United States Department of the Interior
Bureau of Indian Affairs

October 2003

Wanapa Energy Center
Draft Environmental Impact Statement

Cooperating Agency:

Bonneville Power Administration

DOE/EIS-0342

BUREAU OF INDIAN AFFAIRS
MISSION STATEMENT

The Bureau of Indian Affairs' mission is to fulfill its trust responsibilities and promote self-determination on behalf of Tribal Governments, American Indians and Alaska Natives.

United States Department of the Interior

BUREAU OF INDIAN AFFAIRS

Umatilla Agency
Post Office Box 520
Pendleton, Oregon 97801

November 14, 2003

Dear Reader:

Enclosed for your review and comment is the Draft Environmental Impact Statement for the Wanapa Energy Center near Hermiston Oregon. The project is being proposed by Diamond Generating Corporation, the Confederated Tribes of the Umatilla Indian Reservation, the City of Hermiston, the City of Eugene acting through the Eugene Water and Electric Board, and the Port of Umatilla. The Bureau of Indian Affairs is the lead federal agency, and the Bonneville Power Administration is a cooperating agency for this Environmental Impact Statement.

The Draft Environmental Impact Statement analyzes the impacts from construction of a 1,200 megawatt electrical generating plant to be constructed as two separate 600 megawatt blocks. The project would also include of a 4.4 -mile electrical transmission line that would interconnect the plant with the Bonneville Power Administration's McNary Substation, and a 9.9 mile natural gas supply pipeline that would provide power plant fuel from the interstate natural gas pipeline system near Stanfield, Oregon. Cooling water for the plant would be withdrawn from the Columbia River through an existing Port of Umatilla intake structure, and wastewater would be discharged to the Cold Springs Reservoir via a pipeline paralleled with the natural gas pipeline. The EIS analyzes two route alternatives for the natural gas pipeline, and three route alternatives for the electrical transmission line. The Draft EIS addresses issues and concerns raised during the public scoping period.

The Draft EIS is also available on the following website: http://www.efw.bpa.gov/cgi-bin/PSA/NEPA/SUMMARIES/WanapaEnergy.

Public comments concerning the adequacy and accuracy of the Draft Environmental Impact Statement will be accepted for a 45-day period, until December 29, 2003. Comments must be submitted in writing to: Philip Sanchez, Superintendent, Umatilla Agency, Bureau of Indian Affairs, P.O. Box 520, 46807 B Street, Pendleton, Oregon, 97801.

Public Meetings to accept verbal and written comments are scheduled for the dates below. All meetings will begin at 7:00 PM each evening.

December 3, 2003 Tamastslikt Cultural Institute, 72789 Highway 331, Pendleton, Oregon.

December 4, 2003 Oxford Suites, 1050 North First (Highway 395), Hermiston, Oregon.

If you would like to obtain additional information, please contact Mr. Jerry Lauer, Bureau of Indian Affairs, (541) 278-3786.

Sincerely,

Superintendent

DRAFT
ENVIRONMENTAL IMPACT STATEMENT
WANAPA ENERGY CENTER

Lead Agency:	Department of the Interior Bureau of Indian Affairs (BIA) Umatilla Agency Pendleton, Oregon 97801
Cooperating Agency:	Bonneville Power Administration (DOE-EIS-0342) Portland, Oregon
Project Location:	Oregon
Comments on this EIS Should be Directed to:	Philip Sanchez Bureau of Indian Affairs 46807 B Street Pendleton, Oregon 97801 541-278-3786

ABSTRACT

Diamond Wanapa I, LP (DW), the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), the Eugene Water & Electric Board, the City of Hermiston, and the Port of Umatilla propose to jointly build and operate a new 1,200-megawatt (MW) natural gas-fired electric power generating facility that would be located approximately 4 miles east of Umatilla, Oregon. The proposed project referred to as the Wanapa Energy Center would be constructed on approximately 47 acres of Tribal Trust Land managed by the Confederated Tribes of the Umatilla Indian Reservation.

The participants propose to install highly efficient combustion turbines (CTs) generators at the Wanapa Energy Center. Each CT would exhaust through a heat recovery steam generator (HRSG) that can be fired by auxiliary duct burners (DBs). The HRSGs would produce steam to be used on-site in condensing steam turbines. Natural gas would be the sole fuel for the CTs and DBs. The CTs and DBs would employ combustion control technologies (such as dry low-nitrogen oxide [NOx] combustors) as well as post-combustion controls (such as selective catalytic reduction (SCR) and oxidation catalysts) in order to reduce air pollutant emissions.

The Wanapa Energy Center would incorporate two similar blocks of combined cycle. The nominal capacity of each block would be 600 megawatts (MW). Each block would consist of two CTs, two

HRSGs (each with one exhaust stack), one steam turbine (ST), and associated plant equipment. Phase I of the project would include one complete and operable block that would operate independently of the second phase. Phase II would be installed based on market demand for power.

Natural gas would be provided to the power plant from a new lateral pipeline that would extend from the vicinity of Stanfield, Oregon, approximately 10 miles southeast of the plant site. A new 4.4-mile, 500-kilovolt electrical transmission line would by built by the Bonneville Power Administration (BPA) from the proposed plant site to the existing BPA McNary Substation on the Columbia River. A new water supply pipeline would be constructed between the existing intake structure at the Port of Umatilla and the power plant site. Industrial water would be obtained under the City of Hermiston's and the Port of Umatilla's existing water right (Permit #49497) from the Columbia River. Blowdown water from plant cooling towers would be transported by pipeline to the Cold Springs Reservoir east of Hermiston to supplement stored agricultural irrigation water.

Construction activities for the proposed project are scheduled to begin in the fourth quarter of 2004, and the energy facility is scheduled to begin operation in fourth quarter of 2006.

In accordance with the National Environmental Policy Act of 1969 (NEPA), the Bureau of Indian Affairs (BIA) is preparing an Environmental Impact Statement (EIS) for the proposed Wanapa Energy Center Project. The BIA published a Notice of Intent (NOI) on the Wanapa Energy Center Project in the Federal Register dated October 22, 2001. The BPA is a cooperating agency for this EIS.

Responsible Official for EIS:

Philip Sanchez
Superintendent, Umatilla Agency
Bureau of Indian Affairs

EXECUTIVE SUMMARY

Project Description

Diamond Wanapa I, LP, (DW) a Diamond Generating Corporation company, and the Confederated Tribes of the Umatilla Indian Reservations (CTUIR), in conjunction with the City of Hermiston, the City of Eugene acting through Eugene Water & Electric Board, and the Port of Umatilla, entered into an agreement to develop and construct a greenfield combined cycle gas/steam turbine (CCGT) electric generating facility. The proposed combined cycle facility is to be known as the Wanapa Energy Center (the "project") and would be located on land held in trust by the United States (U.S.) Government for the benefit of the Tribes near Hermiston, Oregon.

The proposed Wanapa Energy Center would be located approximately 4 miles east of Umatilla, Oregon and 5 miles north of Hermiston, Oregon (see Chapter 1.0, **Figure 1.1-1**).

The project would include highly efficient combustion turbine (CTs) generators at the Wanapa Energy Center. Each CT would exhaust through a heat recovery steam generator (HRSG) that can be fired by auxiliary duct burners (DBs). The HRSGs would produce steam to be used on-site in condensing steam turbines. Natural gas would be the sole fuel for the CTs and DBs. The CTs and DBs would employ combustion control technologies (such as dry low-nitrogen oxide [NO_x] combustors) as well as post-combustion controls (such as selective catalytic reduction (SCR) and oxidation catalysts) in order to reduce air pollutant emissions.

The Wanapa Energy Center would incorporate two similar blocks of combined cycle. The nominal capacity of each block would be 600 megawatts (MW). Each block would consist of two CTs, two HRSGs (each with one exhaust stack), one steam turbine (ST), and associated plant equipment. Phase I of the project would include one complete and operable block that would operate independently of the second phase. Phase II would be installed based on market demand for power.

Natural gas would be provided from a new buried pipeline that would extend from the vicinity of Stanfield, Oregon, approximately 10 miles southeast of the plant site. A new 4.4-mile, 500-kilovolt (kV) electrical transmission line would interconnect the proposed project site to the Bonneville Power Administration (BPA) McNary Substation on the Columbia River. A new water pipeline would be constructed between the existing intake structure at the Port and the power plant site. Plant cooling water would be obtained under the City and Port existing water right

(Permit #49497) from the Columbia River. Blowdown water from plant cooling structures would be transported by pipeline to the Cold Springs Reservoir east of Hermiston to supplement stored agricultural irrigation water.

In accordance with the National Environmental Policy Act of 1969 (NEPA), the Bureau of Indian Affairs (BIA) is preparing an Environmental Impact Statement (EIS) for the proposed Wanapa Energy Center Project. The BIA published a Notice of Intent (NOI) on the Wanapa Energy Center Project in the Federal Register dated October 22, 2001. The BPA is a cooperating agency for this EIS.

Purpose and Need

The purpose of the Wanapa Energy Center Project is to provide a reliable, cost-effective, and environmentally acceptable electric generation source to satisfy base and peak electricity demands within the region. The project would provide electrical power to the local and regional pool. For the CTUIR, the purpose of the power plant project is to provide a new source of revenue that would: 1) enhance opportunities for future economic development on the Reservation and Tribal trust lands, 2) provide a new source of funding for Tribal health, education, and social services; and 3) offer the opportunity to develop a Tribal electrical distribution utility that would serve Tribal members.

Proposed Action Impact Evaluations

Impacts of the Proposed Action on environmental and human resources are summarized below.

Geology and Soils

The effects of project construction and facility siting and operation on geology would be minor. No geologic hazards such as subsidence, faults, or soil liquefaction occur within or near project component study areas. The prevalence of relatively gentle slopes in the project study area indicates that there is no landslide hazard.

Potential impacts of constructing the project components would include soil disturbance, increased water and wind erosion, reduced agricultural productivity, and management of rock present in excavation areas. Project construction would result in a temporary disturbance to soils, particularly

associated with the natural gas supply/wastewater discharge pipelines. By implementing the Storm Water Pollution Prevention Plan (SWPPP) and reclamation measures, the potential for water erosion would be minimized and returned to pre-construction conditions. The effects of soil erosion from wind would be reduced to pre-construction conditions by implementing mitigation to control dust, reduce traffic use and stabilize soil surfaces in highly erodible areas. Construction of the natural gas supply/wastewater discharge pipelines would result in temporary disturbance to 32 acres of prime farmland. However, topsoil and rock management mitigation measures would ensure that effects would be short-term and minor. The presence of rock would require engineering decisions on removal and rock disposal, particularly for the plant site and natural gas supply/wastewater discharge pipelines. The construction techniques and disposal methods would be designed to minimize effects on other environmental resources.

Water Resources

Project construction would result in localized disturbance to surface soils at the plant site, pipeline corridors, access road, and transmission line route. The SWPPP's erosion control measures would prevent sediment transport to intermittent streams or canals located within or near the project's work areas. As part of gas pipeline construction, Columbia River water may be used for hydrostatic testing. If hydrostatic test water is discharged to intermittent drainages or upland areas, water quality would meet Oregon National Pollution Discharge Elimination System (NPDES) permit requirements.

The impacts of project operation on water resources involve water withdrawal, water discharge, and management of chemical spills or leaks. Approximately 17 cubic feet per second (cfs) (average) or 23 cfs (maximum) of Columbia River water under an existing water right would be used for plant operation. While new water rights, even small ones, raise concerns regarding incremental and cumulative impacts to in-stream flows for fish, the withdrawal quantity comes from an existing water right (Port of Umatilla regional water supply system – Permit #49497), would not require any new water rights and would not result in a measurable change in river flow. The water withdrawal amount would represent less than 0.1 percent of Columbia River flow during the low-flow period. Plant water effluent (average of 2.8 cfs and maximum of 3.7 cfs) would be treated and piped to the end of the canal that discharges to Cold Springs Reservoir. Due to the relatively small discharge quantity, the daily change in reservoir volume would be less than 0.1 percent. By meeting NPDES requirements and state water quality standards, discharge water would not affect water quality in the reservoir. Storm water and sanitary sewage management

would be required during plant operation to ensure that there would be no impacts on surface water near the plant site. The potential effects of a chemical spill at the plant site would be minimized by implementing a spill response plan.

Project construction and operation would not affect groundwater resources, since aquifers are located at least 75 feet below the surface. Groundwater would not be used for water sources or discharge purposes.

Vegetation

Project construction would result in vegetation disturbance to 47 acres at the plant site, 9 acres within the access road ROW, 120 acres within the natural gas supply/wastewater discharge pipeline ROW, and 101 acres within the electric transmission line ROW. The majority of the disturbance would be to grassland-steppe, shrub-steppe, and irrigated cropland. Vegetation removal would be permanent at the plant site. By implementing reclamation procedures, grassland and irrigated crop species would return to the ROWs by the next growing season. Recovery of shrub species would take an estimated 10 to 50 years. Impacts to wetlands would be eliminated by avoiding one wetland proposed to be crossed by the gas/water discharge pipeline and implementing drainage control measures within the pipeline ROW. Noxious weed control measures would be required to minimize the introduction and spread of noxious weed species in the disturbance areas.

Cooling tower drift would deposit water droplets on vegetation such as native grass, weedy, and wetland species within an approximate 0.25-mile radius around the power plant. The concentration of dissolved chemical constituents in the drift would be extremely low - plant growth and reproduction would not be affected.

Fisheries

Project construction would result in localized surface disturbance near wetlands, drainage canals, or intermittent drainages. These water bodies support warmwater fish not taken for subsistence use and invertebrate species. By implementing erosion control measures, sediment transport to surface water resources would be minor. Therefore, impacts to aquatic habitat would be minor.

Project water use and discharge were evaluated for fisheries in the Columbia River, Cold Springs Reservoir, and the Umatilla River. Water withdrawal from the Columbia River would occur under an existing water right. This depletion would slightly reduce habitat for fish species (including listed salmon, steelhead and bull trout) in the Columbia River. Water discharge to Cold Springs Reservoir would provide a beneficial impact to fish and aquatic habitat in Cold Springs Reservoir by providing additional water. No direct impact to the Umatilla River would be expected.

Wildlife

Surface disturbance activities would result in the incremental long-term removal of approximately 47 acres and long-term alteration of 71 acres of native shrubland/grassland habitat. However, habitat quality within the project study area is considered low, based on recent fires on the Wanaket Wildlife Area, the amount of existing habitat fragmentation from agricultural, residential, and industrial activities in the study area, and the establishment of nonnative weed species in the area. Impacts also would result in an incremental increase in habitat fragmentation; limited mortality of small, less mobile species; and temporary displacement of wildlife from the construction area as a result of increased noise and human presence.

