bettas Road illustrating the appearance of larger turbines

KITTITAS VALLEY WIND ENERGY PROJECT

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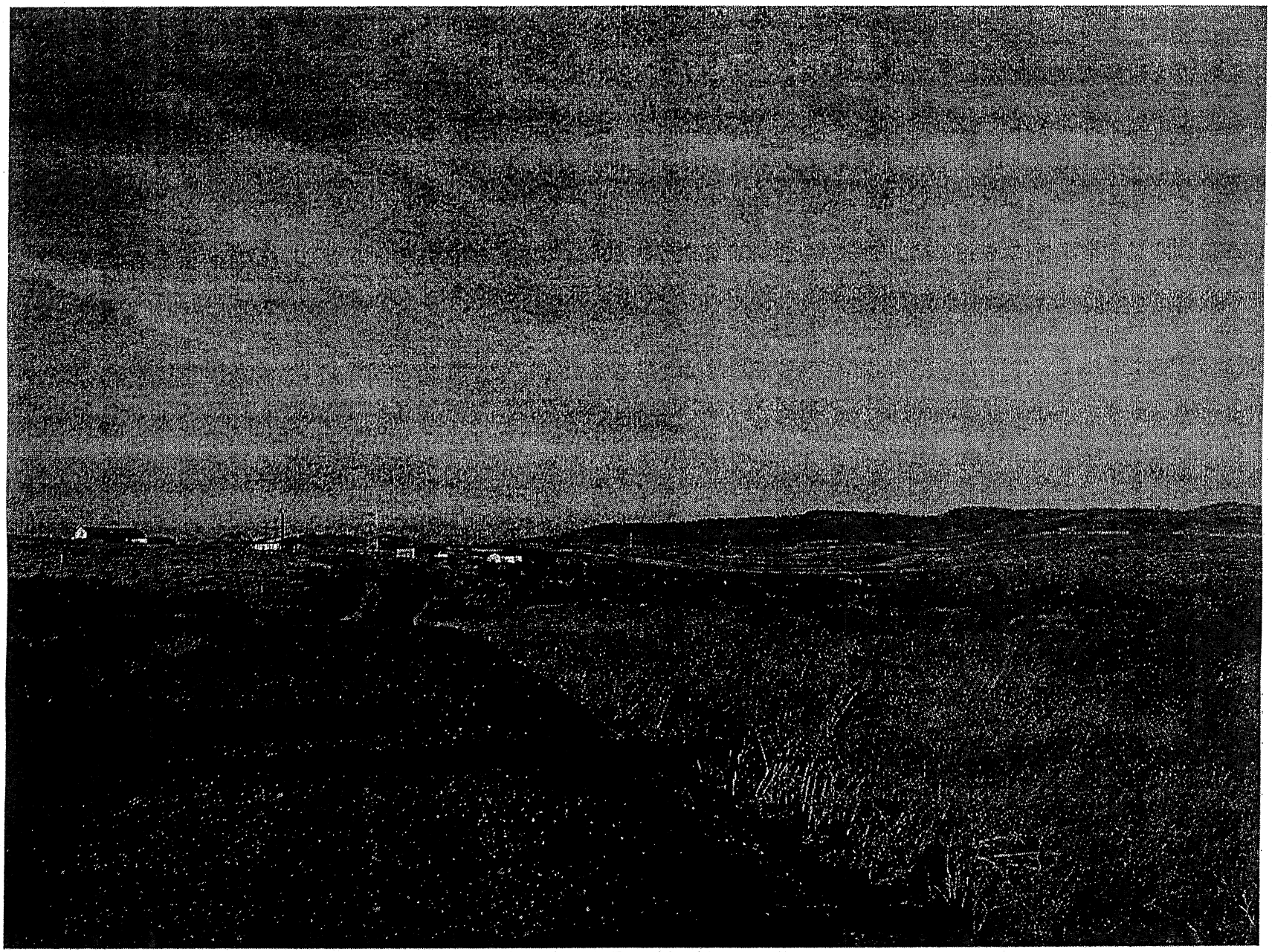

Figure Vis 7a - Simulation View 4: Existing view from Sagebrush Road looking north

KITTITAS VALLEY WIND ENERGY PROJECT

CH2MHILL

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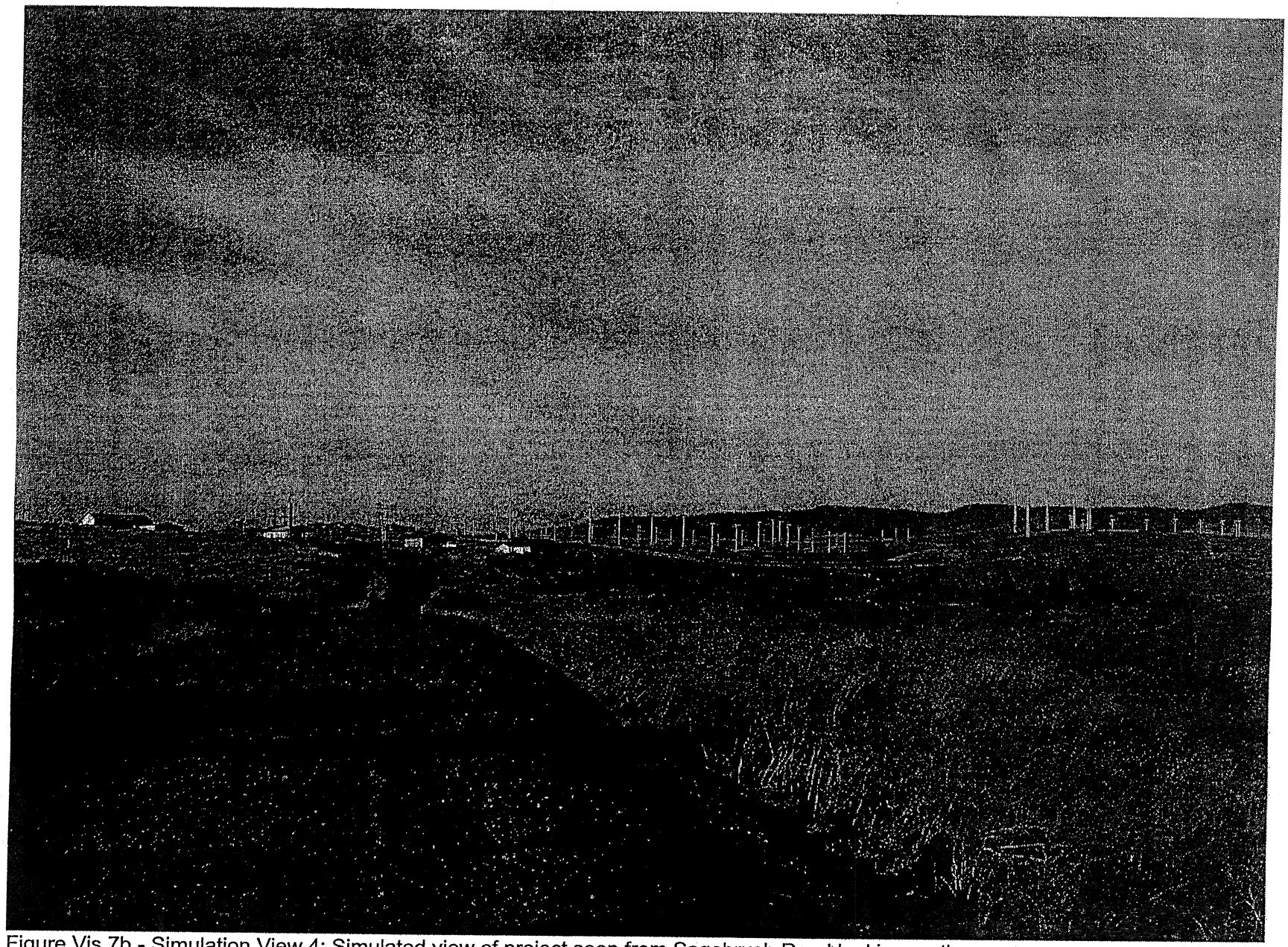

Figure Vis 7b - Simulation View 4: Simulated view of project seen from Sagebrush Road looking north

KITTITAS VALLEY WIND ENERGY PROJECT

170365.C1.01_E112002002SFO•KVWEP photo SIMS•12/3/02•ccc

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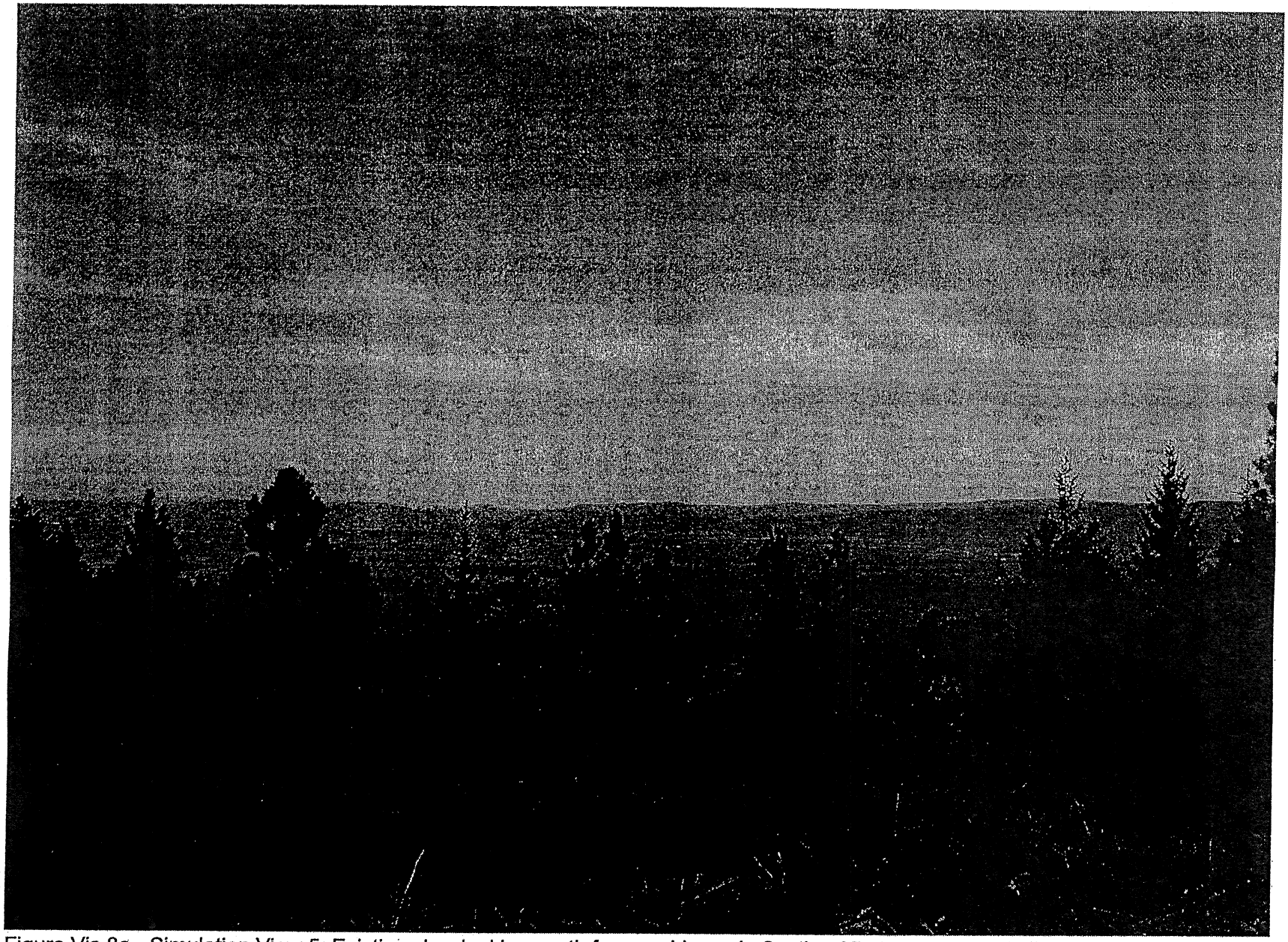