Special Status Species

Surface disturbance activities would result in the removal of approximately 47 acres and long-term modification of 71 acres of potentially suitable foraging habitat (i.e., grassland, shrub-steppe, and wetland habitats) for the bald eagle, ferruginous hawk, Swainson's hawk, American peregrine falcon, long-billed curlew, grasshopper sparrow, loggerhead shrike, and western burrowing owl. The project would temporarily disturb approximately 2.6 acres of potentially suitable wetland habitat for the American white pelican, western painted turtle, western toad, Woodhouse's toad, and western leopard frog. Other impacts could include the short-term displacement of these species from the project area as a result of increased noise levels and human presence during surface disturbance activities and operation of the power plant facility. However, impacts to these species from project construction and operation would be low, based on the known distribution of these species within the project area, low overall habitat quality within the project area, and mitigation measures that have been developed for these species.

Air Quality

Project construction would result in disturbance and handling of surface soils at the plant site and along the pipeline corridors, access road, and transmission line route. By implementing dust control measures, the impacts of construction-related fugitive dust would be minimized. The construction activities would include periodic watering of haul roads and storage piles during periods of observed fugitive dust transport off the site. Traffic speed limits would be established and may be specifically constrained during dry periods when fugitive dust is generated. Once the facility is constructed, the soil storage piles would be stabilized, roadways would be graveled or hard-surfaced, and exposed areas would be reclaimed or revegetated with native species or with special plantings that are maintained.

The air emissions from project operation include the discharge of air pollutants from the main stacks of the combustion turbines and duct firing units. The proposed project is classified as a major source and would be regulated under the PSD program and the Title V operating permit program. The facility must demonstrate continuous compliance with limits on emissions of nitrogen oxides (NO_x), carbon monoxide (CO), and sulfur oxides (SO_x) from these sources, and must perform periodic monitoring of other pollutants including particulate matter <10 microns in size (PM_{10}) and volatile organic compounds (VOCs).

The facility would utilize "state of the art" pollution controls including selective catalytic reduction of NOx emissions and the use of a CO oxidation and removal catalyst. The permit application has demonstrated that the facility is installing Best Available Control Technology for NO_x, CO, SO_2, and PM_{10}. This level of Best Available Control Technology is equal to or better than all recently permitted power production facilities in the Pacific Northwest. The facility also would produce power in a very efficient and clean way with the use of steam turbines producing power from the hot exhaust gases of the combustion turbines that would otherwise be wasted. The facility also would install high performance drift eliminators on its cooling towers to control emissions.

The dispersion modeling for the air permit application shows that impacts of these emissions would be below established significance levels for CO and SO_2. The dispersion modeling also demonstrates that predicted pollutant concentrations are well within allowable ambient air quality standards and PSD increments for NO_2 and PM_{10} including impacts from existing industrial and farming activities, recently permitted industrial activities, existing mobile sources of emissions, and natural sources of emissions. This, therefore, indicates that the operation of the Wanapa

Energy Center would not affect any existing industrial or farming activities and also would allow for any future growth of possible farming or industrial activities. The modeling also addressed impacts on nearby pristine (Class I) areas and demonstrated acceptable impacts on visibility, soils (acid deposition), and vegetation within those areas. The operation of the proposed facility would not cause or contribute to an exceedence of any established air quality standard and would not adversely impact air quality related values.

In summary, the Wanapa Energy Center is a very clean and good alternative to older methods of electric generation, such as coal-fired power plants, as demonstrated in the following table. This table compares emission rates from the proposed Wanapa Energy Center with emission rates from the nearby Boardman Coal Electric Generation facility. Also, the Wanapa Energy Center would meet or exceed emission controls that have been implemented at similar facilities in the Pacific Northwest. Finally, the operation of the Wanapa Energy Center would not cause or contribute to any exceedences of any established air quality standards and would not hinder existing or future farming or industrial activities.

Comparison of Annual Emissions per Megawatt (MW) of Electricity Produced

Pollutant	Wanapa Energy Center Emissions (tons/MW)[1]	Boardman Coal Facility Emissions (tons/MW)[2]	Percent Improvement
Sulfur Oxides	60.1	101,500.0	99.9%
Nitrogen Dioxide	318.2	42,290.0	99.2%
Particulate Matter	542.8	3,520.0	90.3%
Carbon Monoxide	146.4	2,556.7	94.3%
Volatile Organic Compounds	133.5	306.7	56.5%

[1]Based on a plant-wide electric generation capacity of 1,485 MW.
[2]Based on a plant-wide electric generation capacity of 600 MW.

Transportation

Project construction and operation would result in increased traffic on U.S. Highway 730, U.S. Highway 395/SR 32, and local roads. Temporary traffic would increase on access roads during a 24- to 36-month period for power plant construction. Temporary traffic increases on roads used for construction of the pipelines and electric transmission line would occur during a 3- and 4-month

period, respectively. Increased traffic levels also would result in an increased risk for accidents. Increased traffic for an estimated 30 workers would occur during plant operation. Potential traffic congestion and increased accident risks would be reduced by implementing a traffic flow plan, timing major construction traffic during off-peak hours, and using partial site shift changes at the plant.

Visual Resources

Construction of the power plant facility would result in visual impacts on residential areas at McNary and on the Columbia River bluff near Hat Rock State Park, motorists using U.S. Highway 730 east of Umatilla, and hunters in the Wanaket Wildlife Area. The most visible parts of the facility would be the HRSG exhaust stacks and the turbine building. In addition, a steam plume from the cooling towers would be visible over a wide area during cold weather periods. Facility lighting at night also would be seen from public roads and residences. The new electric transmission line would be seen by area residents and motorists on area highways and roads. The intensity of visual effect would depend on the use of single or double circuit towers and whether the structures are new landscape features. The effects of the McNary Substation expansion would be considered minor, since the expansion area is already industrial.

Noise

Increased noise levels would occur in the local area as a result of construction equipment, traffic, and facility operation. Increased traffic would be short term for the construction of the plant (24 to 36 months), pipelines (3 months), and transmission line (4 months) and long term for plant operation. By scheduling construction between 7 a.m. and 5 p.m., the duration of noise during the day would be minimized. Noise impacts would be minor, since the residences and the Two Rivers Correctional Facility are 1.5 miles from the plant. Recreational users of the Columbia River (0.2 mile from the plant) and hunters on the Wanaket Wildlife Area could be affected by construction and operation noise.

Cultural Resources

No National Register of Historic Places (NRHP)-eligible sites were located during the cultural resources field survey of the plant site; however, due to the traditional and historical use of the plant site area by the Umatilla and the Walla Walla tribes, monitors would be present during all

ground disturbing activities associated with construction of the plant facility. If subsurface cultural material or human remains were located during project-related construction, all work would cease, the CTUIR would be notified, and in the case of ancestral remains, the CTUIR's Inadvertent Discovery Plan would be implemented in consultation with the Tribal Historic Preservation Office (THPO). Therefore, any cultural resources excavated within the plant site would receive the appropriate level of treatment as defined by the THPO.

Based on the file search, the proposed water and gas lines would cross two NRHP-eligible historic canals and one NRHP-eligible ditch. Upon receiving concurrence from the State Historic Preservation Office (SHPO), adverse effects to the canals and ditch would be avoided by boring under these historic features; therefore, no impacts to the canals and ditch would be expected to occur. No cultural resources were identified as a result of the file search within or adjacent to the proposed transmission line; however, field surveys are required to determine the location and importance of cultural resources within the transmission line ROW. Adverse impacts and mitigation procedures would be determined in consultation with the SHPO/THPO. Monitors may need to be present during construction on portions of the transmission, water, and gas lines.

Land Use

Construction of the project components would occur on Tribal Trust Land and private land with varying land uses. The power plant would convert 47 acres of grassland-steppe habitat to an industrial site. The other project components would occur on land used for rural residential, agriculture, grassland- and shrub-steppe, industrial, highway ROW, and railroad ROW. Short-term effects (noise, dust) on residential areas would include 16 residences that are located within 200 feet of the natural gas supply/wastewater discharge pipeline ROW centerline and 7 residences within 300 feet of the electric transmission line ROW centerline.

Recreation

Project construction and operation would not displace recreational users in the Wanaket Wildlife Area, McNary Beach State Park and Recreation Area, Hat Rock State Park, Cold Springs National Wildlife Refuge, or Columbia River. However, increased traffic, visual impacts, and noise could affect the recreational experience in the Wanaket Wildlife Area, but not in a manner that would change future use. Recreational users of the McNary Beach State Park and Recreation Area and Hat Rock State Park would not be affected because of visual screening by a bluff.

Socioeconomics

Overall, the proposed project would result in beneficial impacts to socioeconomics. When combining all project components, construction activities would create a total of 320 to 820 temporary jobs during a 3- to 36-month period. An estimated 180 indirect/secondary jobs also would be generated during construction. Project operation would result in 30 permanent workers. Adequate housing would be available for the estimated work force numbers. Beneficial impacts also would occur from increased sales in the local area and additional tax revenues from the natural gas supply/wastewater discharge pipeline ROW property taxes. Since the power plant would be sited on land held in trust by the United States for the CTUIR, the beneficial owners, state and county taxation would not be applicable. However, the power plant would pay a tribal tax to the CTUIR, equivalent to the aggregate of State taxation. CTUIR would spend these tax revenues on goods and services mainly in Umatilla County, thereby directly introducing these revenues into the local economy. All project "tax advantages" are realized in the federal taxation scheme through a federal provision for accelerated depreciation for projects built on tribal land. Therefore, the power plant would introduce the same amount of revenues through taxation into the local and Oregon economies but the manner of introduction would be different. Any "tax breaks" would be at the federal level. Further, the power plant has committed to spend environmental mitigation funds in the local area. The power plant would pay for all local services used by the facility at rates negotiated with the local authorities. Potential adverse impacts would occur due to a temporary loss of crop production along the natural gas supply/wastewater discharge pipelines and electric transmission line ROWs. Public utilities and services are available and would be used for plant operation. A fire protection system would be installed at the power plant site for fire control and protection. Local services would be available to handle solid wastes produced by the plant.

Public Safety

The potential impacts to public safety and health would be minor. During construction of the transmission lines and gas pipeline, good engineering practices and standard safety procedures would be implemented to protect construction workers and the general public. The new transmission line would be located adjacent to existing transmission lines and those residences and buildings already in close proximity to existing lines could experience a slight increase in exposure to electric and magnetic fields. There is a lack of evidence demonstrating health effects from exposure to electric and magnetic fields. Residences, buildings and people in the vicinity of the gas

pipeline would be exposed to a minor risk for pipeline incidents such as leaks, fires or explosions. However, over a 50-year expected service life of the pipeline, the projected incident rate for an accident is 0.014. This means that the estimated risk of incident would be less than 1 incident over 50 years and even then, the chances of serious injury during such an incident are less. The pipeline would be regularly inspected and tested according to industry standards to minimize the potential for incidents. The transmission lines for this project would be constructed to comply with industry and state standards for safe operation.

Mitigation Measures

A summary of mitigation measures for this project is presented in **Table ES-1**.

Project Alternative Impact Comparisons

Project alternatives were proposed for two project components, natural gas supply/wastewater discharge pipeline routes and electrical transmission routes. After consulting with CTUIR elders and their tour of the proposed site, no alternatives were proposed for the other project components (power plant site, access road, and water supply pipeline). In addition to the Proposed Action 9.9-mile route, four other natural gas supply/wastewater discharge routes were evaluated. The alternative routes would be approximately the same length as the Proposed Action route, but would follow a more eastern (Alternatives 1, 3, and 4) and or more western approach (Alternative 2) in connecting the power plant to the interstate gas pipeline system at Stanfield.

In addition to the Proposed Action 4.4-mile route, three alternative routes were proposed for electric transmission connection between the power plant and the McNary Substation. The length of the routes would be 5.3 miles for Alternative 1 and would range from 3.7 to 4.0 miles for the other alternatives.

The impact evaluation focused on environmental resources and impact topics that indicated a difference for one or more alternatives in relation to the Proposed Action. A summary of the impact evaluations for the natural gas supply/wastewater discharge pipeline and electrical transmission line alternatives are presented in **Tables ES-2** and **ES-3**.

The agency (BPA and BIA)-preferred alternative is the Proposed Action.

Table ES-1
Summary of Mitigation Measures

Resource	Mitigation Measure
Soils	
	S-1: Restrict construction traffic to the defined ROW.
	S-2: Restrict the pipeline construction ROW width to 75 feet in the Wanser loamy fine sand and Winchester sand units where the natural gas supply/wastewater discharge pipeline route crosses native vegetation communities.
	S-3: Use measures such as topsoil matting, planting of cover crops, or soil binder in the Wanser loamy fine sand and Winchester sand units along the southern portion of the natural gas supply/wastewater discharge pipeline routes to reduce wind erosion.
	S-4: Segregate the stripped topsoil separately from the trench spoil;
	S-5: Remove all excess large-size rock from the upper 12 inches of the soil to the extent practical in agricultural and residential areas.
	S-6: Excess pipeline trench rock would be placed in a landowner-approved location.
Vegetation/Land Cover	
	VLC-1. The revegetation mixture applied to disturbed soils on the Wanaket Wildlife Area would conform to the future management objectives for the site as described by the Wildlife Area Management Plan (CTUIR and BPA 2001b).
	VLC-2. A pre-construction weed inventory would be completed along the approved pipeline route to determine the location of weed populations within and adjacent to the construction ROW. Excavation equipment would be cleaned (air pressure hoses, or wash stations) after crossing weed infestation areas and entering weed-free areas. All soil excavated from weed-infested areas would be replaced in the same location.
	VLC-3. Any hay used as mulch would be certified as weed-free prior to application.
Wildlife	
	W-1: Prior to construction activities during the raptor breeding season (March 1 - June 30), breeding raptor surveys would be conducted by a qualified biologist through areas of suitable nesting habitat to identify any potentially active nest sites within 0.5 mile from the project area. If applicable, appropriate protection measures, including seasonal constraints and establishment of buffer areas would be implemented at active nest sites until the young have fledged and have dispersed from the nest area. These measures will be implemented on a site-specific and species-specific basis, in coordination with CTUIR and Wanaket Wildlife Area biologists.
	W-2: Standard, safe designs as outlined in Mitigating Bird Collision with Power Lines (APLIC 1994) would be incorporated in the design of the electrical distribution lines to prevent collision to foraging and migrating bird species with the project area, in coordination with CTUIR and Wanaket Wildlife Area biologists. Design features would include the configuration of the route to avoid partitioning foraging and resting habitat, alignment of overhead groundwire to the same height as the conductors, and the use of markers to increase the visibility of the lines to birds.

Table ES-1 (Continued)

Resource	Mitigation Measure
	W-3: Prior to construction activities during the avian breeding season (March 1 - June 30), avian breeding surveys for long-billed curlew, grasshopper sparrow, loggerhead shrike, and western burrowing owl would be conducted by a qualified biologist through areas of suitable nesting habitat to identify any potentially active nest sites within 0.25 mile from the project area. If applicable, appropriate protection measures, including seasonal constraints and establishment of buffer areas would be implemented at active nest sites until the young have fledged and have dispersed from the nest area. These measures would be implemented on a site-specific and species-specific basis, in coordination with CTUIR Wanaket Wildlife Area biologists.
	W-4: Prior to construction activities through suitable breeding habitat for special status reptile and amphibian species, occurrence surveys for western painted turtle, western toad, Woodhouse's toad, and northern leopard frog would be conducted by a qualified biologist to determine presence. If present, appropriate protection measures could include rerouting the pipeline ROW to avoid breeding habitat, in coordination with CTUIR and Wanaket Wildlife Area biologists.
Transportation	
	T-1. Implement partial plant site shift changes to reduce the number of personal vehicles that queue at the Beach Access Road/U.S. Highway 730 intersection.
	T-2. Time major construction material deliveries to off-peak hours (early morning, late evening) to prevent local congestion on U.S. Highway 730.
	T-3. A site-specific construction traffic flow plan would be submitted to the Oregon DOT that documents the present traffic volumes, expected volume of project construction traffic, and the intersections to be used. If warranted by this study, the width of the U.S. Highway 730 at the Beach road intersection (or other intersections) would be expanded to provide left-hand and right-hand turn lanes.

Table ES-2
Summary Comparison of Natural Gas Supply/Waste Water Discharge Pipeline Alternatives

	Proposed Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Length (miles)	9.9	10.2	10.3	10.0	9.5
Temporary Disturbance (Acres)	120.4	123.4	124.4	121.4	114.9
Resource/Impact Issue					
Wetlands	The pipelines would avoid the Wanaket Wildlife Area created Wetlands, but would cross an area that could be developed as wetlands in the future. Trenching across basalt rock could modify the surface drainage feeding wetlands, which could be partially mitigated with trench plugs.	The pipelines would avoid the Wanaket Wildlife Area created wetlands, but would cross an area that could be developed as wetlands in the future. Trenching across basalt rock could modify the surface drainage, which could be partially mitigated with trench plugs.	The pipelines would cross the Wanaket Wildlife Area created wetlands. Trenching across basalt rock could modify the surface drainage, which could be partially mitigated with trench plugs.	The pipelines would avoid the existing Wanaket Wildlife Area created wetlands, as well as areas suitable for wetland development in the future.	The pipelines would avoid the existing Wanaket Wildlife Area created wetlands, as well as areas suitable for wetland development in the future.
Bedrock Construction	Approximately 23 acres containing bedrock or large rock would have to be cleared and excavated which represent difficult revegetation conditions.	Approximately 30 acres containing bedrock or large rock would have to be cleared and excavated which represent difficult revegetation conditions.	Approximately 25 acres containing bedrock or large rock would have to be cleared and excavated which represent difficult revegetation conditions.	Approximately 28 acres containing bedrock or large rock would have to be cleared and excavated which represent difficult revegetation conditions.	Approximately 28 acres containing bedrock or large rock would have to be cleared and excavated which represent difficult revegetation conditions.
Residences/Land Use	16 residential structures are located within 200 feet of the ROW centerline that would be subject to short-term noise and dust during construction. The	12 residential structures are located within 200 feet of the ROW centerline that would be subject to short-term noise and dust during construction. The	43 residential structures are located within 200 feet of the ROW centerline that would be subject to short-term noise and dust during construction. The	12 residential structures are located within 200 feet of the ROW centerline that would be subject to short-term noise and dust during construction. The	14 residential structures are located within 200 feet of the ROW centerline that would be subject to short-term noise and dust during

Table ES-2 (Continued)

	Proposed Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Length (miles)	9.9	10.2	10.3	10.0	9.5
Temporary Disturbance (Acres)	120.4	123.4	124.4	121.4	114.9
Resource/Impact Issue					
Residences/Land Use	majority of these structures are on large land parcels associated with farms. Pipeline ROW is located primarily in irrigated cropland where special efforts would be required to maintain the drainage pattern and soil productivity.	majority of these structures are on large land parcels associated with farms. Pipeline ROW is located primarily in irrigated cropland where special efforts would be required to maintain the drainage pattern and soil productivity.	majority of these structures on small rural residential lots, with many small outbuildings and fences on the existing Northwest Pipeline ROW that would have to be cleared and restored. The proposed alignment is located in and adjacent to county roads that could cause traffic delays, and require detours.	majority of these structures are on large land parcels associated with farms. Pipeline ROW is located primarily in irrigated cropland where special efforts would be required to maintain the drainage pattern and soil productivity.	majority of these structures are on large land parcels associated with farms. Pipeline ROW is located primarily in irrigated cropland where special efforts would be required to maintain the drainage pattern and soil productivity.
Wildlife/Native Habitats	22 acres of shrub-steppe would be altered by construction. Wetlands could be avoided by small reroutes. The route would pass near a known burrowing owl nesting area. 1.6 miles of the Wanaket Wildlife Area would be crossed.	39 acres of shrub-steppe would be altered by construction. Wetlands could be avoided by small reroutes. The route would pass near a known burrowing owl nesting area. 2.8 miles of the Wanaket Wildlife Area would be crossed.	21 acres of shrub-steppe would be altered by construction. Wetlands could be avoided by small reroutes. The route would avoid a known burrowing owl nesting area. 1.7 miles of the Wanaket Wildlife Area would be crossed.	37 acres of shrub-steppe would be altered by construction. Wetlands would be entirely avoided. The route would avoid a known burrowing owl nesting area. 2.2 miles of the Wanaket Wildlife Area would be crossed.	28 acres of shrub-steppe would be altered by construction. Wetlands would be entirely avoided. The route would avoid a known burrowing owl nesting area. 2.2 miles of the Wanaket Wildlife Area would be crossed.

Table ES-3
Summary Comparison of Transmission Line Alternatives

	Proposed Action	Alternative 1	Alternative 2	Alternative 3
Length (Miles)	4.4	5.3	4.0	4.0
Resource/Impact Issue				
Use of existing Utility Corridors	2.6 miles in an existing transmission line utility corridor; 1.8 miles in a new utility corridor	4.2 miles in an existing transmission line utility corridor; 1.1 miles in a new utility corridor.	4.0 miles in a new utility corridor.	4.0 miles in a new utility corridor.
Public Safety	8 residences are located near the edge of the proposed ROW along Lind Road. These locations may experience radio and tv interference, and may be exposed to corona noise that slightly exceeds the Oregon state standard of 50 dBA at the edge of the ROW.	8 residences are located near the edge of the proposed ROW along Lind Road. These locations may experience radio and tv interference, and may be exposed to corona noise that slightly exceeds the Oregon state standard of 50 dBA at the edge of the ROW.	No residences are located near the edge of the alternative ROW. The transmission line is located within 1,000 feet of the Two Rivers Correctional Facility, and could cause interference with communications, and electronic security measures at the prison.	No residences are located near the edge of the alternative ROW. The transmission line is located within 1,000 feet of the Two Rivers Correctional Facility, and could cause interference with communications, and electronic security measures at the prison.
Visual Effects	The transmission line segment located in a new ROW between the plant site and the existing BPA transmission corridor would represent a new industrial element to viewers along Highway 730, and visitors to the Wanaket Wildlife Area.	The transmission line segment located in a new ROW between the plant site and the existing BPA transmission corridor would represent a new industrial element to viewers along Highway 730, and visitors to the Wanaket Wildlife Area.	The transmission line would represent a new industrial element that traverses the Columbia River bluff between the Two Rivers Correctional Facility and the McNary Substation (about 2 miles). The transmission line would intercept the view of approximately 17 McNary residences that overlook the Columbia River and McNary Dam. The transmission line would represent a new industrial element for visitors to the McNary	The transmission line would represent a new industrial element that traverses the Columbia River bluff from Wanapa Plant Site to the McNary Substation (about 3 miles). The transmission line would intercept the view of approximately 17 McNary residences that overlook the Columbia River and McNary Dam. The transmission line would represent a new industrial element for visitors to the McNary State Park and the COE

Table ES-3 (Continued)

	Proposed Action	Alternative 1	Alternative 2	Alternative 3
Length (Miles)	4.4	5.3	4.0	4.0
Resource/Impact Issue				
			State Park and the COE park facilities at McNary Dam and visitor center.	park facilities at McNary Dam and visitor center.
Collision potential for waterfowl	This alignment crosses a portion of the 1.5 square mile Wanaket Wildlife Management Area wetland complex. Approximately 15% of the total wetland complex (waterfowl resting habitat) would be partitioned from agricultural fields to the south and east (waterfowl foraging habitat). Waterfowl using the isolated portion of the wetland would need to negotiate the transmission line as they flew from one habitat type to the other.	This alignment would separate about 70% of the total Wanaket Wildlife Management Area wetland complex from the agricultural area. Waterfowl using the isolated portion of the wetland would need to negotiate the transmission line as they flew from one habitat type to the other.	This alignment would not separate the wetland complex from the agricultural areas and would not cross the Wanaket Wildlife Management Area.	This alignment would not separate the wetland complex from the agricultural areas and would not cross the Wanaket Wildlife Management Area.
	The alignment does not parallel the river and is offset from the river. As a result, waterfowl could use the river as a flight corridor and, for those birds crossing the river, the setback would allow waterfowl ample opportunity to adjust their flight paths and avoid the power lines.	Like the Proposed Action, the alignment would not parallel the river and is offset from the river. As a result, waterfowl could use the river as a flight corridor and, for those birds crossing the river, the setback would allow waterfowl ample opportunity to adjust their flight paths and avoid the power lines.	This alignment would parallel the river, though approximately 50% of the alignment would be about 0.5 miles from the river. This alignment would pose a potential collision hazard to waterfowl utilizing the river as a flight corridor as well as those birds crossing the river.	This alignment would parallel the river. The majority of the alignment would be within 0.2 miles from the river. This alignment would pose a potential collision hazard to waterfowl utilizing the river as a flight corridor as well as those birds crossing the river.

ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
$\mu g/m^3$	micrograms per cubic meter
ADT	average daily traffic
AEO	Annual Energy Outlook
APLIC	Avian Power Line Interaction Committee
BACT	Best Available Control Technology
BIA	Bureau of Indian Affairs
BMP	Best Management Practices
BOR	U.S. Bureau of Reclamation
BPA	Bonneville Power Administration
CAA	Clean Air Act of 1990
CAM	compliance assurance monitoring
CCGT	combined cycle gas/steam turbine
CFR	Code of Federal Regulations
cfs	cubic feet per second
CO	carbon monoxide
CO_2	carbon dioxide
CRPP	Cultural Resources Protection Program
CT	combustion turbines
CTG	connected to a generator
CTUIR	Confederated Tribes of the Umatilla Indian Reservation
CWA	Clean Water Act of 1972
DB	duct burners
dBA	decibels on the A-weighted scale
DEQ	Department of Environmental Quality
DOT	Department of Transportation
DPS	Distinct Populations Segment
DW	Diamond Wanapa 1, LP
EFH	essential fish habitat
EFSC	Energy Facility Siting Council
EIS	Environmental Impact Statement
EMF	electromagnetic fields
ESA	Endangered Species Act

ESU	evolutionary significant unit
FAA	Federal Aviation Administration
FCRTS	Federal Columbia River Transportation System
H_2SO_4	sulfuric acid
HAP	hazardous air pollutant
HID	Hermiston Irrigation District
HRSG	heat recovery steam generator
I-82	Interstate 82
I-84	Interstate 84
km	kilometer
kV	kilovolt
MACT	Maximum Achievable Control Technology
mG	milligauss
mg/l	milligrams per liter
mgd	million gallons per day
MMBtu	million British thermal unit
MW	megawatt
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NIEHS	National Institute of Environmental Health
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NO_x	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NRCS	National Resources Conservation Service
NRHP	National Register of Historic Places
NWPPC	Northwest Power Planning Council
O_3	ozone
OAR	Oregon Administrative Rules
ODFW	Oregon Department of Fish and Wildlife
Pb	lead
PGT	Pacific Gas Transmission

PM_{10}	particulate matter with an aerodynamic diameter of 10 microns or less
ppm	parts per million
ppmvd	parts per million by volume, dry
PSD	Prevention of Significant Deterioration
RI	radio interference
RM	river mile
ROD	Record of Decision
ROW	right-of-way
RV	recreational vehicle
scf	standard cubic feet
SCR	selective catalytic reduction
SHPO	State Historic Preservation Office
SO_2	sulfur dioxide
SR	State Route
SWPPP	Storm Water Pollution Prevention Plan
TCP	Traditional Cultural Property
THPO	Tribal Historic Preservation Officer
TRCI	Two Rivers Correctional Institution
TVI	television interference
U.S.	United States
UPRR	Union Pacific Railroad
USACE	U.S. Army Corps of Engineers
USDOT	U.S. Department of Transportation
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VOC	Volatile Organic Compounds
WA	Wilderness Area
WECC	Western Electricity Coordinating Council