Figure Vis 8a - Simulation View 5: Existing view looking south from residence in Section 35 at upper end of Elk Springs Road

KITTITAS VALLEY WIND ENERGY PROJECT

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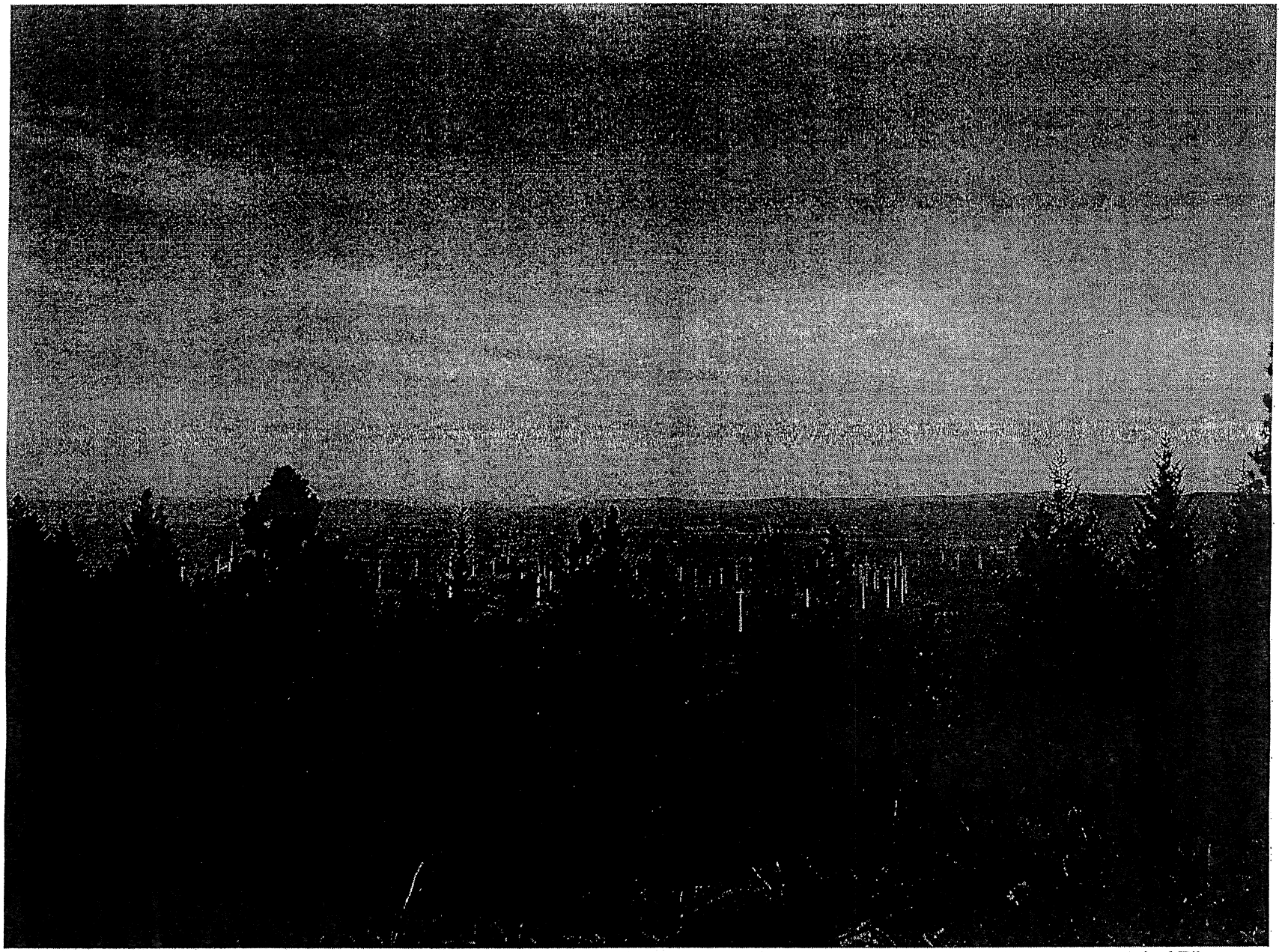

Figure Vis 8b - Simulation View 5: Simulated view of project seen looking south from residence in Section 35 at upper end of Elk Springs Road

KITTITAS VALLEY WIND ENERGY PROJECT

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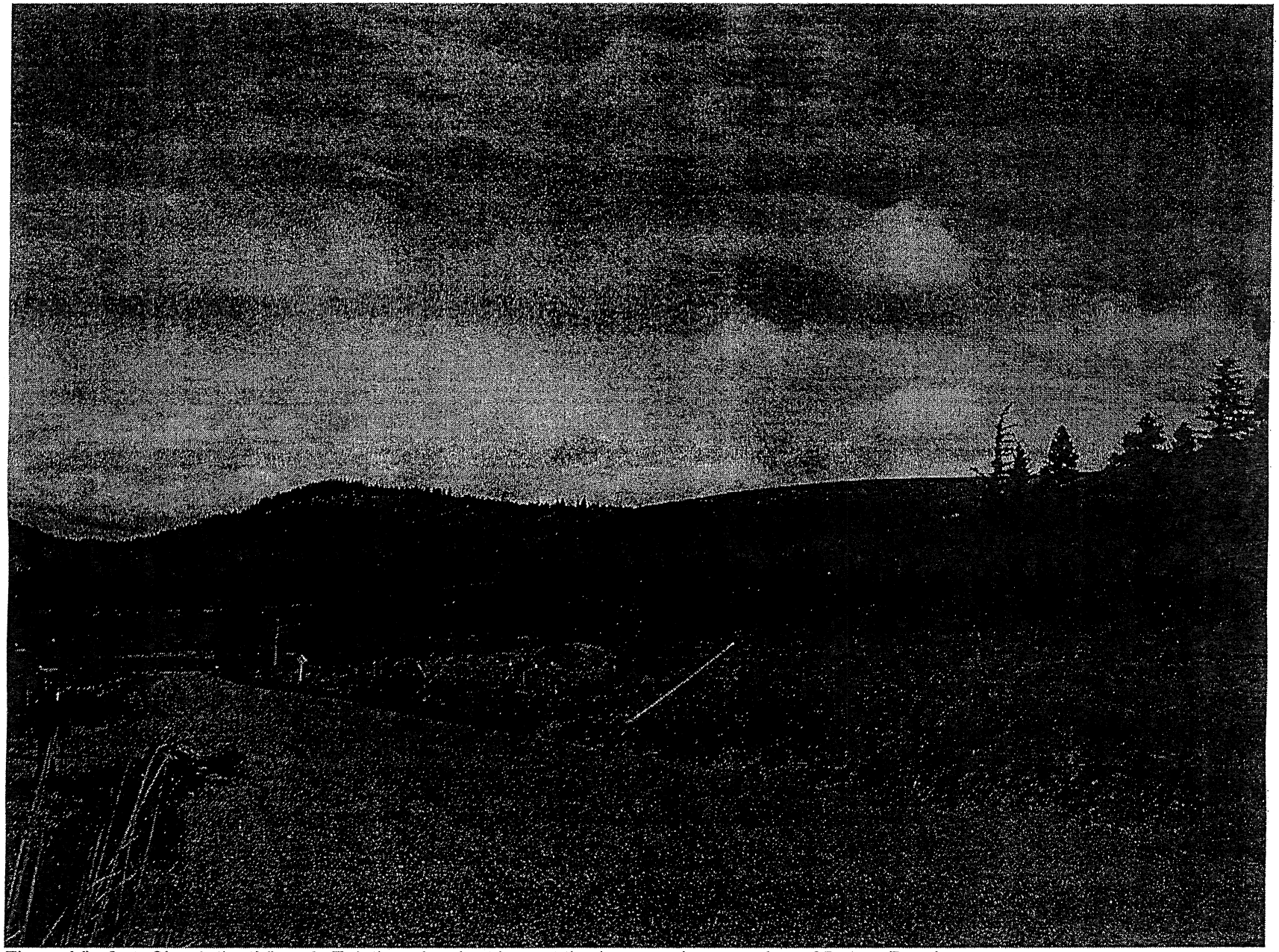

Figure Vis 9a - Simulation View 6: Existing view looking north along northern portion of Bettas Road

KITTITAS VALLEY WIND ENERGY PROJECT

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170365.C1.01_E112002002SFO•KVWEP photo SIMS•12/3/02•ccc

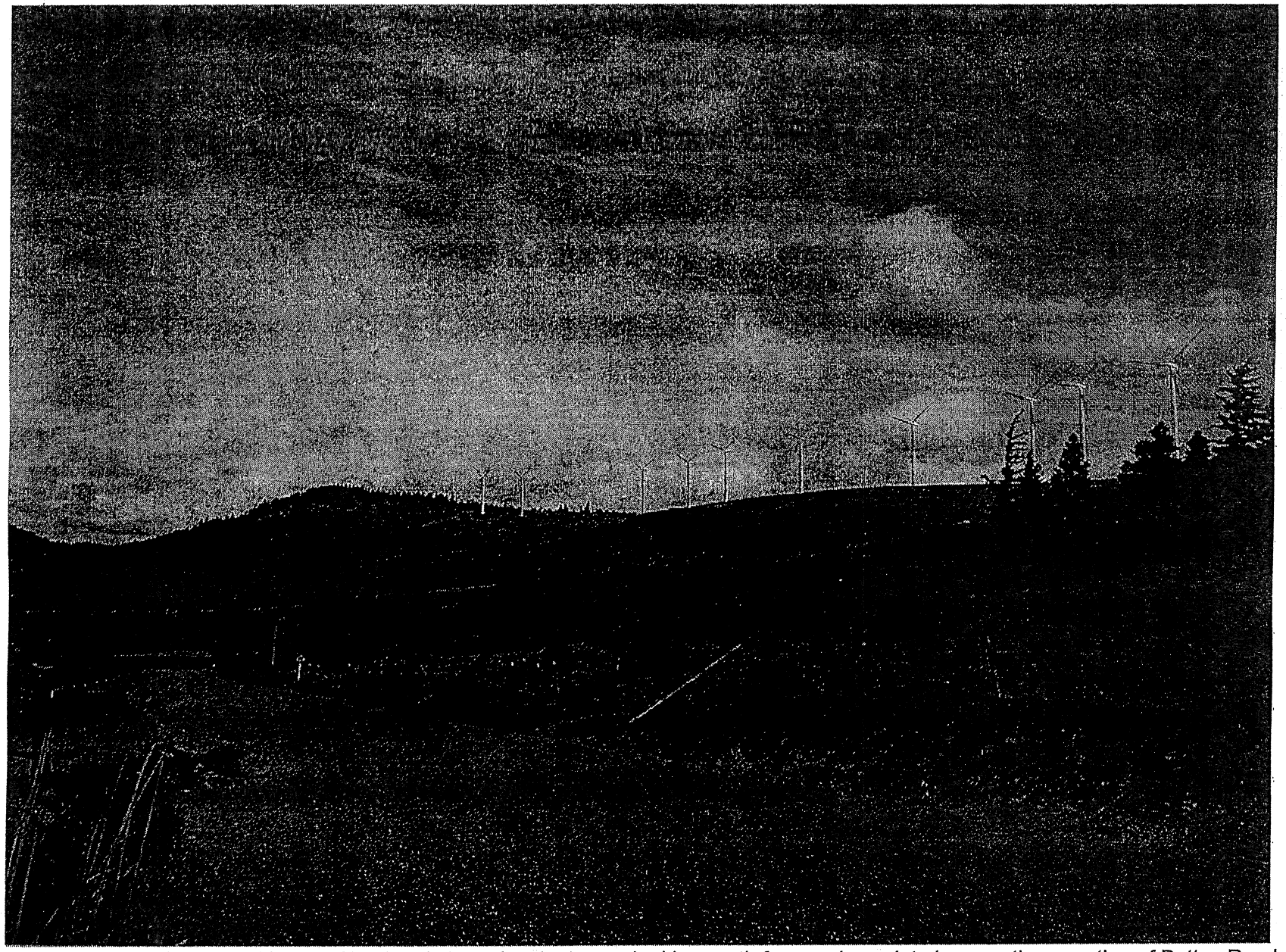

Figure Vis 9b - Simulation View 6: Simulated view of project seen looking north from a viewpoint along northern portion of Bettas Road

KITTITAS VALLEY WIND ENERGY PROJECT

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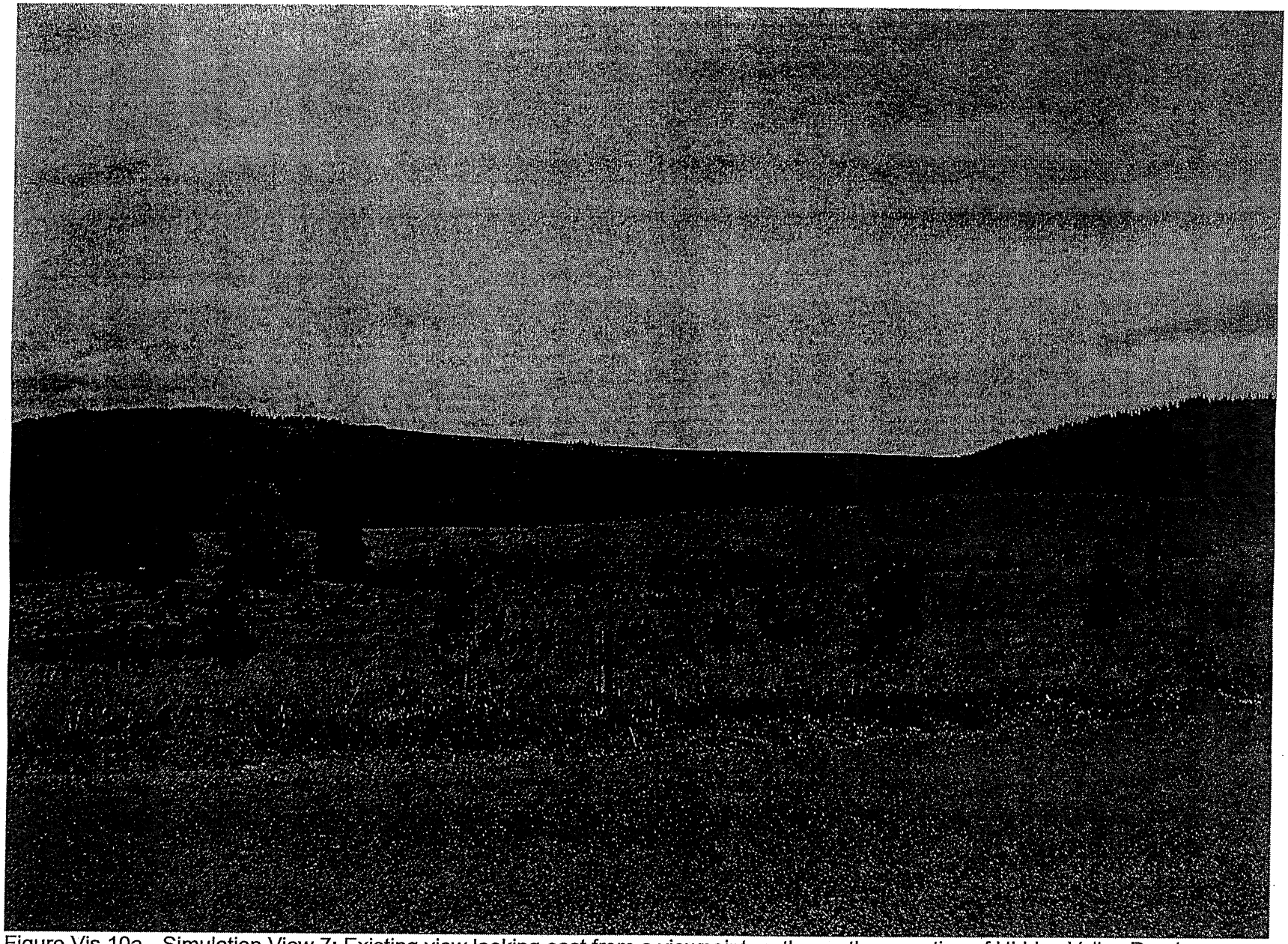

Figure Vis 10a - Simulation View 7: Existing view looking east from a viewpoint on the northern portion of Hidden Valley Road

KITTITAS VALLEY WIND ENERGY PROJECT

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170365.C1.01_E112002002SFO•KVWEP photo SIMS•12/3/02•ccc

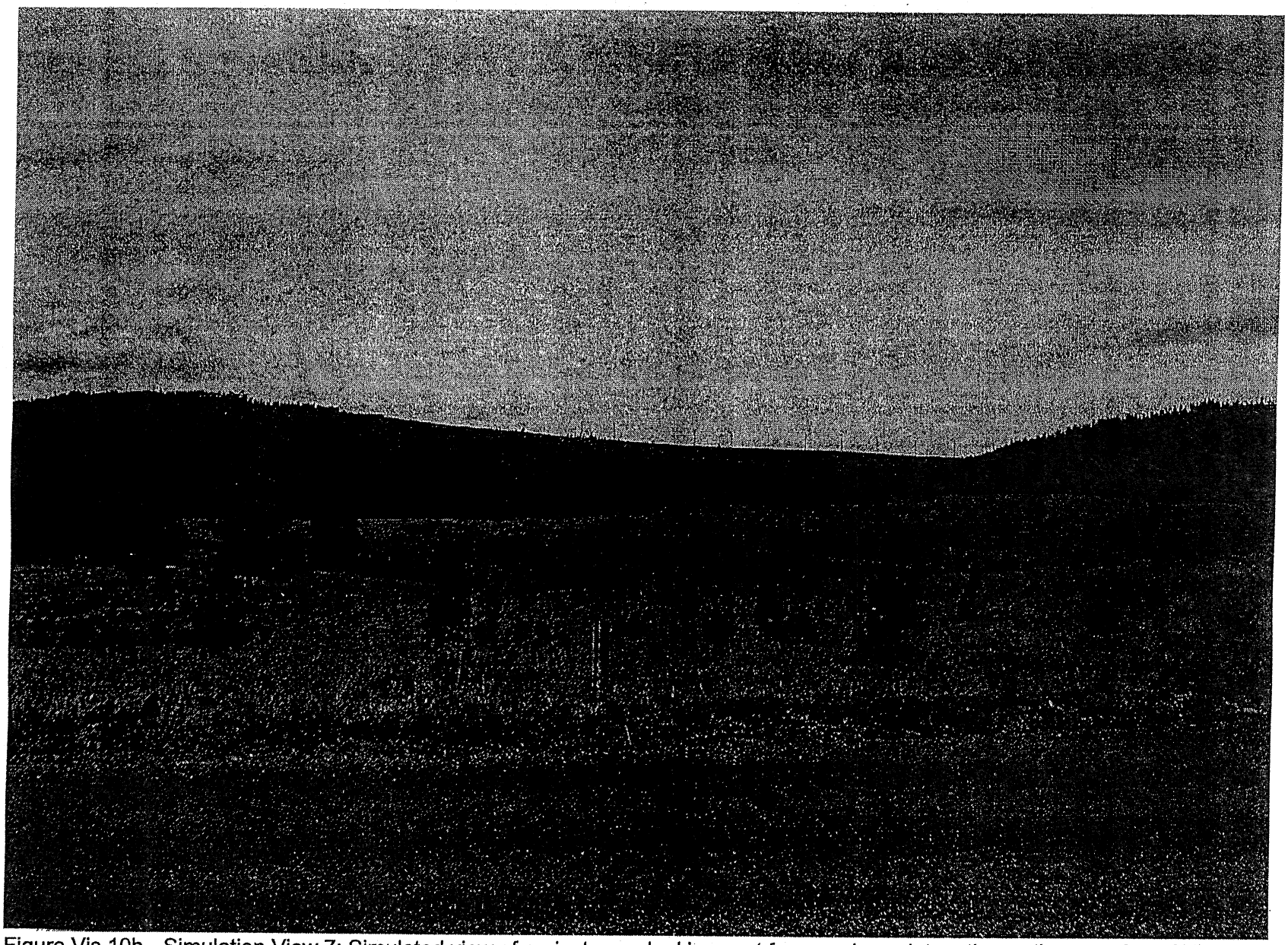

Figure Vis 10b - Simulation View 7: Simulated view of project seen looking east from a viewpoint on the northern portion of Hidden Valley Road