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1.0 INTRODUCTION

1.1 Project Background

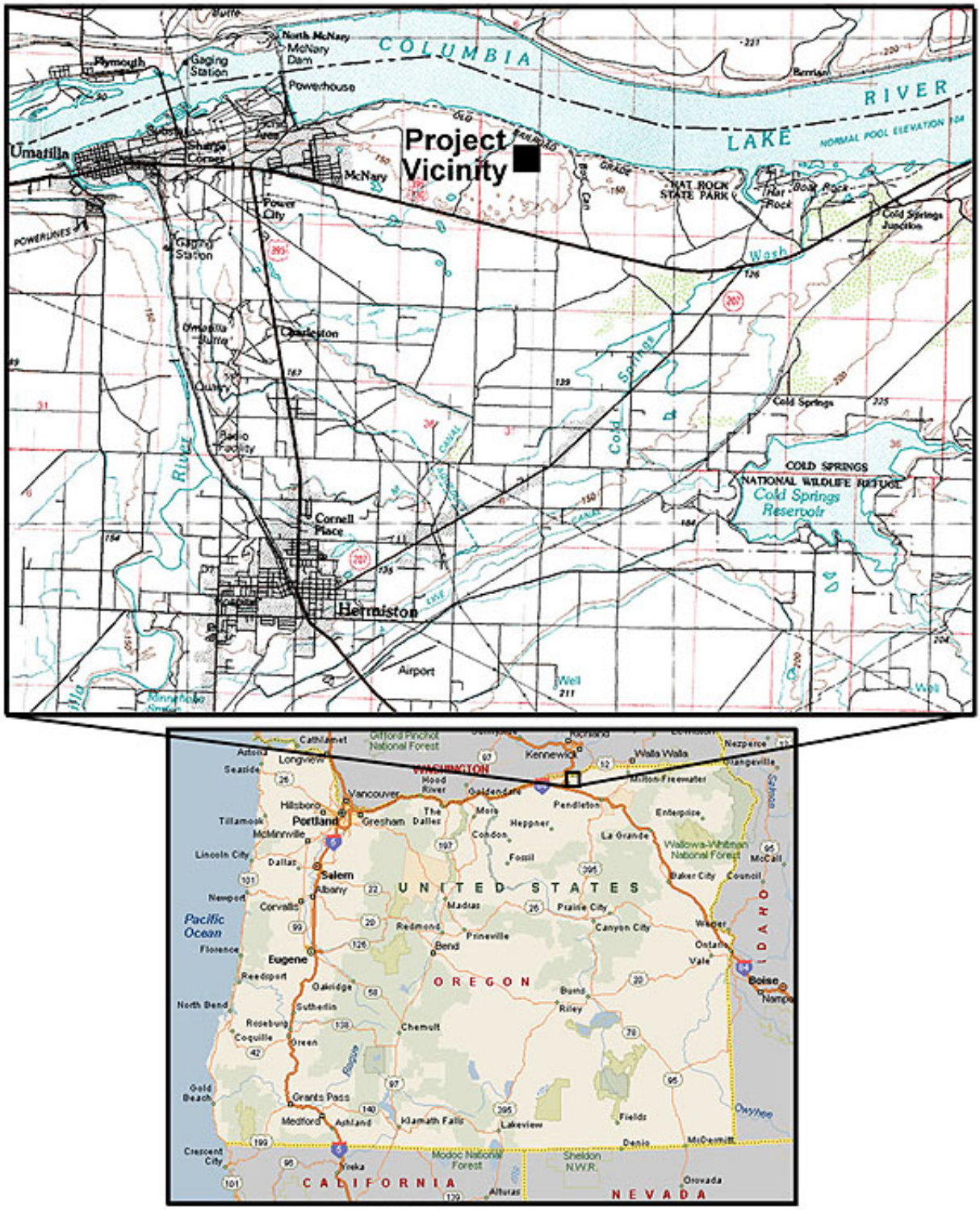
Diamond Wanapa I, LP, (DW) a Diamond Generating Corporation company, and the Confederated Tribes of the Umatilla Indian Reservations (CTUIR) in conjunction with the City of Hermiston, the City of Eugene acting through Eugene Water & Electric Board, and the Port of Umatilla, entered into an agreement to develop and construct a greenfield combined cycle gas/steam turbine (CCGT) electric generating facility. The proposed combined cycle facility is to be known as the Wanapa Energy Center (the "project") and would be located on land held in trust by the United States (U.S.) Government for the benefit of the Tribes near Hermiston, Oregon.

The proposed Wanapa Energy Center would be located approximately 4 miles east of Umatilla, Oregon and 5 miles north of Hermiston, Oregon (**Figure 1.1-1**).

The project would include highly efficient combustion turbines (CTs) generators at the Wanapa Energy Center. Each CT would exhaust through a heat recovery steam generator (HRSG) that can be fired by auxiliary duct burners (DBs). The HRSGs would produce steam to be used on-site in condensing steam turbines. Natural gas would be the sole fuel for the CTs and DBs. The CTs and DBs would employ combustion control technologies (such as dry low-nitrogen oxide [NO_x] combustors) as well as post-combustion controls (such as selective catalytic reduction (SCR) and oxidation catalysts) in order to reduce air pollutant emissions.

The Wanapa Energy Center would incorporate two similar blocks of combined cycle. The nominal capacity of each block would be 600 megawatts (MW). Each block would consist of two CTs, two HRSGs (each with one exhaust stack), one steam turbine (ST), and associated plant equipment. Phase I of the project would include one complete and operable block that would operate independently of the second phase. Phase II would be installed based on market demand for power.

Natural gas would be provided from a new buried pipeline that would extend from the vicinity of Stanfield, Oregon, approximately 10 miles southeast of the plant site. A new 4.4-mile, 500-kilovolt (kV) electrical transmission line would interconnect the proposed project site to the Bonneville Power Administration (BPA) McNary Substation on the Columbia River. A new water supply pipeline would be constructed between the existing intake structure at the Port and the power plant site. Plant cooling water would be obtained under the City and Port existing water right



Wanapa Energy Center EIS

Figure 1.1-1

Project Location

9/24/03

(Permit #49497) from the Columbia River. Blowdown water from plant cooling structures would be transported by pipeline to the Cold Springs Reservoir east of Hermiston to supplement stored agricultural irrigation water.

In accordance with the National Environmental Policy Act of 1969 (NEPA), the Bureau of Indian Affairs (BIA) is preparing an Environmental Impact Statement (EIS) for the proposed Wanapa Energy Center Project. The BIA published a Notice of Intent (NOI) on the Wanapa Energy Center Project in the Federal Register dated October 22, 2001. The BPA is a cooperating agency for this EIS.

1.2 Purpose and Need

The purpose of the Wanapa Energy Center Project is to provide a reliable, cost-effective, and environmentally acceptable electric generation source to satisfy base and peak electricity demands within the region. The project would provide electrical power to the local and regional pool. For the CTUIR, the purpose of the power plant project is to provide a new source of revenue that would: 1) enhance opportunities for future economic development on the Reservation and Tribal trust lands; 2) provide a new source of funding for Tribal health, education, and social services; and 3) offer the opportunity to develop a Tribal electrical distribution utility that would serve Tribal members.

1.2.1 Underlying Need for Action

Recent national and regional forecasts project increasing consumption of electrical energy to continue into the foreseeable future, requiring development of new generation resources to satisfy the increasing demand.

The Energy Information Administration provides a National forecast in its report *Annual Energy Outlook (AEO) 2003 with Projections to 2025*:

> Total electricity demand is projected to grow by 1.9 percent per year from 2001 through 2020 (the same as in AEO 2002) and 1.8 percent per year from 2001 to 2025. Rapid growth in electricity use for computers, office equipment, and a variety of electrical appliances in the residential and commercial sectors is only partially offset by improved efficiency in these and other more traditional electrical

applications; however, demand growth is expected to slow as regional and national market saturation is reached for air conditioning and some other applications (**Figure 1.2-1**)

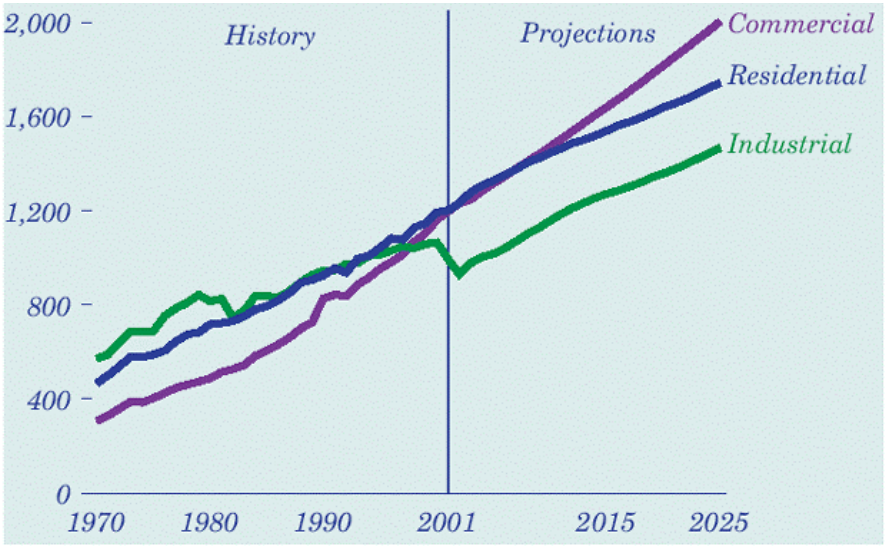


Figure 1.2-1. Annual Electricity Sales by Sector, 1970-2025 (billion kilowatt-hours)

Generation from natural gas, coal, nuclear, and renewable fuels is projected to increase through 2025 to meet growing demand for electricity and offset the projected retirement of existing generating capacity, mostly fossil steam capacity being displaced by more efficient natural-gas-fired combined-cycle capacity brought online in the past few years and still being constructed. The projected levels of generation from power plants using coal, nuclear, and renewable fuels are higher than in AEO 2002 due to higher projected natural gas prices and uprates and life extensions of nuclear plants (**Figure 1.2-2**).

The natural gas share of electricity generation is projected to increase from 17 percent in 2001 to 29 percent in 2025, including generation by electric utilities, (Independent Power Producers), and (Combined Heat and Power) generators (Energy Information Administration 2003).

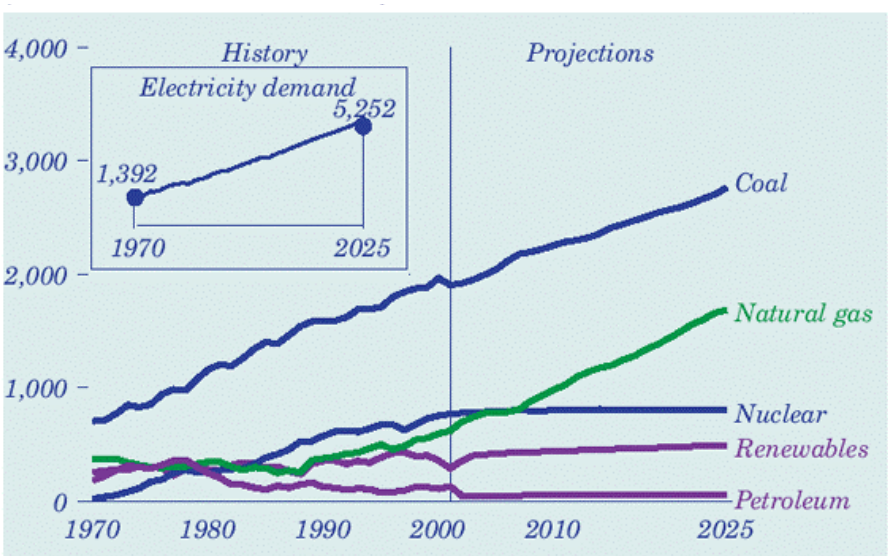


Figure 1.2-2. Electricity Generation by Fuel, 1970-2025 (billion kilowatt-hours)

The Western Electricity Coordinating Council (WECC 2002) forecasts electricity demand in the Western U.S. System-wide, according to their most recent 10-year coordinated plan summary, "The 2001-2011 summer peak demand requirement is forecast to increase at a compound rate of 2.5 percent per year" (**Figure 1.2-3**).

For the Northwest Power Pool Area, WECC forecasts:

> For the period from 2001 through 2011, peak demand and annual energy requirements are projected to grow at respective annual compound rates of 2.5 percent and 1.9 percent (**Table 1.2-1**). With a significant percentage of hydro generation in the region, the ability to meet peak demand is expected to be adequate for the next 10 years. The ability to meet sustained seasonal energy requirements over the 10-year period is dependent on new generation additions (**Figure 1.2-4**).

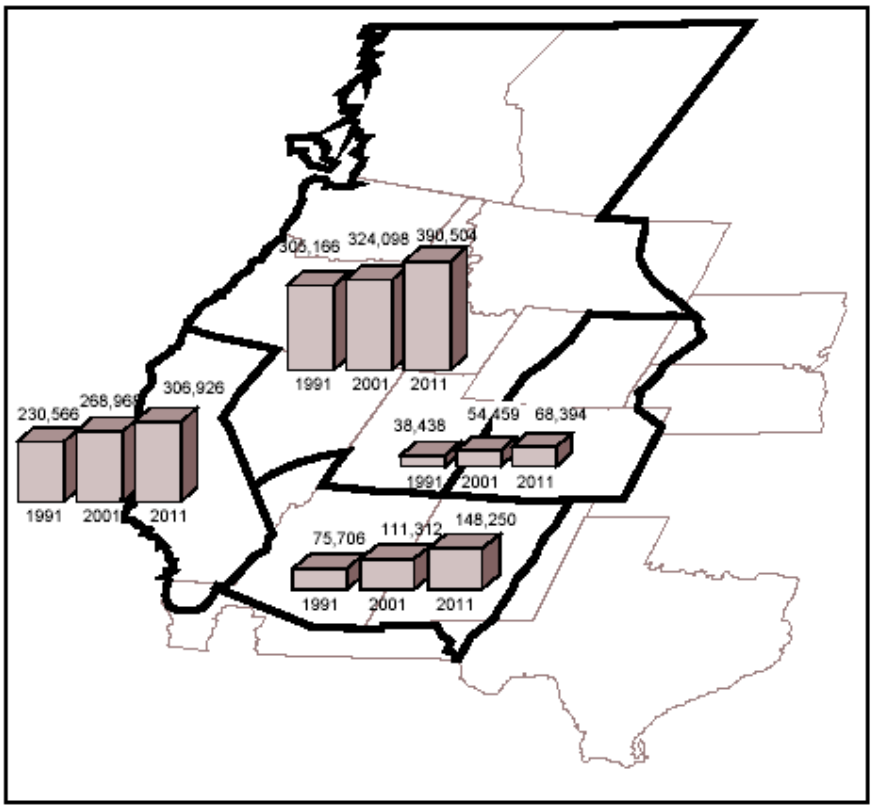


Figure 1.2-3. Electrical Energy Demand Estimates for the Northwest Power Pool Service Area (1991-2011)

Table 1.2-1
Electricity Demand Increases (2000-2025)

	Actual			Growth Rates	
	2000	**2015**	**2025**	**2000-2015**	**2000-2025**
Low	20,080	17,489	17,822	-0.92	-0.48
Medium Low	20,080	19,942	21,934	-0.05	0.35
Medium	20,080	22,105	25,423	0.64	0.95
Medium High	20,080	24,200	29,138	1.25	1.50
High	20,080	27,687	35,895	2.16	2.35

Source: Northwest Power Planning Council (NWPPC) 2003.