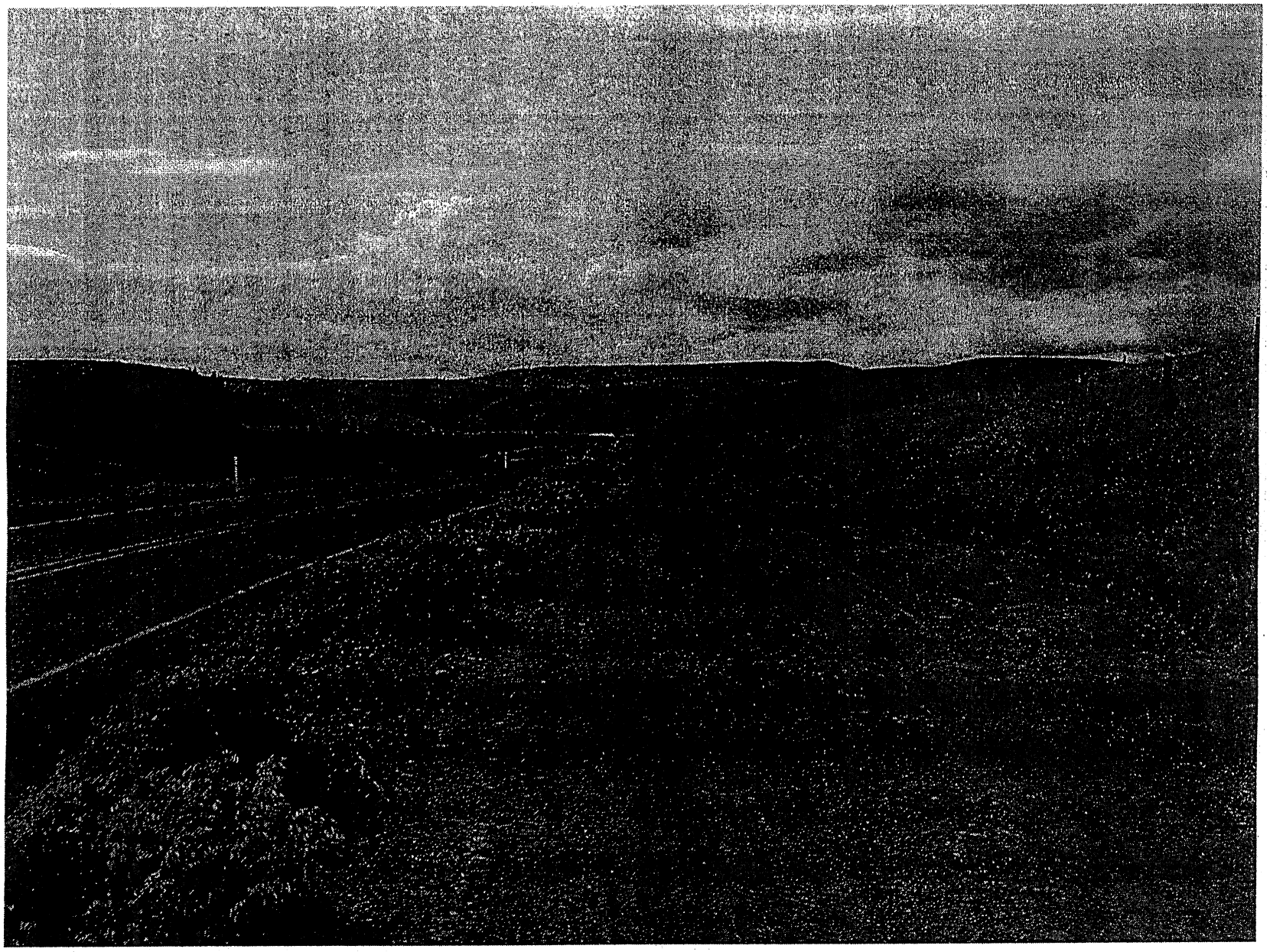

Figure Vis 11a - Simulation View 8: Existing view looking west from a viewpoint along Highway 10 at Hayward Road

KITTITAS VALLEY WIND ENERGY PROJECT

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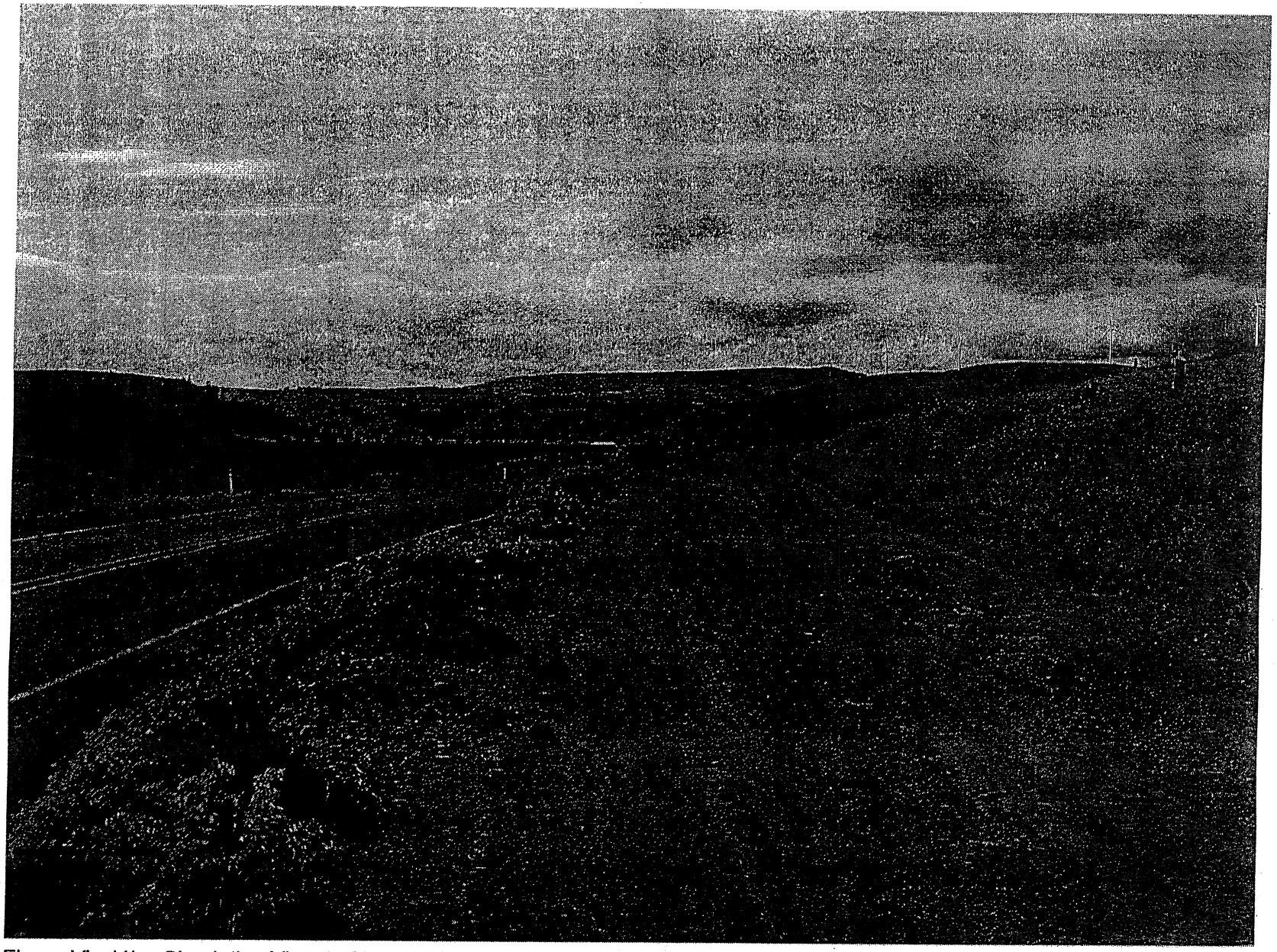

Figure Vis 11b - Simulation View 8: Simulated view of project seen looking west from a viewpoint along Highway 10 at Hayward Road

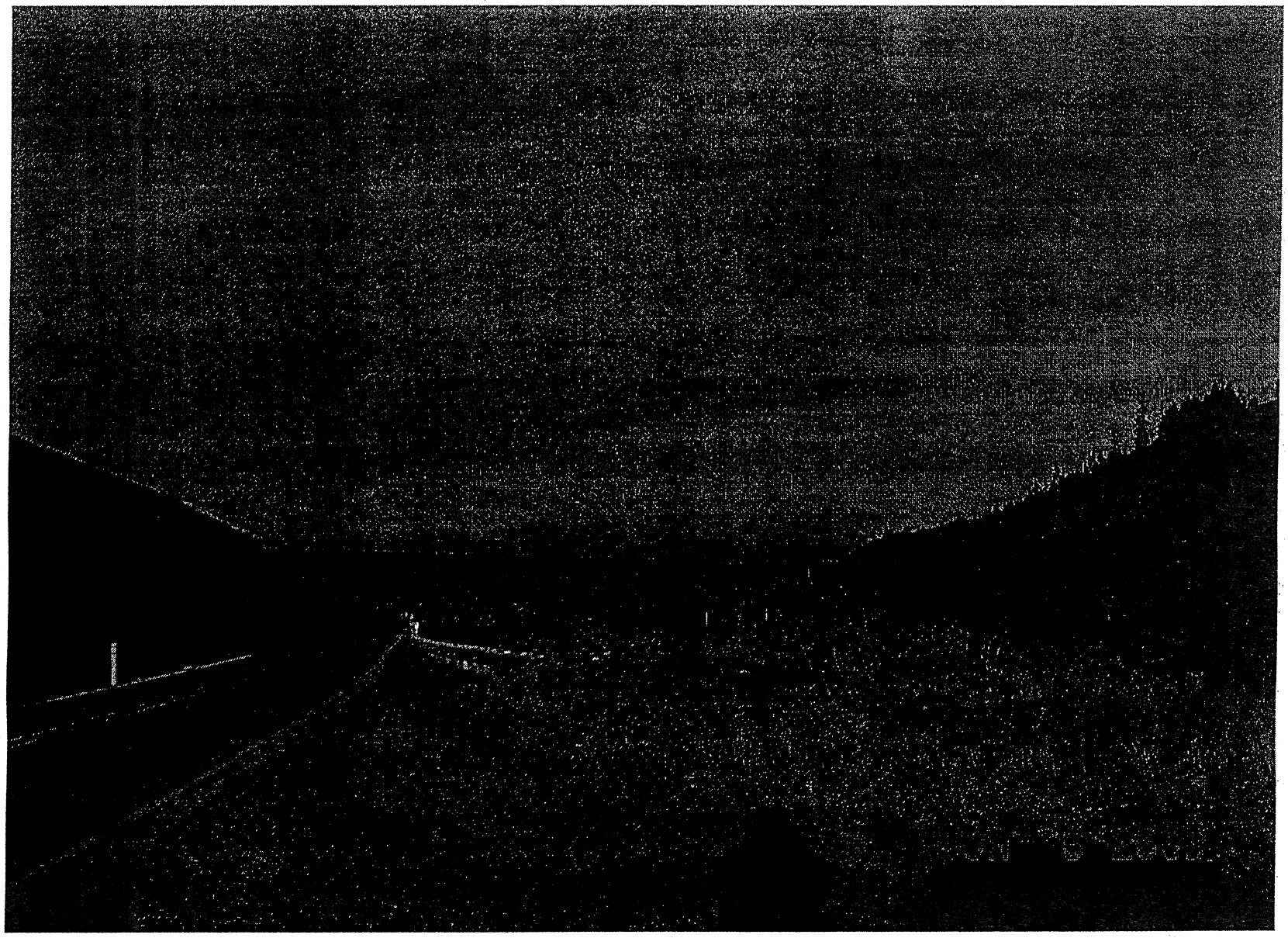

Figure Vis 12a - Simulation View 9: Existing view looking east from a viewpoint along Highway 10 between Morrison Canyon and Swauk Creek

KITTITAS VALLEY WIND ENERGY PROJECT

CH2MHILL

170365.C1.01_E112002002SFO•KVWEP photo SIMS•12/3/02•ccc

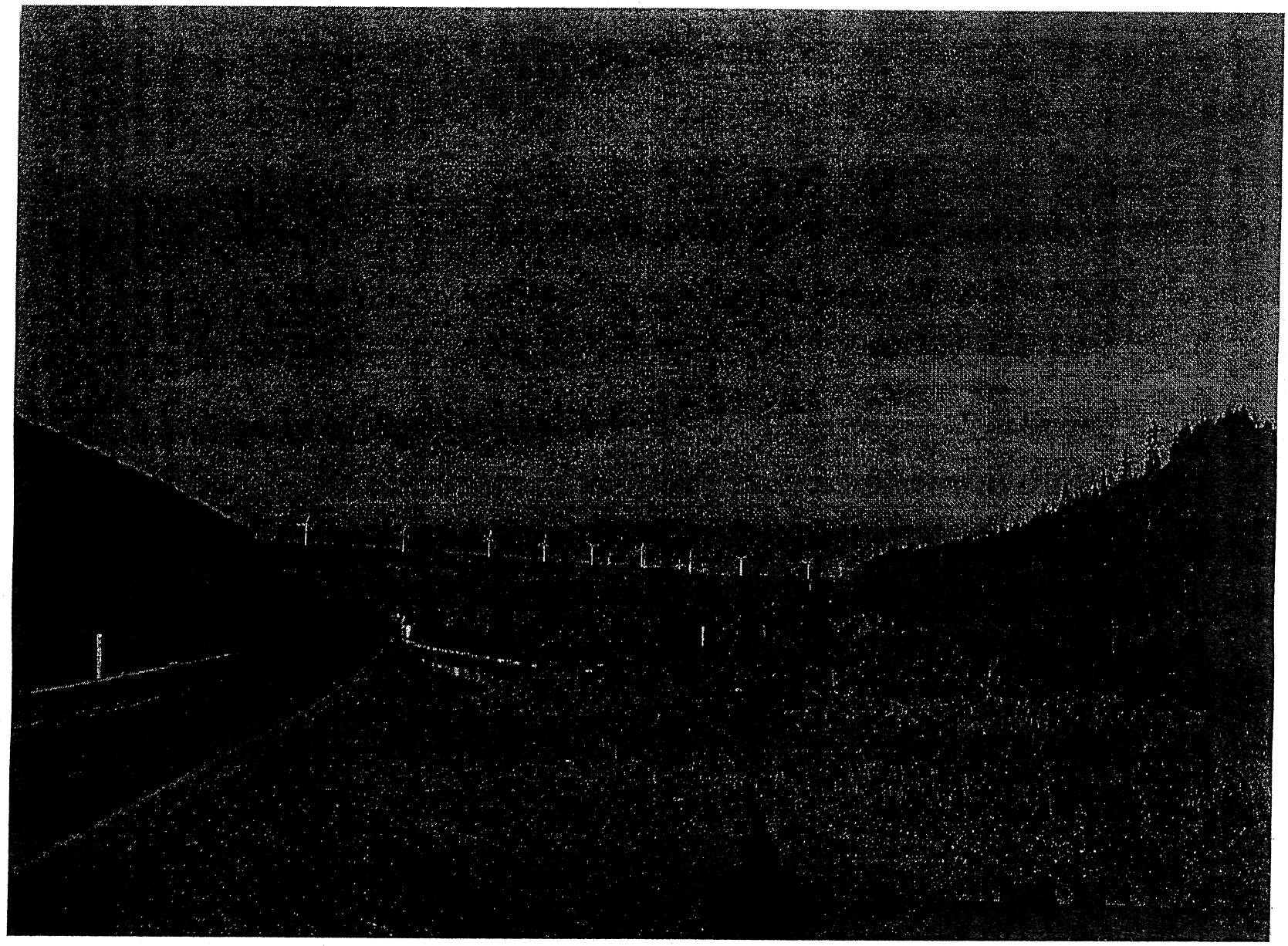

Figure Vis 12b - Simulation View 9: Simulated view of project seen looking east from viewpoint along Highway 10 between Morrison Canyon and Swauk Creek

Figure Vis 13a - Simulation View 10: Existing view looking east from a viewpoint along Highway 10 west of Swauk Creek

KITTITAS VALLEY WIND ENERGY PROJECT

CH2MHILL

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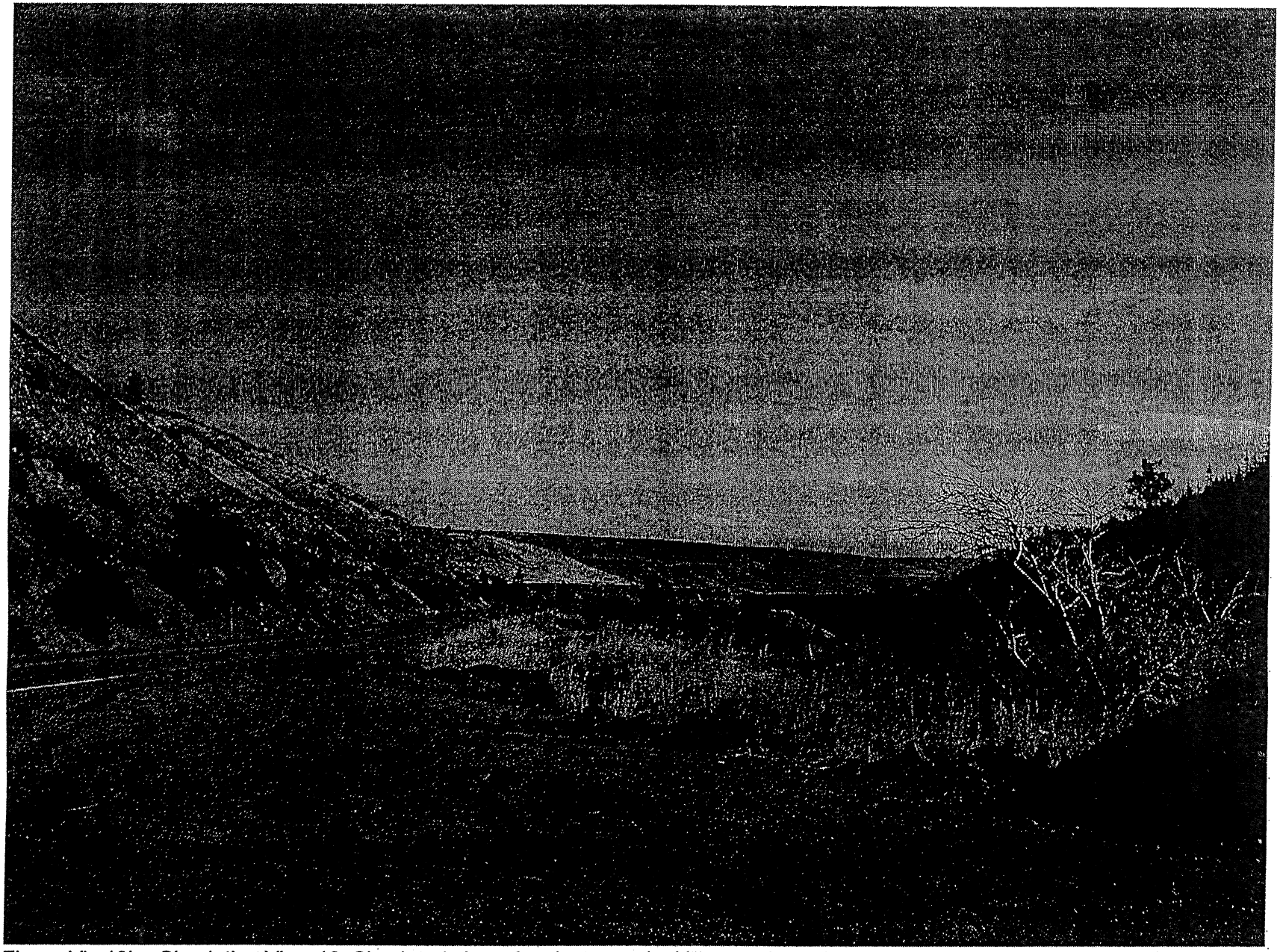

Figure Vis 13b - Simulation View 10: Simulated view of project seen looking east from viewpoint along Highway 10 west of Swauk Creek

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170365.C1.01_E112002002SFO•KVWEP photo SIMS•12/3/02•ccc

Figure Vis 14a - Simulation View 11: Existing view looking north from a viewpoint along the John Wayne Trail at Taneum Road

Figure Vis 14b - Simulation View 11: Simulated view of project seen looking north from a viewpoint along the John Wayne Trail at Taneum Road

KITTITAS VALLEY WIND ENERGY PROJECT

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170365.C1.01_E112002002SFO•KVWEP photo SIMS•12/3/02•ccc

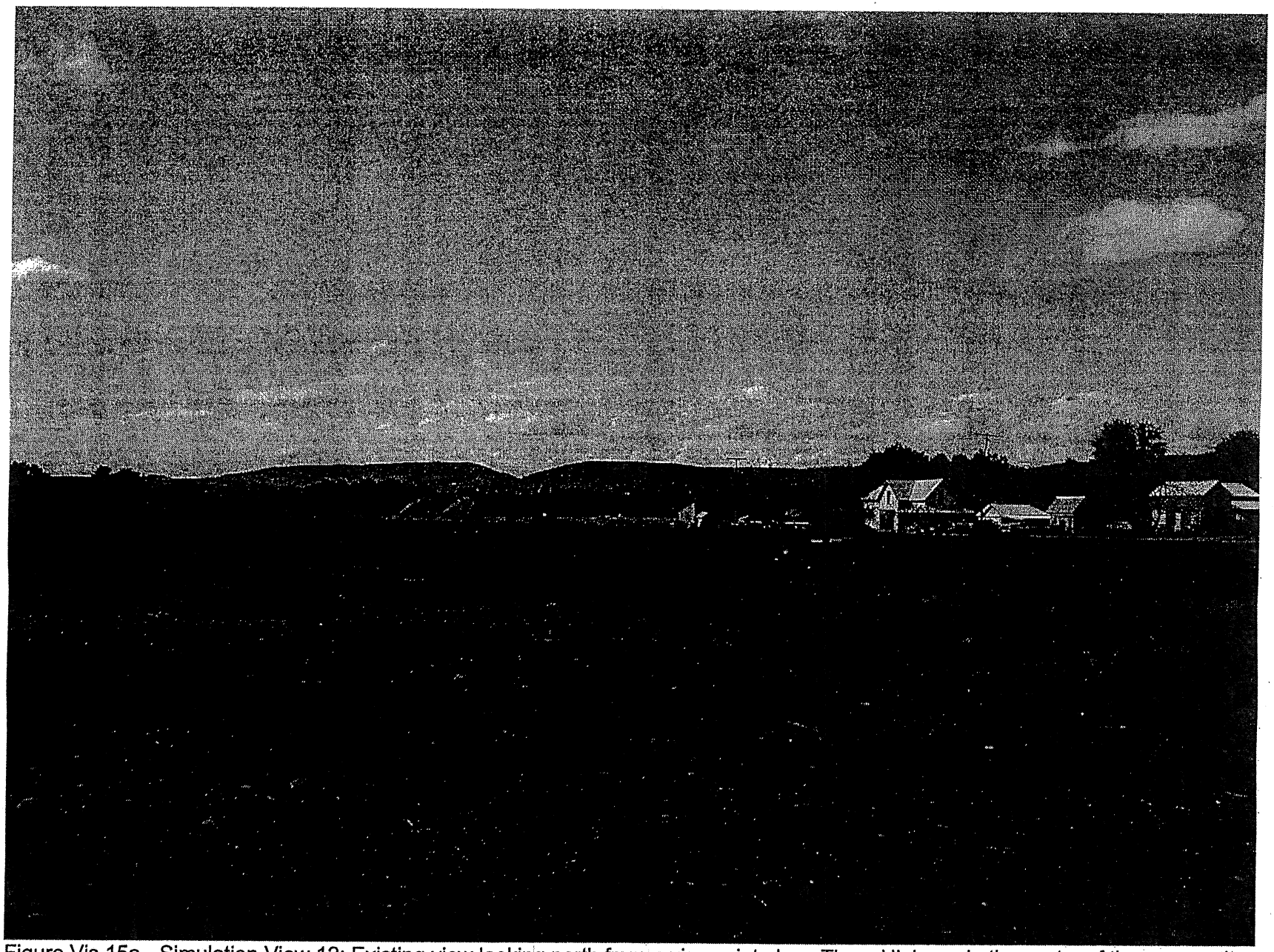

Figure Vis 15a - Simulation View 12: Existing view looking north from a viewpoint along Thorp Highway in the center of the community of Thorp