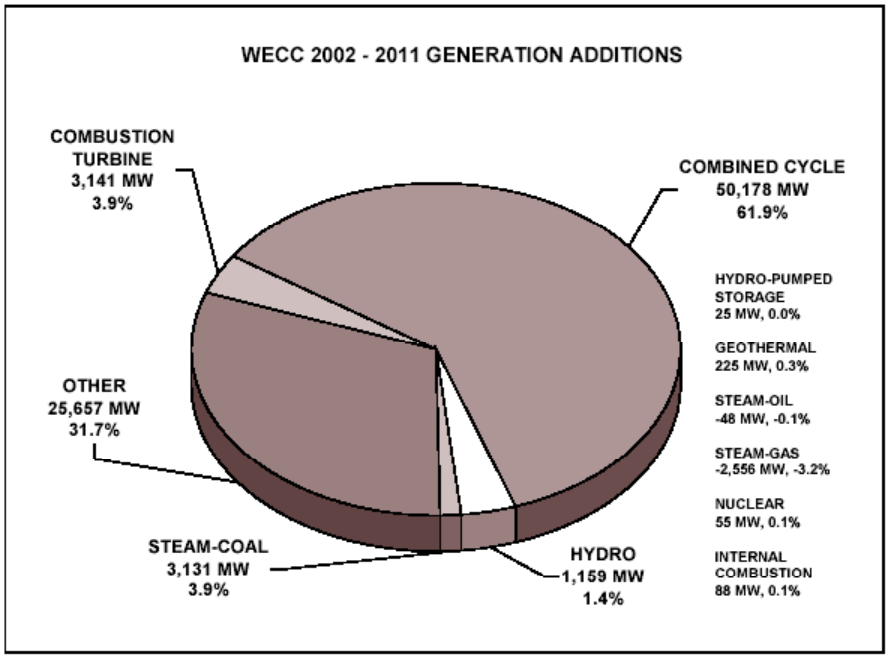


Figure 1.2-4. Predicted Power Generation Additions in the Western U.S. (2002-2011)

Finally, the NWPCC regularly prepares a 20-year forecast of electricity demand in the Pacific Northwest. Electricity demand is forecast to grow from 20,080 average MW in 2000 to 25,423 average MW by 2025 in the medium forecast. The average annual rate of growth in this forecast is just less than 1 percent per year. The most likely range of demand growth (between the medium-low and medium-high forecasts) is between 0.4 and 1.50 percent per year. However, the low to high forecast range recognizes that growth as low as -0.5 percent per year or as high as 2.4 percent per year is possible, although relatively unlikely (see **Table 1.2-1**).

Generation resources typically require interconnection with a high-voltage electrical transmission system for delivery to purchasing retail utilities. BPA owns and operates the Federal Columbia River Transmission System (FCRTS), comprising more than three-fourths of the high-voltage transmission grid in the Pacific Northwest and including extra-regional transmission facilities. BPA operates the FCRTS, in part, to integrate and transmit "electric power from existing or additional federal or non-federal generating units." Interconnection with the FCRTS is essential to

deliver power from many generation facilities to loads both within and outside the Pacific Northwest.

In summary, electrical consumers served by the Northwest Power Pool and in other Western states need increased power production to serve increasing demand, and high-voltage transmission services to deliver that power.

1.3 Federal Agency Approval Process and Authorizing Actions

NEPA requires that the environmental consequences of a proposed action be determined prior to a final decision on the action is taken by a federal agency. The EIS follows guidelines promulgated by the Council on Environmental Quality Regulations (40 Code of Federal Regulations [CFR] Parts 1500 through 1508) and the Department of Interior Manual (516 DM 1-6) for implementing the procedural provisions of NEPA. Federal agencies involved in land use or permit approvals are listed in **Table 1.3-1**. The following are the decisions to be made by the lead and cooperating federal agencies.

1.3.1 Bureau of Indian Affairs

1.3.1.1 Trust Responsibilities

The United States Government owes a trust obligation to Indian Tribes. This trust obligation doctrine imposes fiduciary standards on the conduct of the federal government. The Secretary of Interior, through delegation of authority to the BIA must protect and preserve Indian trust assets from loss, damage, unlawful alienation, waste, and depletion. The BIA also must assure that any management of Indian trust assets that the Secretary of Interior has an obligation to undertake promotes the interest of the beneficial owner and supports to the extent it is consistent with the government's trust responsibility the beneficial owner's intended use of the property. The BIA must decide whether to grant a lease for the proposed electrical generating plant on CTUIR trust land located in Section 7, Township 5 North (T5N), Range 29 East (R29E). If the BIA decides to grant a lease, the BIA also must decide which natural gas supply/waste water discharge pipeline routes, and which transmission line route to approve in the Record of Decision (ROD). These decisions would be reached in consultation with BPA, the other federal cooperating agency.

Table 1.3-1
Federal Permits, Approvals, and Reviews Required for Construction and Operation of the Proposed Wanapa Energy Center Project

Agency	Nature of Action	Authority
U.S. Bureau of Indian Affairs (BIA)	Lease of CTUIR trust lands	5 U.S.C. 301; 25 U.S.C. 2 and 9; 25 U.S.C. 380, 393, 393a, 394, 395, 397, 402, 402a, 403, 403a, 403b, 403c, 409a, 413, 415, 415a, 415b, 415c, 415d, 477, 635, 3701, 3702, 3703, 3712, 3713, 3714, 3715, 3731, 3733; 44 U.S.C. 3101; 25 CFR Part 162 Subpart F
	Issue antiquities and cultural resource use permit to excavate or remove cultural resources on federal lands	Archaeological Resources Public Protection Act of 1979, 16 U.S.C. Section 470aa-470mm; 43 CFR Part 7
Bonneville Power Administration (BPA)	Interconnection Agreement to include project in power grid as capacity allows	Federal Columbia River Transmission System Act, 16 U.S.C. Section 638
	Firm Transmission Agreement to guarantee power capacity for project	Same as above
	Operation, Construction, and Maintenance Agreement	Same as above
Bureau of Reclamation	Consent for change in water use	
U.S. Environmental Protection Agency (USEPA), Region X	Air Construction (Prevention of Significant Deterioration [PSD]) Permit	40 Code of Federal Regulations 52.21
	Acid Rain Permit	40 CFR Parts 72-75
	Title V Operating Permit	40 CFR Part 71
	Risk Management Plan	40 CFR Part 68
	Section 316(b) Rule for New Cooling Water Intake Structures	Section 316(b) of the Clean Water Act of 1972 (CWA)
	National Pollutant Discharge Elimination System (NPDES) Permit for discharge of wastewater and storm water	40 CFR 122
U.S. Fish and Wildlife Service (USFWS)	Section 7 Consultation process for endangered or threatened species	Endangered Species Act of 1973 (ESA); 16 U.S.C. 1531 et seq.
U.S. Department of Transportation Federal Highway Administration (USDOT)	Issue permits to cross federal-aid highways	23 U.S.C. Sections 116, 123, 23 CFR Part 645 Subpart B
U.S. Department of the Army Corps of Engineers (USACE)	Issue Section 404 permit for placement of dredged or filled material in waters of the U.S.	Section 404 of the CWA (40 CFR 122-123); 33 U.S.C. Section 1344; 33 CFR Parts 323, 325
U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), Fisheries	Section 7 Consultation process for endangered or threatened species	ESA; 16 U.S.C. 1531 et seq.
Advisory Council on Historic Preservation	Review and compliance activities as requested by Tribal Historic Preservation Officer (THPO) and State Historic Preservation Office (SHPO)	Section 106 National Preservation Act (16 U.S.C. 470f) (36 CFR Part 800)

1.3.2 Bonneville Power Administration

Because participants in the Wanapa Energy Center have requested to integrate power from the proposed electrical generating facility into the FCRTS at the McNary Substation, BPA must decide whether and how to grant that request. These decisions include whether to build a transmission line to connect the Center to the FCRTS, and whether to enter into contracts to interconnect the Center and integrate its power into the FCRTS. If BPA should decide to grant this request, the agency preferred transmission line route will be documented in the BPA ROD.

BPA intends to base its decision on the following objectives:

- An adequate, economical, efficient and reliable power supply to the Pacific Northwest, including FCRTS electrical stability and reliability;
- Consistency with BPA environmental and social responsibilities; and
- Cost and administrative efficiency.

1.3.3 Bureau of Reclamation

Because participants in the Wanapa Energy Center have requested to deliver water to the Cold Springs Reservoir, a federal irrigation project administered by the BOR, the BOR must decide whether to accept this water in conjunction with existing uses and rights pertaining to this reservoir. The USFWS administers the Cold Springs Reservoir National Wildlife Refuge, which includes the reservoir surface area and adjacent lands. The ongoing management for waterfowl, fisheries, and threatened and endangered species will be considered in the BOR decision.

1.4 Non-Federal Agency Approval Process and Authorizing Actions

State and local authorizations that are required for various aspects of project construction and operation are listed in **Table 1.4-1**. Before construction of an energy facility can occur in Oregon, the project must be approved by the Energy Facility Siting Council (EFSC) by following standards to protect environmental resources under Oregon Administrative Rule (OAR) Chapter 345,

Table 1.4-1
State, Local, and Tribal Permits, Approvals, and Reviews Required for Construction and Operation of the Proposed Wanapa Energy Center Project

Agency	Nature of Action	Authority
Oregon Department of Environmental Quality (DEQ)	Dust Control Permit	Oregon Environmental Quality Act
U.S. Department of Transportation (USDOT)	Issue permits for oversize and overweight loads	Highway Department Rules and Regulations
	Issue encroachment permits	Department Rules and Regulations
Department of Land Conservation and Development	Issue easements to cross state lands	
State Historic Preservation Office (SHPO)	Review and compliance activities	Section 106 National Preservation Act (16 U.S.C. 470f) (36 CFR Part 800)
	Issue antiquities and cultural resource use permit to excavate or remove cultural resources as necessary for non-federal lands	Archaeological Resources Public Protection Act of 1979, 16 U.S.C. Section 470aa-470mm; 43 CFR Part 7
Umatilla County Commissioners	Road crossing permits, land use permits, and licenses	County zoning regulations
Umatilla County Health Departments	Temporary sanitation facilities	County sanitation requirements
Confederated Tribes of the Umatilla Indian Reservation Planning Department	Building and construction permit	Land Use Planning Code, Umatilla Tribal Statutes (Section 3.190, Subsection 8)
	Onsite Sewage Disposal System	Environmental Health & Safety Code, Umatilla Tribal Statutes (Section 5.015)
Confederated Tribes of the Umatilla Indian Reservation - THPO	Issue antiquities and cultural resource use permit to excavate or remove cultural resources on tribal lands	National Historic Preservation Act (16 U.S.C. 47a(d)(1)(A)(5)

Division 22, Section 045. However, the proposed electrical generation facility (to be located on tribal land) is exempt from EFSC regulations because of tribal status as a sovereign entity. Ancillary facilities that cross public and private lands (natural gas supply/wastewater discharge pipeline) are subject to EFSC regulations, and would require a separate state-administered process. The natural gas supply/wastewater discharge pipeline appears to be consistent with the local comprehensive land use designation and zoning, subject to further review by EFSC and local jurisdictions.

1.5 Project Land Surface Occupancy Agreements

Table 1.5-1 provides a summary of the major agreements that would be required to construct various Proposed Action project components depending on land ownership.

Table 1.5-1
Wanapa Energy Center
Land Occupancy Agreements

Component	Land Ownership	Agreement(s) for Land Occupancy by Project Components
Plant Site	CTUIR (Beneficial Owner)	BIA lease
Plant site water supply pipeline and access road	Port of Umatilla, BPA, CTUIR	BIA lease; BPA crossing permit; right-of-way (ROW) easement from the Port of Umatilla
Electrical transmission line; interconnection with McNary Substation	CTUIR, Port of Umatilla, BPA, U.S. Army Corps of Engineers (USACE), private landowners	BIA lease; ROW easements from Port of Umatilla and private landowners; USACE lease
Natural gas supply/wastewater discharge pipelines	CTUIR, Port of Umatilla, BPA, BOR, private landowners	BIA lease; BPA crossing permit; ROW easements from Port of Umatilla, BOR, and private landowners

1.6 Public Participation and EIS Issues

NEPA requires that the public be provided the opportunity to participate in the EIS process, both before environmental analyses are initiated and after the Draft EIS is completed. The public

scoping process was initiated by the publication of the NOI in the Federal Register on October 22, 2001. The NOI announced the commencement of a 45-day scoping period during which time public comments could be received regarding the project. Public scoping meetings were held at the CTUIR Tamastslikt Cultural Institute in Pendleton, Oregon, on October 29 and November 5 and at the Hermiston Community Center in Hermiston, Oregon, on October 30 and November 6, 2001. The meetings were presented in an open house, workshop format. Public comments were provided in written form at the meetings via mail, to the BIA.

A summary of issues resulting from oral and written comments includes the following:

- Concern with keeping financial project benefits in Umatilla County for the local economy;
- Concern about using the remaining allocation of water under the Port of Umatilla existing water rights, which could limit further development;
- Effects of power plant operation on air quality;
- Effects of the cumulative actions on air and water resources;
- Visual effects of the plant lighting at night on the surrounding viewshed; and
- Utilization of existing corridors as much as possible to minimize the effects of new disturbance on environmental resources.

Agency scoping meetings also were held to provide information about the project and identify any agency issues or concerns. Meetings were held at the CTUIR Administration Building in Pendleton, Oregon, on November 27 and the Federal Building in Portland, Oregon, on November 28, 2001. The following issues were identified at the meetings:

- If possible, avoid the Wanaket Wildlife Area in routing pipelines and the transmission line to minimize effects on wildlife species.
- If data gaps are identified for raptors or other sensitive wildlife species, conduct spring surveys to identify their presence in relation to the power plant and linear project components.

- Wetland mitigation should be required for at least a 1:1 replacement ratio.
- Effects of water withdrawal from the Columbia River on federally listed salmon species.
- Concern over the project's ability to obtain water from the Port of Umatilla due to their water withdrawal permit being on hold pending an evaluation of municipal water rights issues.
- Concern about using the remaining allocation of water under the Port of Umatilla existing water rights, which could limit further development.
- Potential impacts of the project on air quality.
- Concern over the project site being exempt from paying Umatilla County property taxes.
- Potential impacts of the project on the local economy and transportation system.
- Discuss if the project would ensure a stable energy supply at a reasonable price in Umatilla County.
- Potential impacts of the project on the present and future use of the BPA system for wind energy production within Umatilla County.
- Concern over where the produced electrical power will be used.
- Define the life of the project and explain if the facility and infrastructure could be decommissioned.
- Concern over bonding requirements to restore the site if construction of the facility is not completed or the facility is closed.
- Potential conflicts over water use for industrial, agricultural, and protection for listed fish species in the Columbia River.
- Potential impacts of waste disposal on environmental resources.

- Concern over safety risks for the power plant and other project components.
- Describe the impacts of the project on aesthetics.
- Describe how many temporary and permanent jobs would be created by the project.
- Describe the cumulative effects of the Wanapa Energy Center Project and other natural gas projects in the local area (i.e., Hermiston Generating Project, Hermiston Power Partnership, and Umatilla Generating Project) on environmental resources.

2.0 PROJECT ALTERNATIVES

2.1 Agency-Preferred Alternative

Two primary alternatives are evaluated in this EIS: Proposed Action and No Action. At this time the agency (BPA and BIA)-preferred alternative is the Proposed Action.