KITTITAS VALLEY WIND ENERGY PROJECT

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170365.C1.01_E112002002SFO•KVWEP photo SIMS•12/3/02•ccc

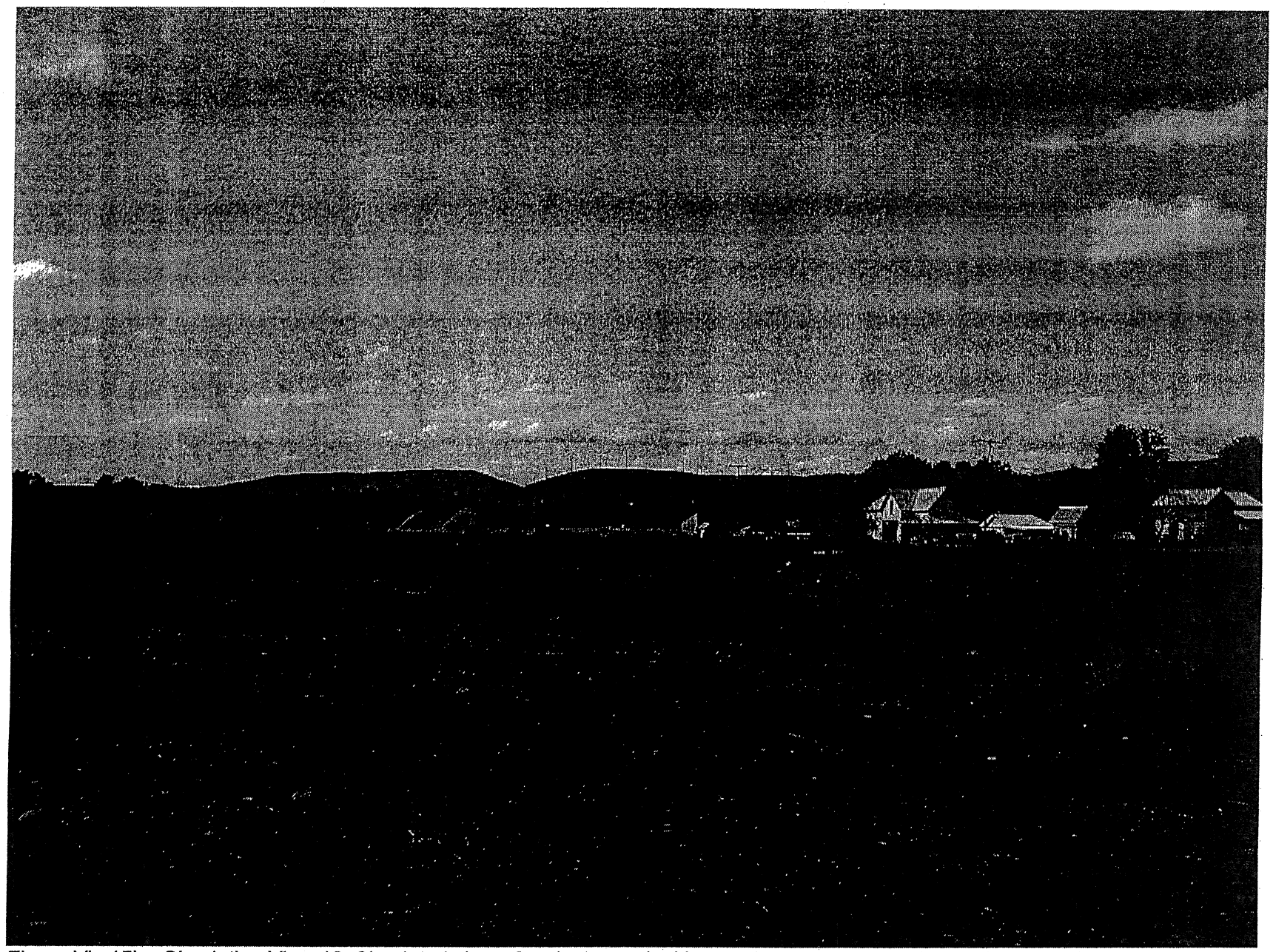

Figure Vis 15b - Simulation View 12: Simulated view of project seen looking north from a viewpoint along Thorp Highway in the center of the community of Thorp

KITTITAS VALLEY WIND ENERGY PROJECT

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170365.C1.01_E112002002SFO•KVWEP photo SIMS•12/3/02•ccc

Figure Vis 16a - Simulation View 13: Existing view looking east from a viewpoint along Highline Loop in Sunlight Waters

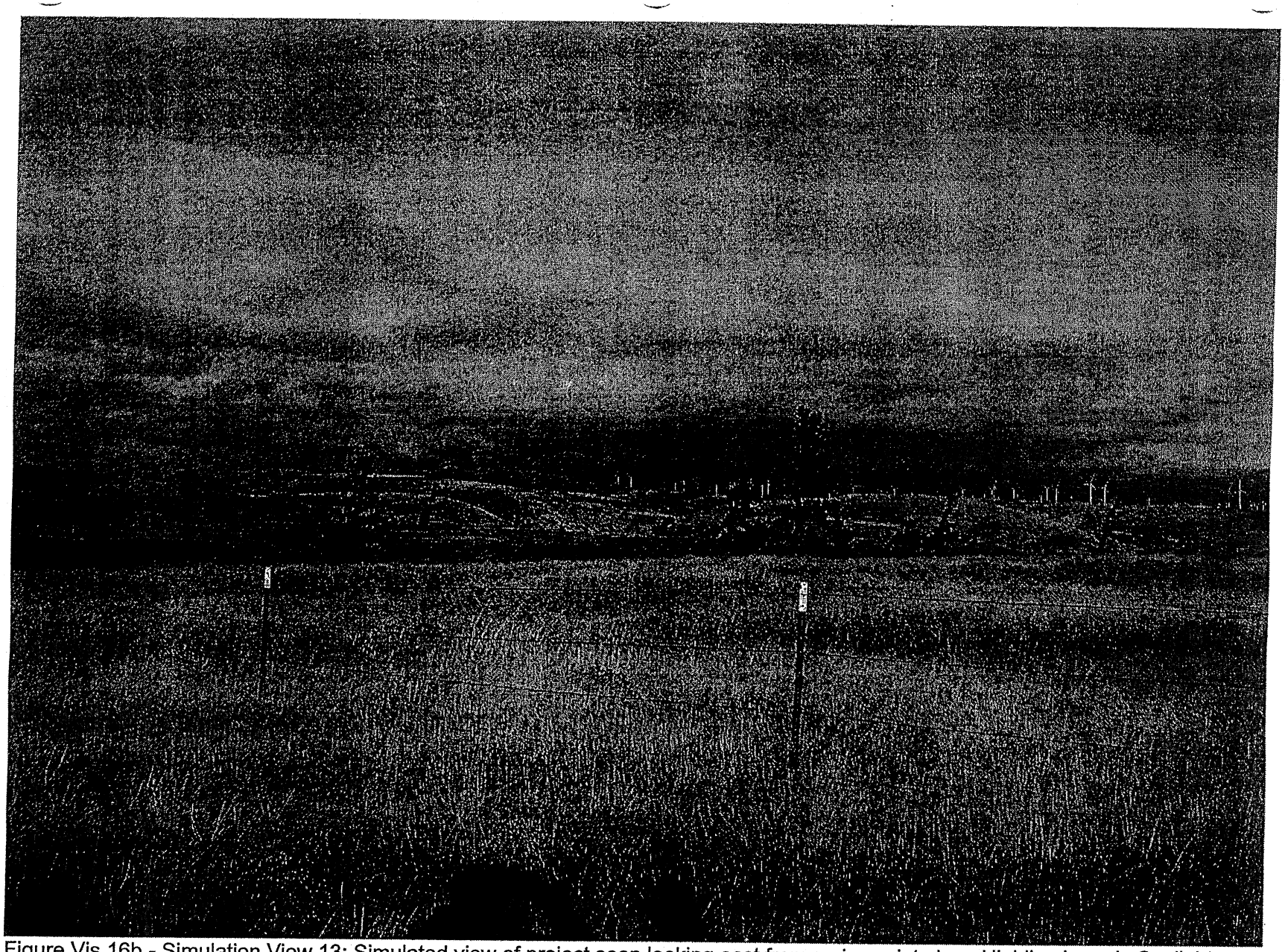

Figure Vis 16b - Simulation View 13: Simulated view of project seen looking east from a viewpoint along Highline Loop in Sunlight Waters

KITTITAS VALLEY WIND ENERGY PROJECT

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170365.C1.01_E112002002SFO•KVWEP photo SIMS•12/3/02•ccc

Figure Vis 17a - Simulation View 14: Existing view looking northeast from a viewpoint along I-90 at Springwood Ranch

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170365.C1.01_E112002002SFO•KVWEP photo SIMS•12/3/02•ccc

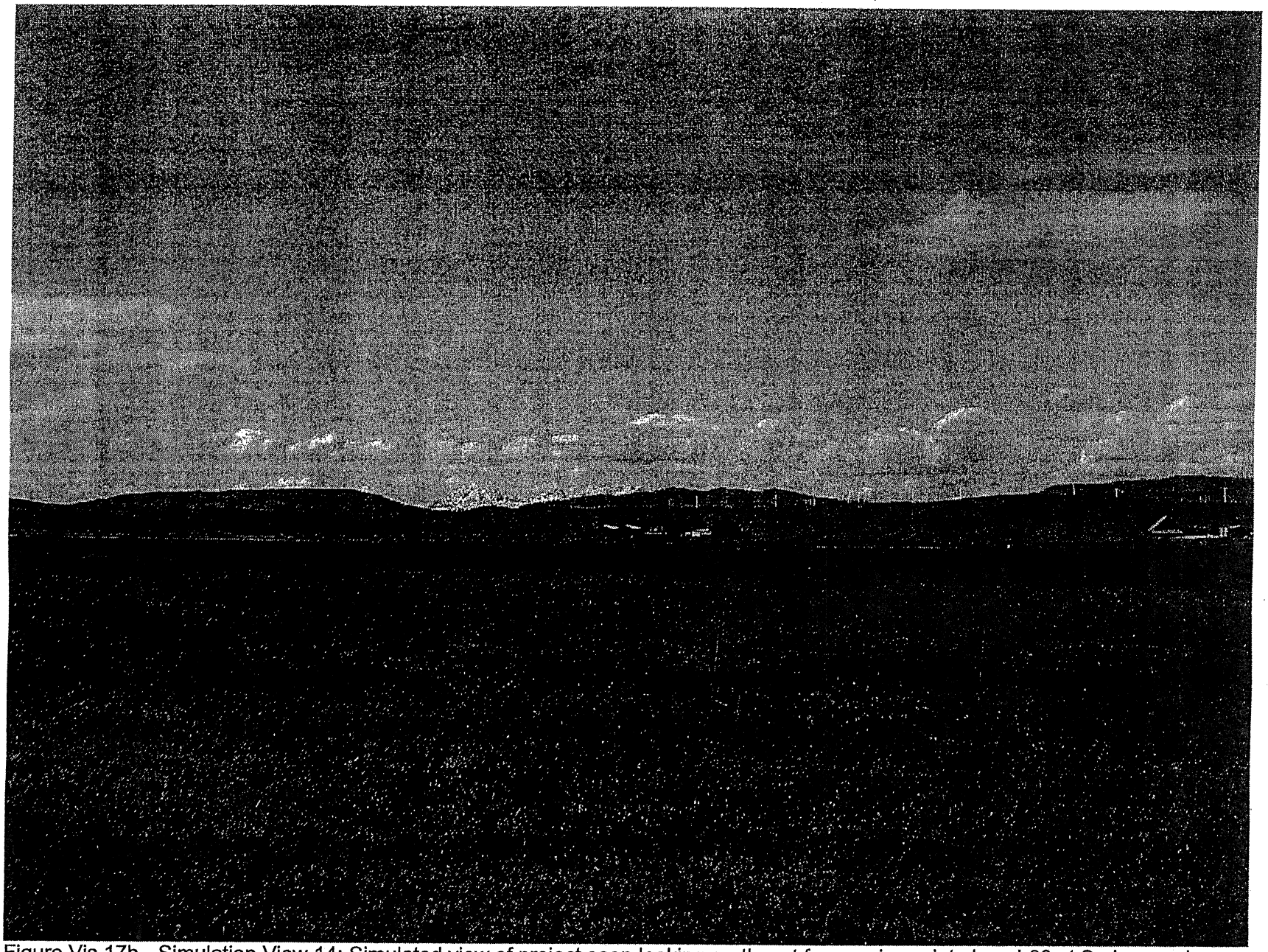

Figure Vis 17b - Simulation View 14: Simulated view of project seen looking northeast from a viewpoint along I-90 at Springwood Ranch – turbines painted gray

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Figure Vis 17c - Simulation View 14: Simulated view of project seen looking northeast from a viewpoint along I-90 at Springwood Ranch – turbines painted brown

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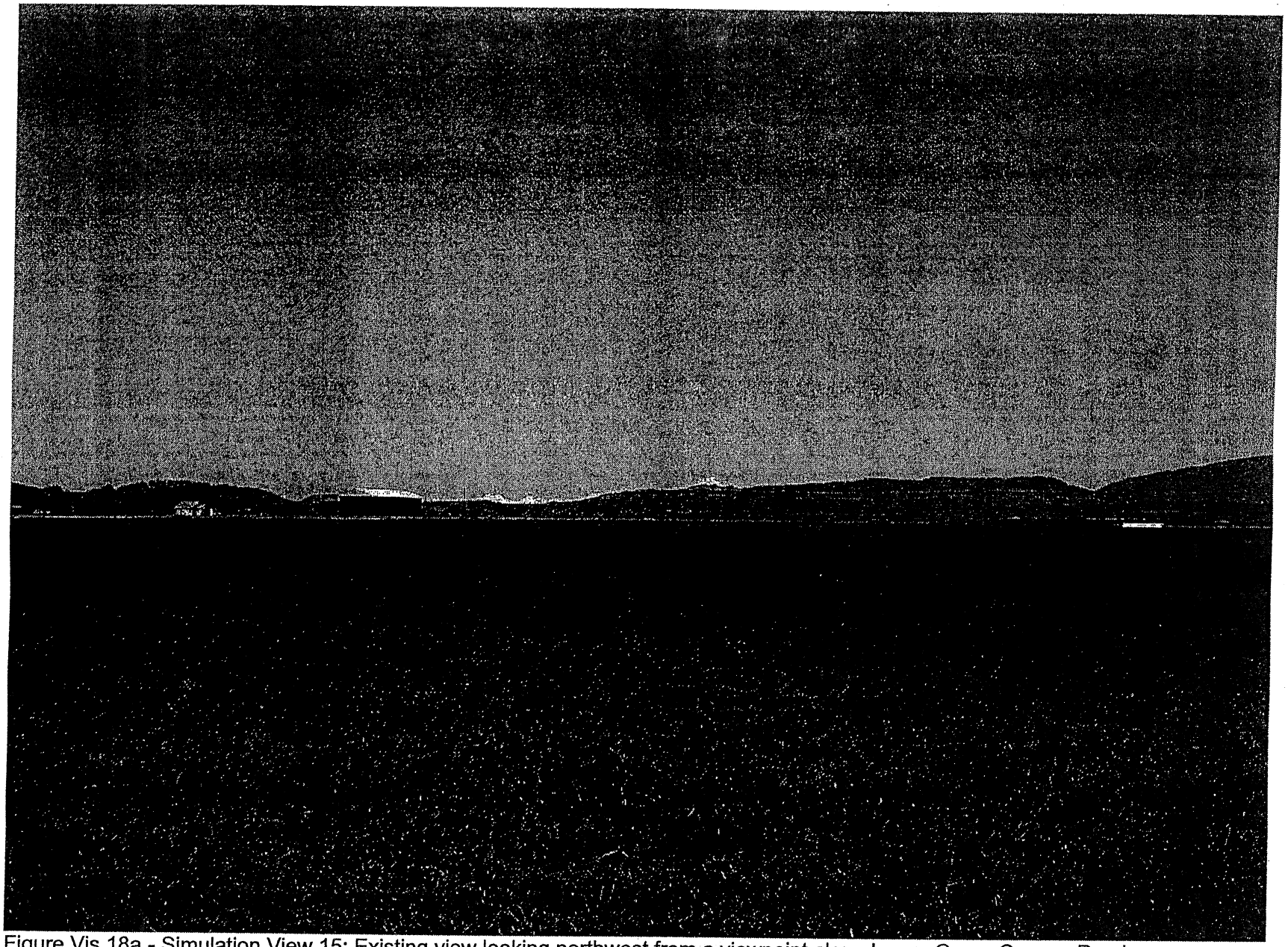

Figure Vis 18a - Simulation View 15: Existing view looking northwest from a viewpoint along Lower Green Canyon Road

KITTITAS VALLEY WIND ENERGY PROJECT

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170365.C1.01_E112002002SFO•KVWEP photo SIMS•12/3/02•ccc

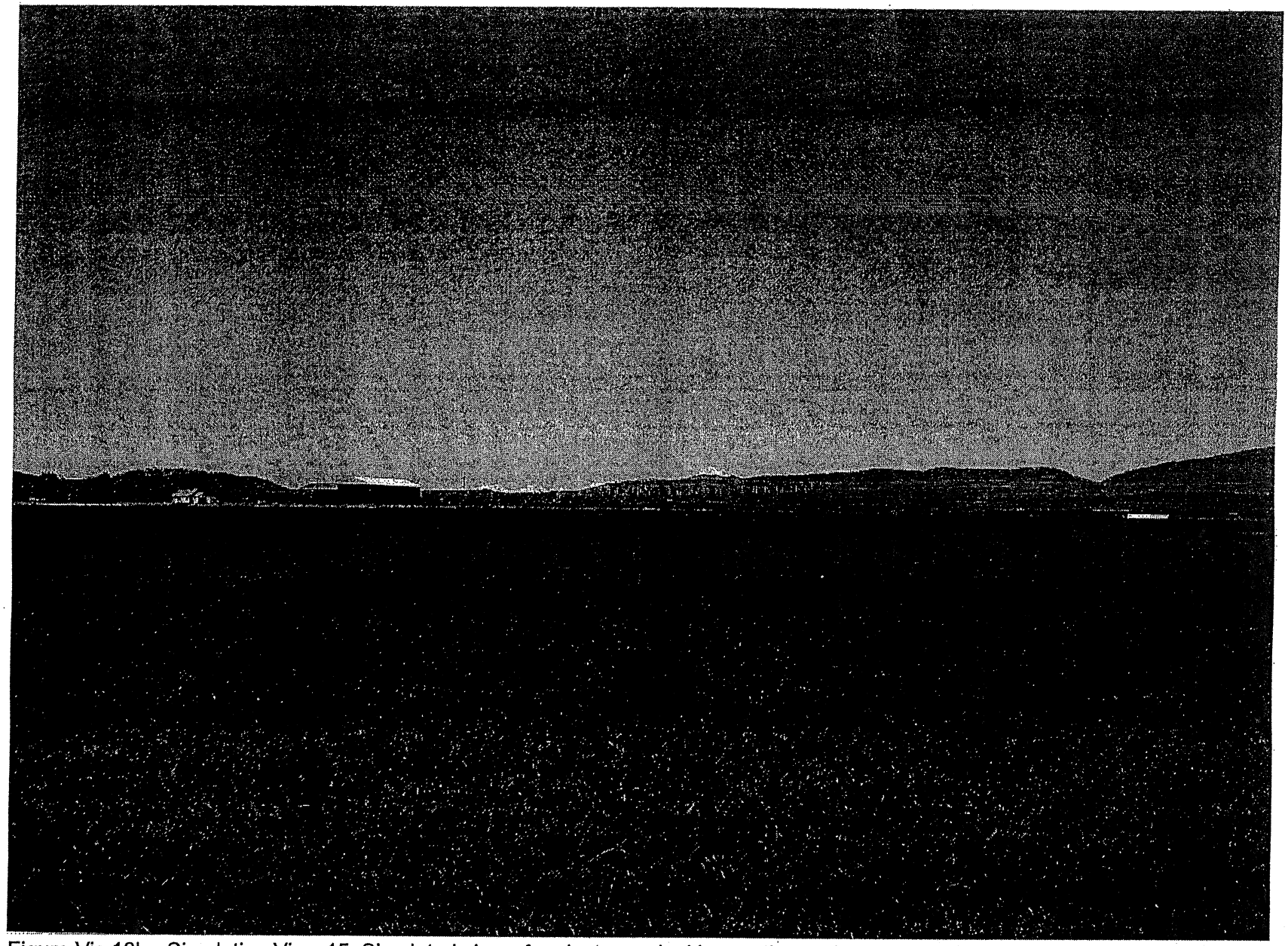

Figure Vis 18b - Simulation View 15: Simulated view of project seen looking northwest from a viewpoint along Lower Green Canyon Road