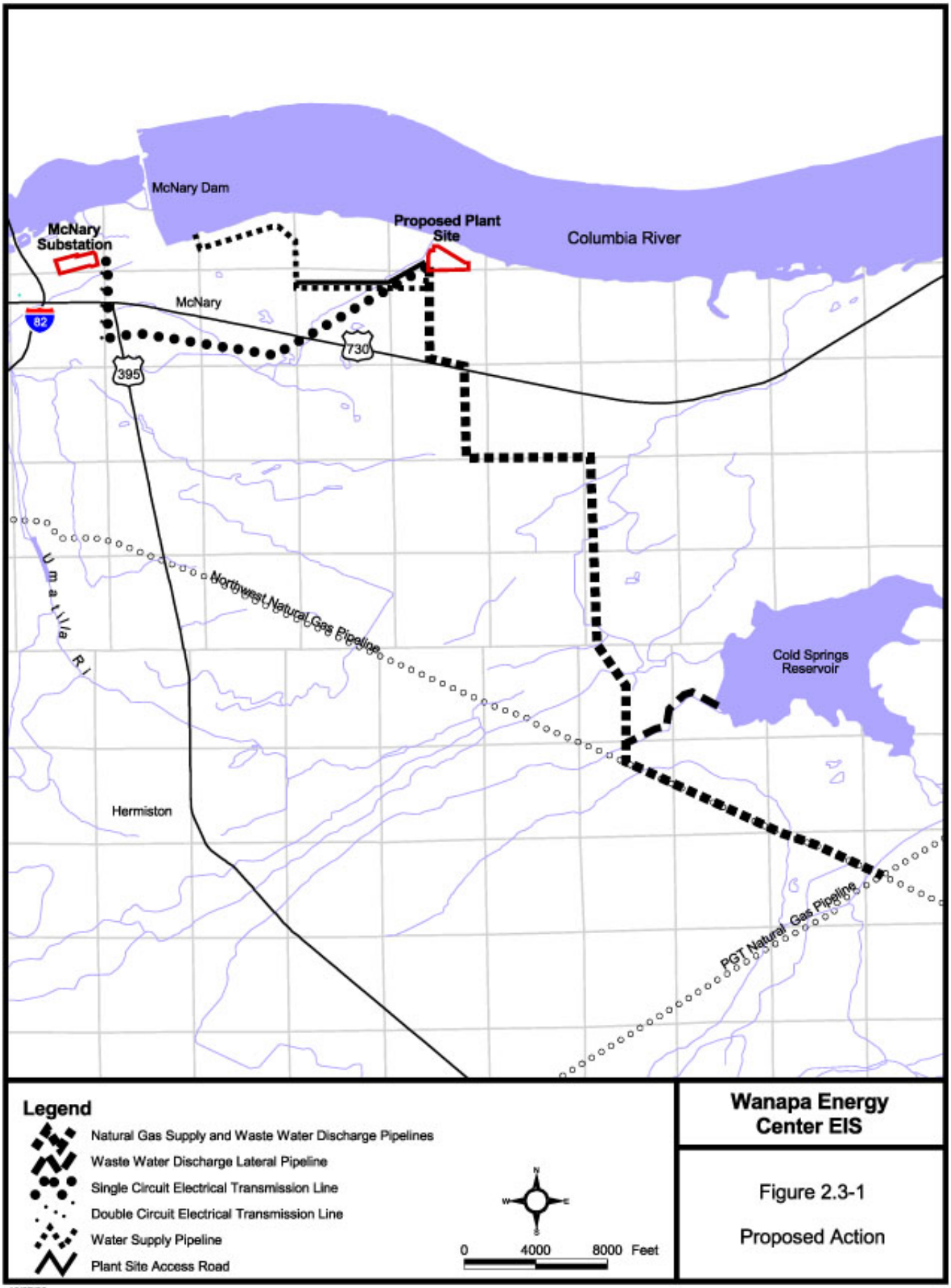
Project component alternatives (e.g., electrical transmission line and natural gas supply/wastewater discharge pipeline routes) also are analyzed in detail. Other alternatives that were considered but eliminated are discussed.

2.2 No Action

If either the lead federal agency (BIA) or cooperating agency (BPA) selected the No Action Alternative, the project as proposed would not be constructed and operated. If the BIA selected the No Action Alternative, the proposed electric power generating plant and ancillary facilities would not be approved for construction. If the BPA selected the No Action Alternative, the electric power generating plant could not interconnect with the BPA grid. In either case, the project analyzed in this document would not be constructed. A No Action decision would preclude the potential socioeconomic benefits available to the CTUIR and the region.

2.3 Proposed Action

DW, the CTUIR, the Eugene Water & Electric Board, the City of Hermiston, and the Port of Umatilla would jointly build and operate, the Wanapa Energy Center, a new CCGT natural gas-fired electric power generation plant and ancillary supporting facilities. The location of the power plant and support facilities (transmission line, gas pipeline, and water pipelines) are shown in **Figure 2.3-1**. Collectively, these facilities are hereafter referred to as the Project. The following sections describe the major components of the project. **Table 2.3-1** provides the temporary and life-of-project land requirements for the various components.



Wanapa Energy Center EIS

Figure 2.3-1

Proposed Action

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Table 2.3-1
Proposed Action Project Component, Surface Disturbance Areas, and Long-Term Land Requirements

	Temporary Disturbance (Acres)	Permanent Disturbance (Acres)	Permanent ROW Easement Width (feet)	Number of Structures
Plant Site	47.0	47.0	N/A	N/A
Transmission Line - Single Circuit and Access Roads	80.8	6.5	150 to 200	18
Transmission Line - Double Circuit and Access Roads	20.0	2.4	150 to 200	7
Gas Pipeline (includes water discharge line)	120.4	0.0	50	
Water Supply Line	3.4	0.0	50	
Plant Site Access Road	8.5	4.3	25	
Total	**280.1**	**60.2**		

Assumptions: Temporary disturbance width for Electric Lines = 150 feet.
Temporary disturbance width for Gas Lines = 100 feet.
Temporary disturbance width for Water Line = 50 feet.
Temporary disturbance width for Access Road = 50 feet.
Permanent disturbance for Electric Lines = number of power poles x 0.05 acre per pole.
Permanent disturbance width for Gas Lines = 0.0 foot.
Permanent disturbance width for Water Lines = 0.0 foot.
Permanent width for Plant Site Access Road = 25 feet.
Permanent width for Transmission Line Access Roads = 20 feet.

2.3.1 Electric Power Generation Plant

2.3.1.1 Location and Facilities

The proposed electric power generation plant would be located in the southern one-third of Section 7, T5N, R29E in Umatilla County, Oregon. The fenced plant site would occupy approximately 47 acres, within an overall area of 195 acres. The land would be leased from the CTUIR who, as beneficial owner, manages land within and adjacent to the site on the east and south. The northern property boundary is a fenceline located immediately south of an old railroad grade that parallels the southern bank of the Columbia River. The Port of Umatilla owns the land situated immediately south and southwest of the site. The Two Rivers Correctional Institution (TRCI) is located on state land approximately 1 mile west of the site. The Wanaket Wildlife Area,

owned by BPA and managed by the CTUIR, is located on a 1,800-acre block of land south and east of the proposed plant site.

Access to the site would be provided by the construction of a new paved road from an existing Umatilla County Road (Beach Access Road). The length of the new facility road would be approximately 1.4 miles. Beach Access Road provides access to U.S. Highway 730 (Columbia River Highway) located southwest of the site (**Figure 2.3-1**).

The electric power generation system would consist of "F class" advanced combustion turbine technology fueled exclusively with natural gas. Each gas-fired combustion turbine would be connected to a generator (CTG) to produce electricity. The exhaust gas from each combustion turbine would be directed through a structure of densely packed tubes through which water is pumped. The water would be converted into steam by the heat of the combustion turbine exhaust. These structures are called HRSGs. The steam produced in each pair of HRSGs would be combined and routed under pressure to drive one of the two steam turbine/generators to produce electricity. During periods of high electric demand, additional burners installed in the HRSGs could be fired to boost steam production and thereby provide supplemental electric generating capacity. In addition, inlet air evaporative coolers would be utilized at the inlet to each gas turbine to enhance the performance of the combustion turbine during hot weather.

Spent steam from the steam turbine/generators would be cooled and condensed in a surface condenser, using water cooled in two mechanical draft cooling structures with high performance drift eliminators. Condensed water from the surface condenser would then be sent back to the HRSG for reuse in making steam.

Since electricity is created from both the combustion turbine and the steam turbine, facilities like the Wanapa Energy Center are known as "combined-cycle" facilities. By contrast, "simple-cycle" facilities allow the hot combustion gases from the gas turbine to be released through the exhaust stack. Combined-cycle facilities are thus more efficient as they are able to generate more electricity from every unit of fuel consumed.

The major structural features of the facility include the turbine building, the administration building, the water treatment building, a natural gas metering building, a warehouse, switchyard, diesel fuel pumps, raw water storage tank, demineralized water storage tank, HRSGs, HRSG exhaust stacks, electrical and control modules, secondary pump modules, and cooling structures

(**Figure 2.3-2**). The HRSGs and HRSG exhaust stacks would be connected to the turbine building. The site also would contain tanks for water treatment and pollution control chemicals such as aqueous ammonia, sulfuric acid, and other chemicals.

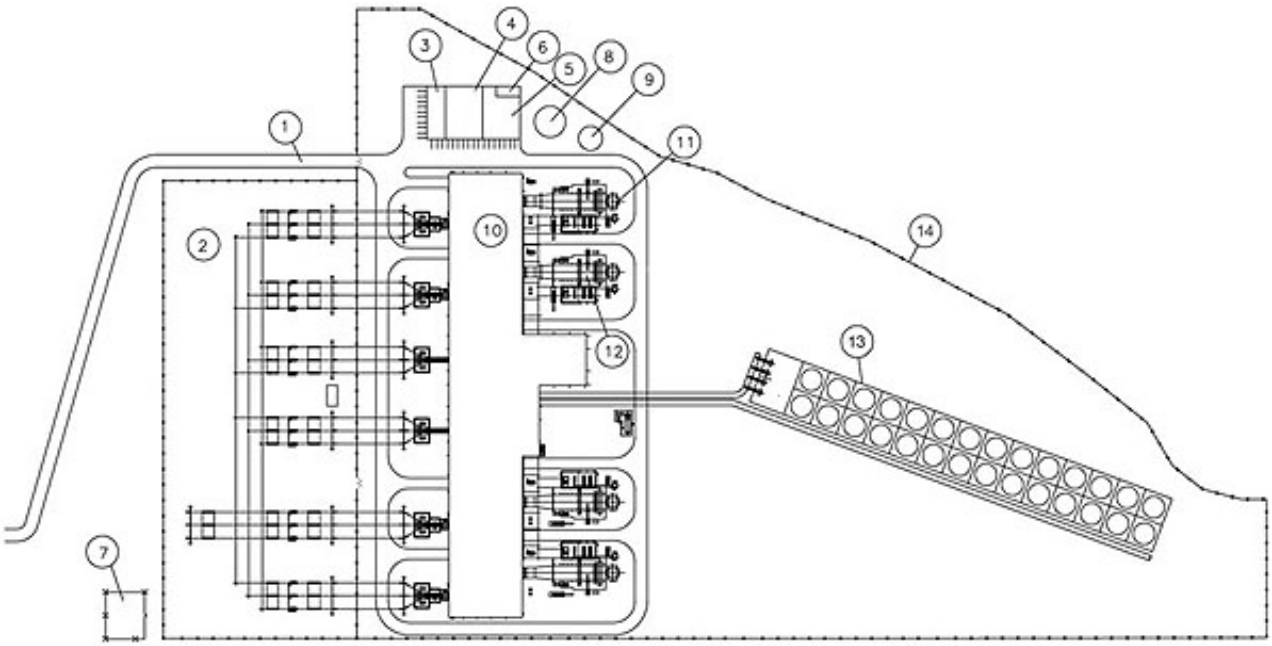
The turbine building would enclose the lead combustion turbine generators, the steam turbine generators and associated steam surface condensers, steam piping, and the control room. The administration building would contain offices, locker rooms, plant control rooms, maintenance areas, and equipment storerooms. The water treatment building would enclose the water treatment equipment and also include warehouse and maintenance facilities (**Figure 2.3-3**). The HRSGs, exhaust stacks, generator step-up transformers, cooling structures, and water storage tanks would all be located outdoors. It is anticipated that each of the 4 exhaust stacks would be 213 feet tall, which would be the tallest elements at the site. There would be two stacks for each of the two generating blocks. The cooling structures would be contained within a 110-foot x 850-foot area adjacent to the turbines.

Air emission control equipment at the project would include dry low- NO_x combustors and a SCR system for NO_x control and oxidation modules for carbon monoxide (CO) control. These technologies would allow the project to comply with the Best Available Control Technology (BACT) for all criteria pollutants, including NO_x, CO, volatile organic compounds (VOCs), particulate matter with an aerodynamic diameter of 10 microns or less ($PM_{10,}$) and sulfur dioxide (SO_2)/sulfuric acid (H_2SO_4). This level of BACT controls meets or exceeds all BACT controls utilized at recently permitted and constructed combined cycle power plants within Oregon and Washington.

Chemical storage areas would be surrounded by concrete containment curbing with drains that are connected to chemical collection or treatment facilities. Lockable drain valves would be used where appropriate. All areas of potential oil or lubrication spills also would be protected by concrete containment structures with drains directed to an oil/water separator. A concrete containment area would be located beneath diesel fuel tanks and filling hookup areas to capture and contain unlikely fuel spills and overfills.

Storm water runoff would be contained and diverted via a system of surface drains to a holding pond with sufficient volume to hold the required design storm event. This storm water would be monitored before it is discharged through a permitted outfall offsite.

FACILITIES LEGEND	
PT #	DESCRIPTION
1	ACCESS ROAD
2	SWITCHYARD
3	ADMINISTRATION BUILDING
4	WAREHOUSE/MAINTENANCE
5	WATER TREATMENT BUILDING
6	DIESEL FIRE PUMPS
7	SITE GAS METERING & CONDITIONING AREA
8	RAW WATER STORAGE TANK
9	DEMINERALIZED WATER STORAGE TANK
10	TURBINE BUILDING
11	EXHAUST STACK
12	HEAT RECOVERY STEAM GENERATOR
13	COOLING TOWER
14	SITE SECURITY FENCE



Wanapa Energy Center EIS

Figure 2.3-2

Plant Site

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Wanapa Energy Center EIS

Figure 2.3-3

Three-dimensional Ground Level View of Plant Facilities

8/25/03

2.3.1.2 Construction

The site would be cleared and graded to provide a level surface for equipment and facilities' foundation pads. Because the site is located on basalt cap rock, some rock drilling and blasting may be required, as well as importation of fill. No off-site disposal of rock is expected. Concrete foundations and pads would be poured.

The turbine sets are very large and heavy, and may be delivered by river barge, railroad, or truck, depending upon size and weight restrictions. The major project components (turbines, HRSGs, HRSG exhaust stacks, cooling structures, storage tanks, pumps, transformers) would be delivered to the site, and installed on the concrete pads. Steam piping and electrical systems would be connected to the power generation units. The turbine building would be erected around the turbines. The remaining buildings (water treatment, administration) would be constructed in a manner to allow efficient use of man and material.

The plant would be constructed in two phases. Each phase would include one block consisting of two gas turbines, two HRSGs, two stacks, one steam turbine, one cooling structure, three generators, and other facilities for an operable generating plant.

2.3.1.3 Operation

With both phases and all turbines in operation, the plant would generate a nominal average of 28,800 MW hours per day for two 600-MW (nominal) blocks. The plant would operate 365 days per year, with periodic partial shutdowns for maintenance on an established schedule.

The electric generation process would consume approximately 10.2 million cubic feet of natural gas per hour. The volumes (tons per year) of estimated natural gas combustion emissions of priority pollutants and other compounds are summarized in Chapter 3.0.

It is estimated that operation of the Wanapa Energy Center would produce approximately 1,200 cubic yards of solid waste from routine operations per year. Waste would be stored in closed on-site roll-off bins. Recyclable materials would be separated from the solid waste stream. Solid waste would be collected periodically by a private contractor and hauled to a licensed disposal facility.

Most of the solid waste would be generated from the water pretreatment system. The primary type of solid waste resulting from this process would be silt from the raw water supply. The silt would be removed from the raw water through a combination of filtration, flocculation, and clarification. A non-hazardous solid waste product (i.e., filter cake) would be discharged from the filter press system. The filter cake material would be delivered to a suitable disposal facility.

A variety of industrial chemicals would be required for different parts of the electric power generation process. Demineralizer regeneration chemicals would be stored in the water treatment building or in nearby tanks. HRSG feedwater treatment chemicals and laboratory chemicals would be stored in the turbine building. Aqueous ammonia for the SCR system would be stored in a double-walled tank outside the turbine building.

The following information summarizes the types of chemicals used for various plant needs.

- Demineralizer Regeneration Chemicals – Raw Columbia River water would be treated by ion exchange to produce demineralized water for the steam cycle make-up water. The demineralization systems would require the use of sodium hydroxide and sulfuric acid for regeneration of the exchange resins.

- HRSG Feedwater Treatment Chemicals – Demineralized water that would be used in the HRSG would require the addition of an oxygen scavenger, neutralizing amine solution to control pH, and phosphate for pH adjustment and scale control. These chemicals would be stored in self-contained storage tanks or containers and the chemicals would be injected into the feedwater and/or directly to the HRSGs. Periodic cleaning of the HRSGs would require the use of citric acid, sodium carbonate, sodium nitrite, sodium hydroxide, and various inhibitors. These wastewaters would be disposed of by a licensed contractor.

- SCR Chemicals – The SCR system would use an aqueous ammonia solution as a reagent for control of NO_x emissions.

- Cooling system treatment chemicals – Cooling water would be treated with small quantities of chemicals for corrosion protection, deposit control, pH control, and prevention of microbiological growth. These chemicals would include sulfuric acid, sodium hydrochlorite (bleach solution), and mixtures of inorganic phosphates, organic phosphates, and polymers.

These chemicals would be stored in self-contained storage tanks or containers and the chemicals would be injected into the cooling structure basin.

- Other Materials – A number of miscellaneous chemicals, laboratory reagents, and equipment lubricants would be stored in small quantities within either the warehouse or other station buildings. Diesel fuel would be required for the diesel engine driven fire pump. Sulfuric acid would be required for the project's batteries. Compressed gases used at the project, such as carbon dioxide (CO_2) and nitrogen, would be stored outdoors in returnable cylinders. Hydrogen would be stored outdoors in high-pressure storage cylinders mounted aboveground or in trailers. Insulating mineral oil would be included with the transformer system. Sulfur hexafluoride would be used as an electrical insulating gas for the substation. Fire protection chemicals would include at least 15 Type BC (10 BC), 20-pound CO_2 hand-held extinguishers, and at least 25 Type ABC (20A120BC), 20 pound dry chemical extinguishers.

- Solid and Hazardous Wastes – Oil periodically pumped from the oil/water separators, turbine wash water, and periodic chemical cleaning wastes would be removed from the facility by a licensed hauler for disposal at a licensed facility.

The power plant would be equipped with lights on utility poles to illuminate nighttime activities within the fenced area. Lights would be shielded to reduce glare and overall visibility from nearby public roadways and residences. The exhaust stacks would be lit with warning lights consistent with Federal Aviation Administration (FAA) requirements.

2.3.2 Natural Gas Fuel Supply

2.3.2.1 Location and Facilities

Natural gas would be supplied to the project via an underground 24-inch-diameter high-pressure pipeline that would connect to the Northwest Natural Gas Pipeline and/or Pacific Gas Transmission (PGT) Natural Gas Pipeline (**Figure 2.3-1**). The pipeline would be buried to a depth of approximately 4 feet at the top of the pipe. The pipeline would be constructed within a 100-foot-wide temporary construction ROW. A 50-foot-wide permanent ROW easement would be obtained from landowners.

The new 9.9-mile gas supply pipeline would be partially co-located with existing utilities (roads, pipelines) throughout its length. The pipeline would extend from interconnections with the Northwest and PGT pipelines where the two pipelines cross over at the Northwest Stanfield Compressor Station. The pipeline would be located parallel to Northwest Pipeline for about 2.5 miles. The pipeline would then turn northward and westward in a new ROW across farmland and rangeland to a terminus at the plant site (**Figure 2.3-1**).

A gate station would be constructed to connect the supply pipeline to the Northwest and PGT interstate main lines. The gate station would include metering, regulation, odorization, heating, and compression. The gate station would be located next to the Northwest Stanfield Compressor Station. PGT pipeline provides for sufficient pressure for direct delivery to the plant site. A gas compression system may be required at the gate station to transfer Northwest gas and to supply the required delivery pressure to the gas turbine. Current estimates indicate that 7,500 horsepower would be required to provide adequate pressure for the 1,200-MW generating plant.

2.3.2.2 Construction

The gas supply pipeline and associated aboveground installations would be designed, constructed, operated, and maintained in accordance with the USDOT regulations in 49 CFR Part 192, *Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards*, and other applicable federal and state regulations. Among other design standards, 49 CFR 192 specifies pipeline material selection; minimum design requirements; protection from internal, external, and atmospheric corrosion; and qualification procedures for welders and operations personnel. It is currently anticipated that the water discharge pipeline would be constructed within the same ROW as, and concurrently with, the natural gas supply pipeline.

The wastewater discharge pipeline would be located parallel to the natural gas pipeline, and would extend from the electric power generation plant, southward to the Feed Canal that delivers water to Cold Springs Reservoir. From the point where the pipelines cross the Feed Canal, a lateral wastewater pipeline would be constructed adjacent to the Feed Canal to a concrete spillway where the Feed Canal discharges water into Cold Springs Reservoir. Wastewater from the pipeline would flow by gravity over the same spillway into the reservoir. Where the two pipelines are co-located, the wastewater discharge pipeline would be offset from the natural gas pipeline by approximately 25 feet. The permanent 50-foot-wide ROW would encompass both pipelines. The wastewater discharge pipeline is discussed further in Section 2.3.4.

Landowners would be notified at least 5 days before the start of construction unless earlier notice is requested in the easement negotiations. Overland pipeline construction would generally proceed as a moving assembly line. Standard pipeline construction is composed of specific activities that make up the linear construction sequence. These operations collectively include survey and staking of the ROW, clearing and grading, trenching, pipe stringing, bending, welding, lowering-in, backfilling, hydrostatic testing, and cleanup and restoration. Special construction techniques would be used when constructing through rock and across canals, paved roads, highways, and railroads. It is expected that any wetlands encountered would be crossed during dry periods using standard construction techniques.

Survey and Staking

Prior to construction, the pipeline owner would complete land or easement acquisition. Civil survey crews would finalize surveys and locate, stake, and flag the pipeline centerline and the construction work area (e.g., nominal construction ROW and additional temporary workspace). Existing utility lines would be located and marked to prevent accidental damage during pipeline construction. A 100-foot-wide construction ROW with additional temporary use areas adjacent to the ROW where expanded work zones are needed would be staked.

Clearing and Grading

Fences would be cut before clearing and grading are conducted to provide access for equipment. Landowners would be notified of construction plans and schedules on their property. Any fence that needed cutting would be braced and secured to prevent the slacking of wires. Temporary gates would be installed across openings to control livestock and limit public access.

The construction ROW would be cleared of vegetation and graded to provide a level work surface for trench excavating equipment and a sufficiently wide work space for the passage of heavy construction equipment. Backhoes or wheel trenchers and rock saws, where necessary, would be used to excavate the pipeline trench. Excavated soil would be stockpiled adjacent to the trench. Subsoil would be segregated from topsoil and stockpiled in separate windrows. Temporary erosion controls would be installed immediately after initial disturbance of the soils and would be maintained throughout construction.

Trenching

Trenching of the ditch would conform to USDOT Title 49 CFR, Part 192 regulations. The pipeline trench would be excavated to a minimum width of approximately 12 inches wider than the diameter of the pipe and a minimum depth of approximately 6 feet to provide for a minimum of 4 feet of cover over the pipe. A bucket wheel excavator or a backhoe would normally be used for trench excavation. Where access across the trench is required, trench plugs or steel plates would be installed to permit safe crossing for livestock, wildlife, vehicles, equipment, or people. Fencing also would be installed at the access points to prevent entry into the trench.

In areas where rock is too extensive to trench, a rock saw would be used to cut and remove the rock. If the rock or sand produced from the cutting operation is deemed usable, it would be used as backfill. Any rock determined to be unsuitable as backfill material would be hauled off to an authorized disposal location and new, approved backfill material would be brought in.

Pipe Stringing, Bending, and Welding

Following trenching, sections of externally coated pipe would be transported by truck to the construction ROW, and placed or "strung" along the trench in a continuous line. Individual sections of the pipe would be bent where necessary to fit the contours of the trench, aligned, welded together into long strings, and placed on temporary supports along the edge of the trench. Welds would be x-rayed to ensure structural integrity. Those welds that do not meet established specifications would be repaired or removed. Once the welds are approved, the welded joints would be coated with a protective coating equal to the rest of the pipeline to protect the pipeline from corrosion.

Lowering-In and Backfilling

The trench would be dewatered (if necessary), cleaned of debris, and padded as necessary before the pipeline is lowered into the trench. The welded pipe would be progressively lowered into the trench as work proceeds along the excavated trench. Warning tape would be placed over the pipe to warn unauthorized third-party excavators of the presence of the pipeline beneath. Trench barriers and breakers would be installed before backfilling to prevent water movement along the pipeline. Backfilling machines, backhoes, and graders would be used to backfill the pipeline trench. The trench would be backfilled using the excavated materials; subsoil would be replaced

first, then the topsoil. If the excavated material is rocky, the pipeline would be padded with select fill from commercial borrow areas or by separating suitable material from the existing trench spoil. No topsoil would be used for pipeline padding. No foreign substances, including skids, welding rods, containers, brush, trees, or refuse of any kind, would be permitted in the backfill. If the subsoil material excavated from the trench is not suitable for any other reason, suitable material would be brought in as fill. After the trench is backfilled, the interior of the pipeline would be cleaned of any dirt, water, or debris by pipeline cleaning "pigs," which are propelled through the pipeline.

Pipe Testing

After backfill and cleaning, the pipeline would be hydrostatically tested or tested by an alternative approved method, according to USDOT specifications. If hydrostatically tested, water would be obtained from nearby surface waters or available municipal supplies. Test water would be pumped into each test section, pressurized to design test pressure, and maintained at that pressure for at least 8 hours. Any leaks detected would be repaired and the pipeline retested until the specifications are met. After testing a segment, the water may be pumped into the next test segment, discharged either through an energy dissipater and erosion control device off ROW, in upland areas, back into the source waterbody through an aeration type energy dissipater, or into a transport trailer tank.

Cleanup and Restoration

All work areas would be final graded and restored as closely as possible to preconstruction contours. To minimize future settling, the trench would either be crowned (with landowner permission) or compacted with tracked construction equipment. Surplus construction material and debris would be removed and disposed of at appropriate facilities. Initially, subsoil would be ripped to help alleviate compaction in agricultural areas and the topsoil would be returned to its original horizon. Permanent erosion controls (waterbars or slope breakers) would be installed within the ROW, except in agricultural and pastureland where the landowner has not consented to their installation.

Restoration would begin within 6 days of final grading, weather and soil conditions permitting, and the construction work areas that are not in cultivated croplands would be fertilized and seeded. The pipeline owner would be responsible for using reclamation seed mixes recommended by the

Natural Resources Conservation Service (NRCS) for reclamation of the construction ROW and other disturbance areas. Specific seed mixes would be reviewed and approved by the appropriate agencies or landowners prior to application.

Private property, such as fences, gates, and driveways, would be restored to a condition equal to or better than preconstruction condition, and pipeline markers and warning signs would be installed at roads as required. In areas of new ROW, off-road vehicle control (trees, slash and timber barriers, gates, and fencing) may be installed as agreed with each landowner or land management agency.

Special Construction Situations and Techniques

Where pipeline construction would parallel an existing public road, the pipeline contractor would ensure that one traffic lane is always open, and that private driveways remain accessible. Depending upon the permits received from local and state agencies, major roadways would be bored to avoid damage to the surface and travel disruptions. Special construction methods may be required in basalt outcrop areas (trench blasting), and in large wetlands where saturated soils may be present. No new long-term access roads would be constructed to support pipeline operation.

- Rock – When rock is encountered during trenching, it would be cut and removed using a rock saw. If the rock or sand produced from the rock saw is deemed usable, it would be used as backfill. Any rock determined to be unsuitable as backfill would be hauled off and new approved backfill would be brought in.

- U.S. Highway 730 Crossing – The geology in the area of this crossing is assumed to be mostly rock. Currently, an open cut trench is planned for this crossing, utilizing a rock saw. A traffic control plan would be implemented to minimize the effects on local traffic along this highway.

- Railroad and Canal Crossings – To avoid loss of service by open cut trenching of the railroad and canal crossings, the pipeline contractor would propose to use directional drilling or boring techniques as their first option. For directional drills or bores, pipe that is double-coated with standard yellow extruded polyethylene (X-True coat) and a minimum 0.25-inch Priatec extruded polyethylene coating would be installed. Two heat-shrinkable sleeves would provide appropriate protection at the joints of the entry and exit of the bore pipe.

- Proximity issues – Sufficient distance would be maintained from residential dwellings along the proposed route for safety reasons. Proximity to structures could result in minor route realignments, once a more detailed route survey is completed (see discussion of residential and farm structure locations in Chapter 3.0, Section 3.8) in relation to the pipeline.