KITTITAS VALLEY WIND ENERGY PROJECT

CH2MHILL

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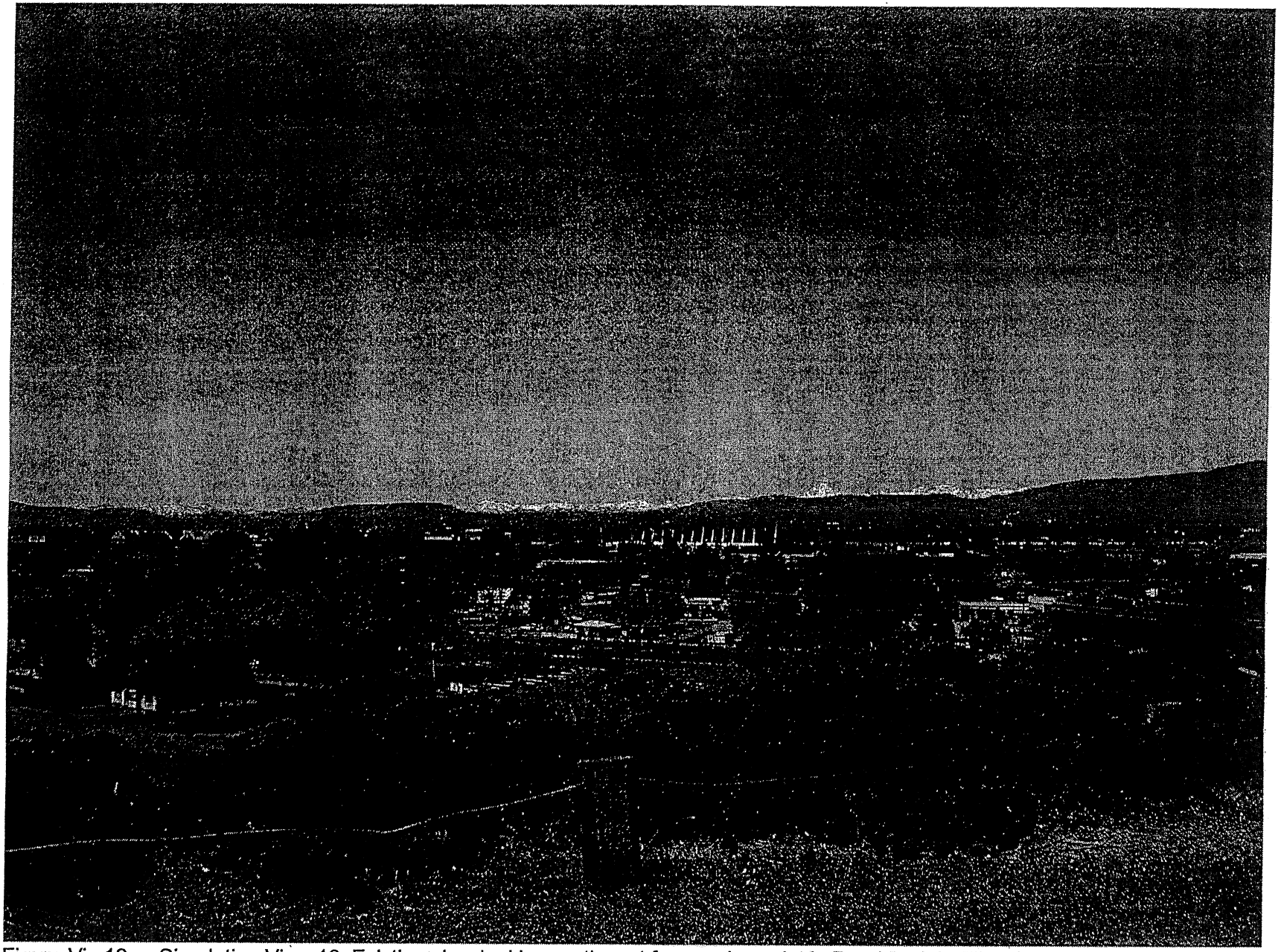

Figure Vis 19a - Simulation View 16: Existing view looking northwest from a viewpoint in Reed Park in Ellensburg

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170365.C1.01_E112002002SFO•KVWEP photo SIMS•12/3/02•ccc

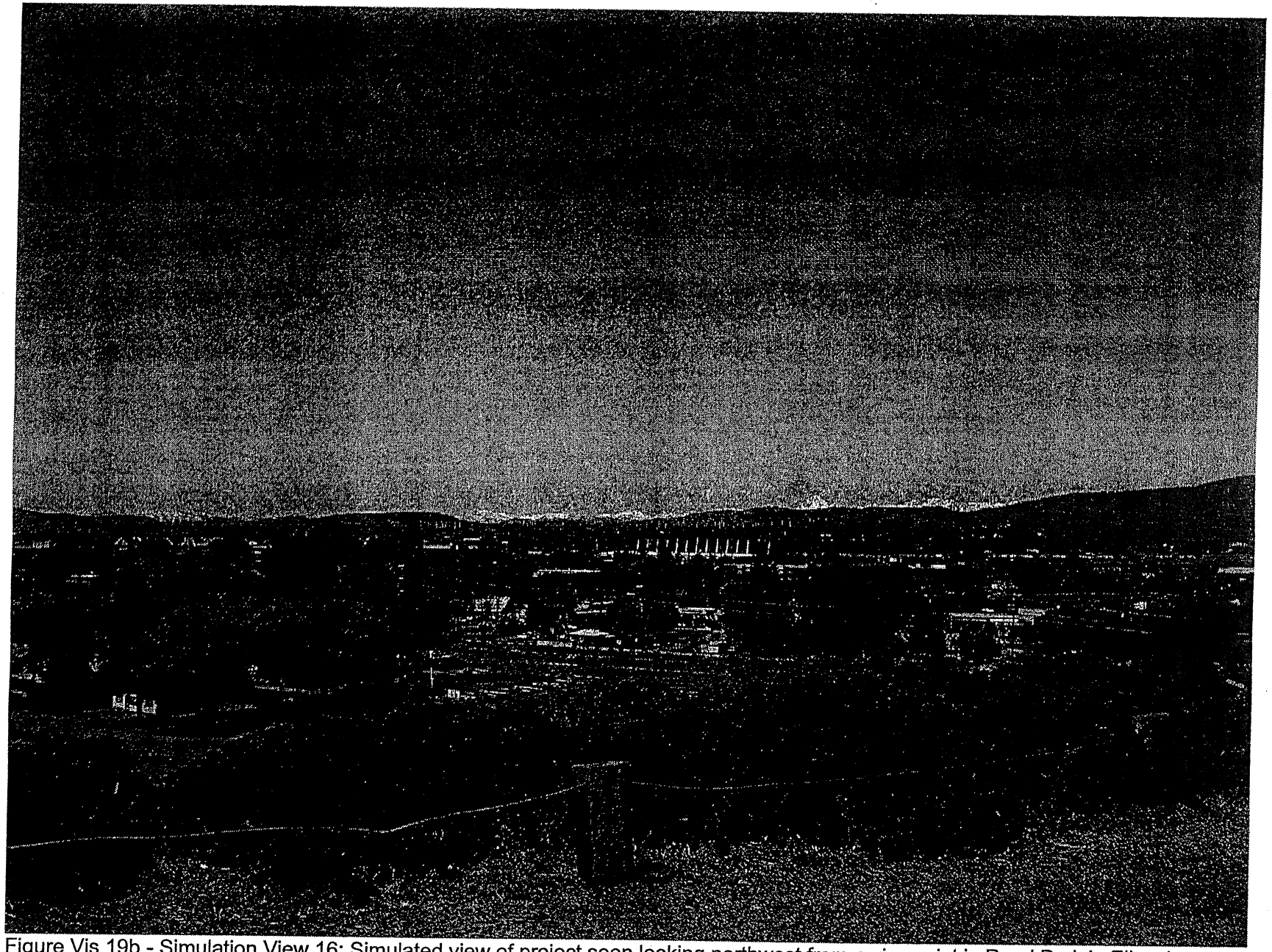

Figure Vis 19b - Simulation View 16: Simulated view of project seen looking northwest from a viewpoint in Reed Park in Ellensburg

KITTITAS VALLEY WIND ENERGY PROJECT

170365.C1.01_E112002002SFO•KVWEP photo SIMS•12/3/02•ccc

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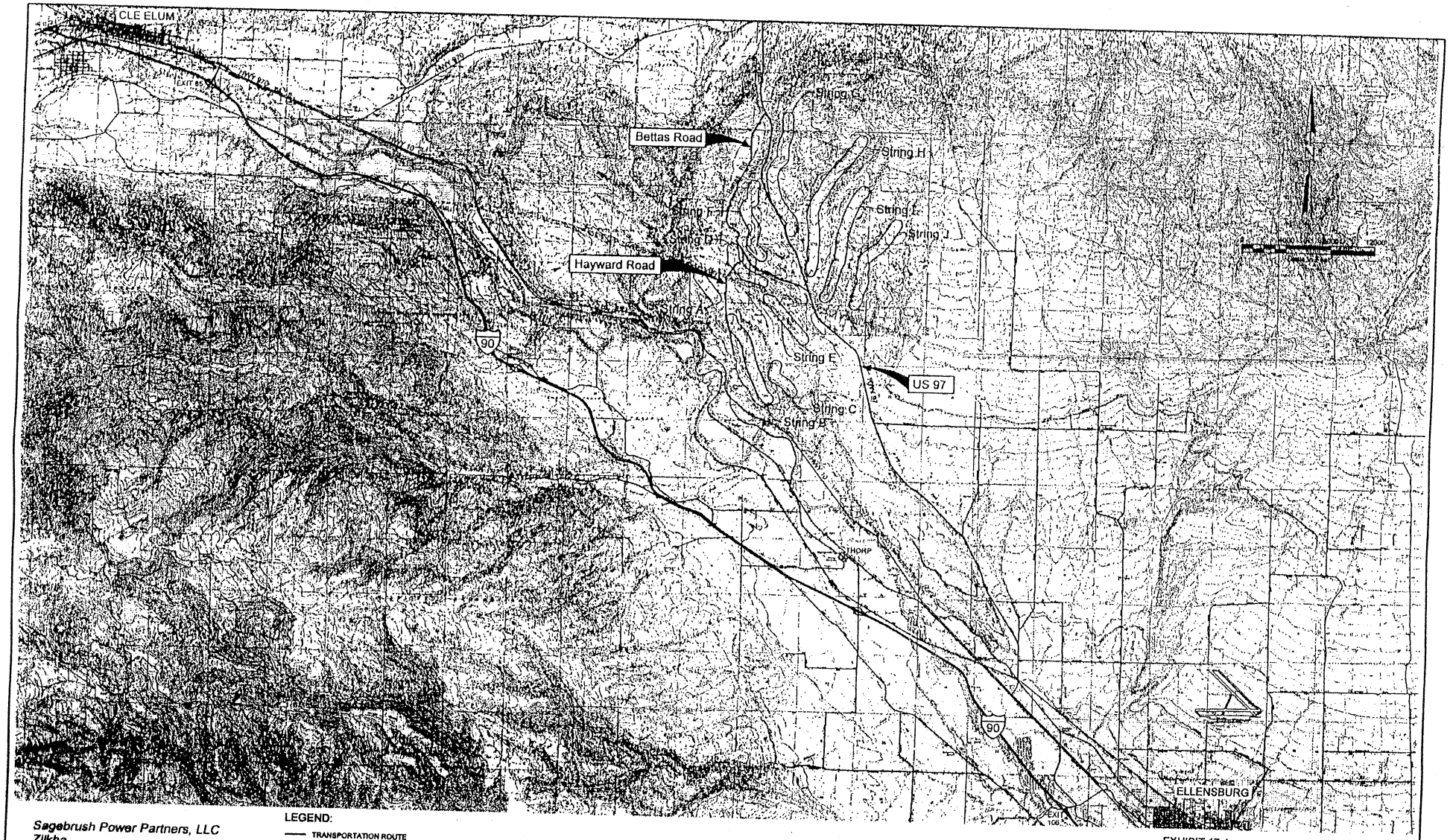
**Exhibit 15**




Sagebrush Power Partners, LLC
Zilkha Renewable Energy

LEGEND:
- TRANSPORTATION ROUTE
- EXISTING ROADS
- LOCATION OF PROPOSED WTG STRING

EXHIBIT 17-1
PROJECT SITE AND SURROUNDING ROADWAY NETWORK
APPLICATION FOR SITE CERTIFICATE
KITTITAS VALLEY WIND POWER PROJECT
JANUARY 2003

CH2MHILL

17/0386 C1
FILENAME zp-fig07-road.dgn PLOT DATE 10-JAN-2003 PLOT TIME 12:04:56