2.3.2.3 Operation

The pipeline would deliver gas to the plant to meet the 10.2 million cubic feet per hour demand. To ensure integrity of the pipeline and to minimize any potential for pipeline failure, the completed pipeline system (including all ancillary facilities) would be operated and maintained in accordance with the applicable federal USDOT safety standards at 49 CFR, Part 192, and other applicable federal and state regulations. Operation and maintenance activities would include aerial and ground inspections, pipeline marker replacement, corrosion inspections, and stability and vegetation reestablishment inspections, among others.

2.3.3 Water Supply and Treatment

2.3.3.1 Location and Facilities

Water for the proposed power plant would be obtained from the Port of Umatilla's regional raw water supply system. The Port of Umatilla diverts water from the Columbia River into the regional raw water supply system in accordance with an existing municipal water use permit from the State Oregon approved in 1979 (Permit #49497). Presently, the permit is under an extension application, which would extend the permit date. No new state-administered water right, water rights transfer, or surface or groundwater permit would be needed for this water supply. The Port of Umatilla's raw water system serves the City of Hermiston and industrial users in northwestern Umatilla County. The committed uses represent a total of approximately 23.4 cubic feet per second (cfs) out of the total water right of 155 cfs (100.17 million gallons per day).

The present water intake system at the Port of Umatilla was built in 1995. The Section 10/404 permit with the USACE, Portland District was completed in 1994 (USACE 1994). The intake system is located at the Port of Umatilla Dock (River Mile [RM] 293 in the Columbia River) upstream of the boat launch ramp above the McNary Dam. It consists of a platform in the river with four canisters to hold pumps with three turbine type pumps installed and a fourth one to be installed in the existing empty canister if needed, pipelines to take water from the pumps to end-

users, and a water treatment plant. A fourth pump would be added to the vacant canister if required to provide water for the Wanapa Energy Center and by making minor modifications to the pump manifold, if necessary. A pump house encloses the turbine pumps, air compressors, and other control equipment. No new construction in the river intake area would be required for the modification. The intake system contains a screen with 0.125-inch openings and maximum approach velocity of 0.4 cfs. These design features follow the National Marine Fisheries Service (NMFS) criteria for protecting salmonid species. The water supply pipeline from the pump house to the shoreline is attached above the pier deck.

The proposed location of the water supply pipeline is shown on **Figure 2.3-1**. Municipal water would be used for sanitary, potable, and process uses. The project would interconnect with the municipal system at the nearest point where municipal water is available, likely in the vicinity of the prison west of the plant site.

The HRSGs require the use of demineralized water since water impurities can accumulate in the steam tubes or damage the steam turbine blades. Therefore, water for process use would be demineralized at the project site. A tank would be constructed to hold the demineralized water. The cooling water reserve supply stored in the raw water storage tank would help avoid disruption in facility operation in the event of a disruption of water flow from the Port of Umatilla.

2.3.3.2 Construction

The steel (or plastic) water supply pipeline would be constructed using the same excavation, installation, and reclamation methods described for the natural gas supply pipeline. However, the water supply pipeline would not be subject to the weld and pipe strength tests required for gas supply lines. Construction of the demineralization system would be part of the overall plant construction process.

2.3.3.3 Operation

The project water demand would vary seasonally, depending upon the heat loading and evaporative cooling requirements. The estimated project withdrawal volume would be approximately 10 to 13 million gallons per day, which represents 12 to 13 percent of the total Port of Umatilla water right.

2.3.4 Process Cooling System and Wastewater Generation

2.3.4.1 Location and Facilities

A recirculating cooling system with mechanically induced draft evaporative cooling towers completed with highly efficient drift eliminators, would be used to minimize water use. The cooling towers would be located on the east side of the plant site, where they would receive hot water from the steam cycle condenser (**Figure 2.3-2**). Water (make-up water) would be added to the cooling system to compensate for evaporative losses, and the cooling tower drift and blowdown. An initial evaluation of the existing Columbia River water quality at the McNary Dam indicated that cooling water could be recirculated through the cooling system about 6 times and still meet applicable discharge standards for aquatic and wildlife use. An oil/water separator is proposed for treatment of process water in each power block and the demineralizer regeneration wastes would be neutralized. No additional process wastewater treatment is proposed. A domestic sewage pipeline would be connected to the Umatilla municipal system. Another option would be to treat sewage on site with a septic tank and leach field.

By meeting aquatic and wildlife water quality standards, the plant discharge would be suitable for discharge to surface water. The proposed wastewater pipeline route is illustrated on **Figure 2.3-1**. The wastewater would be conveyed by a 12-inch pipeline to a discharge point at the end of the Feed Canal immediately upstream of Cold Springs Reservoir. The water would be stored in the reservoir where it would mix with water delivered from the Umatilla and Columbia rivers. This water is then withdrawn for agricultural purposes.

2.3.4.2 Construction

Construction methods for the discharge water pipeline would be the same as those described for the gas and water supply pipelines. It is currently anticipated that the water discharge pipeline would be constructed within the same ROW as, and concurrently with, the natural gas supply pipeline, and that it would extend from the electric power generation plant, southward to the end of the Feed Canal, where the process water would be discharged. The wastewater discharge pipeline would be offset from the natural gas pipeline by approximately 25 feet. The permanent 25-foot-wide ROW would encompass both the natural gas pipeline and the wastewater discharge pipeline.

2.3.4.3 Operation

The estimated cooling water discharge volume would be 2.4 million gallons per day under high ambient heat load conditions (summer), and about 1.8 million gallons per day under average ambient heat loads. These daily discharge volumes translate to discharge rates of 1,667 gallons per minute and 1,250 gallons per minute, respectively. The wastewater temperature is estimated to average 70 to 75 degrees Fahrenheit (°F).

2.3.5 Electric Power Transmission

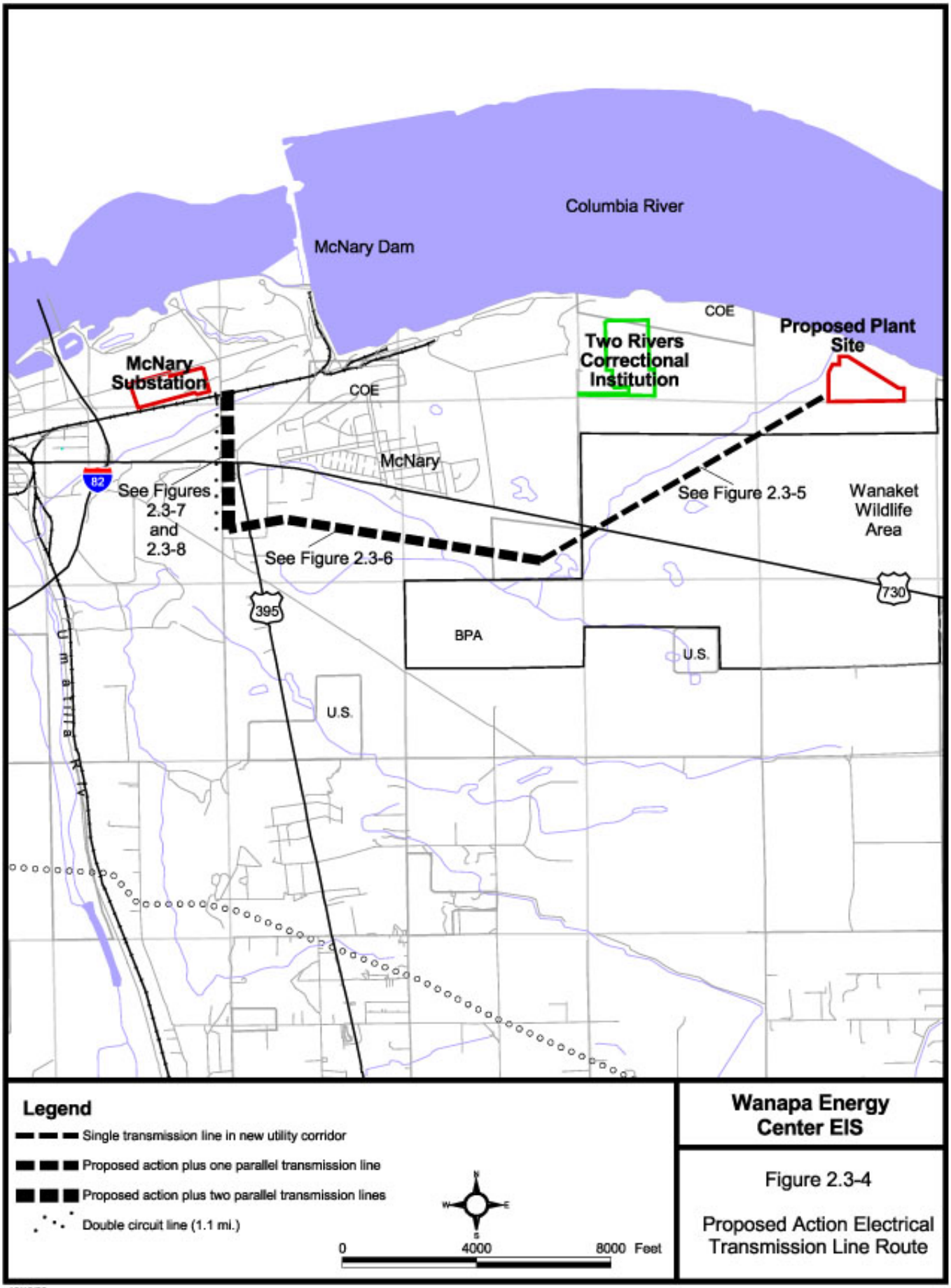
2.3.5.1 Location and Facilities

In response to a request from the applicant for interconnection and firm transmission, BPA may design and construct a 500-kV transmission system from the proposed 1,200-MW Wanapa Energy Center in Umatilla County, Oregon, to BPA's existing McNary Substation in Umatilla County, Oregon. BPA would own and operate the interconnection transmission system.

Double-circuit 500-kV transmission structures would be constructed from the power plant site to McNary Substation but would be strung with a single circuit 500-kV transmission line for this project. An additional circuit could be added for future transmission. The length of the transmission line would be approximately 23,000 feet (4.36 miles) long. The proposed alignment parallels existing utilities (roads and transmission lines) over the majority of its length.

The new transmission line would traverse southwest from the project site in a new utility corridor until crossing and going south of U.S. Highway 730. The transmission line would then join the existing BPA transmission utility corridor and traverse west/northwest. Just after crossing U.S. Highway 395 and before turning north, the last 5,200 feet of the existing Lower Monumental-McNary line would be relocated onto new double-circuit structures in a new corridor 125 feet east of the double-circuit structures that carry Calpine-McNary and McNary Loop to Lower Monumental-John Day. The new Wanapa-McNary line would then be connected to McNary Substation on the existing 500-kV single circuit structures in the corridor previously occupied by Lower Monumental-McNary (**Figure 2.3-4**).

Figures 2.3-5, 2.3-6, and **2.3-7** illustrate the appearance of transmission line structures in corridors containing one, two, and three transmission lines, respectively. **Figure 2.3-8** shows where



Wanapa Energy Center EIS

Figure 2.3-4

Proposed Action Electrical Transmission Line Route

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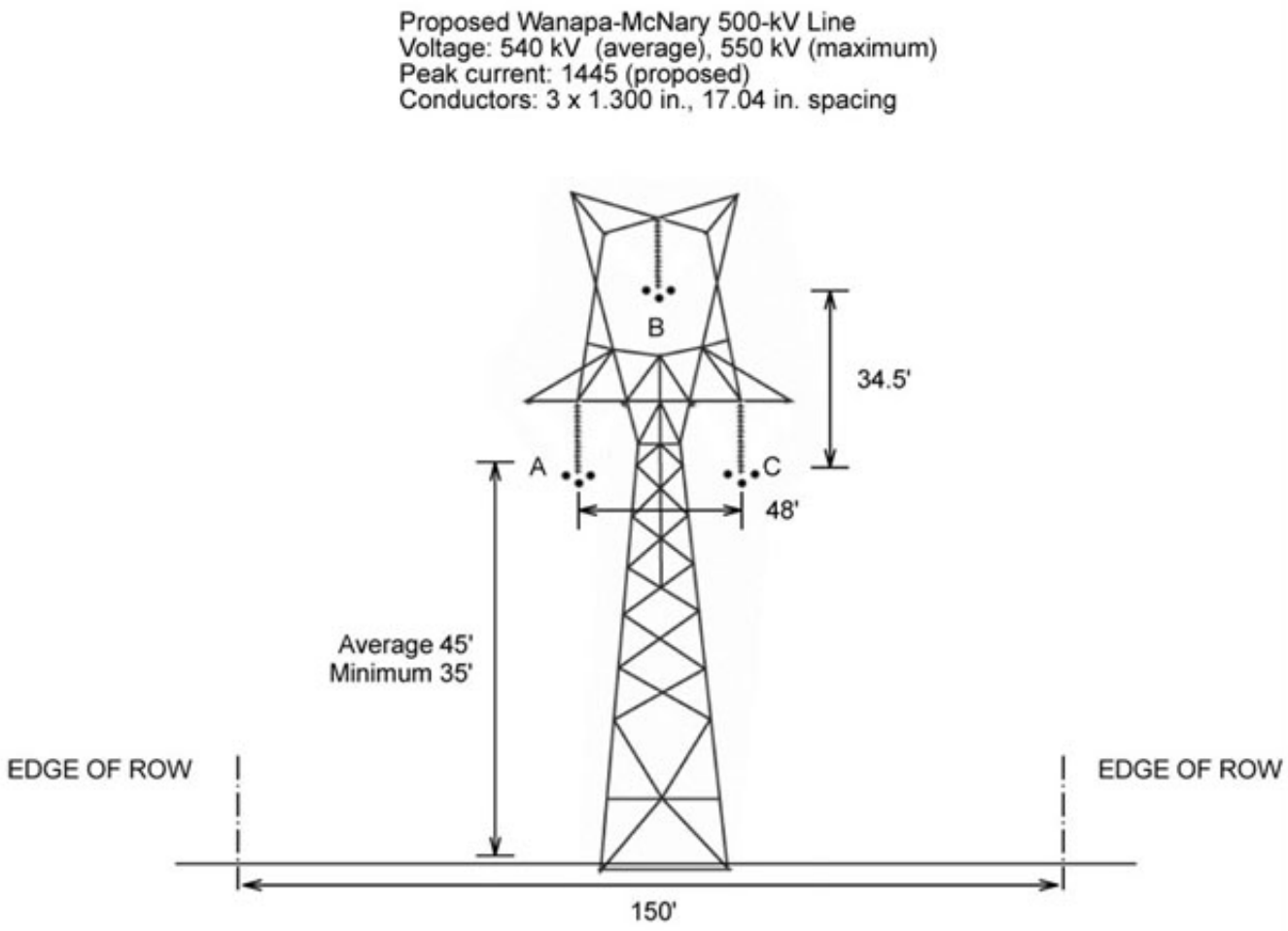


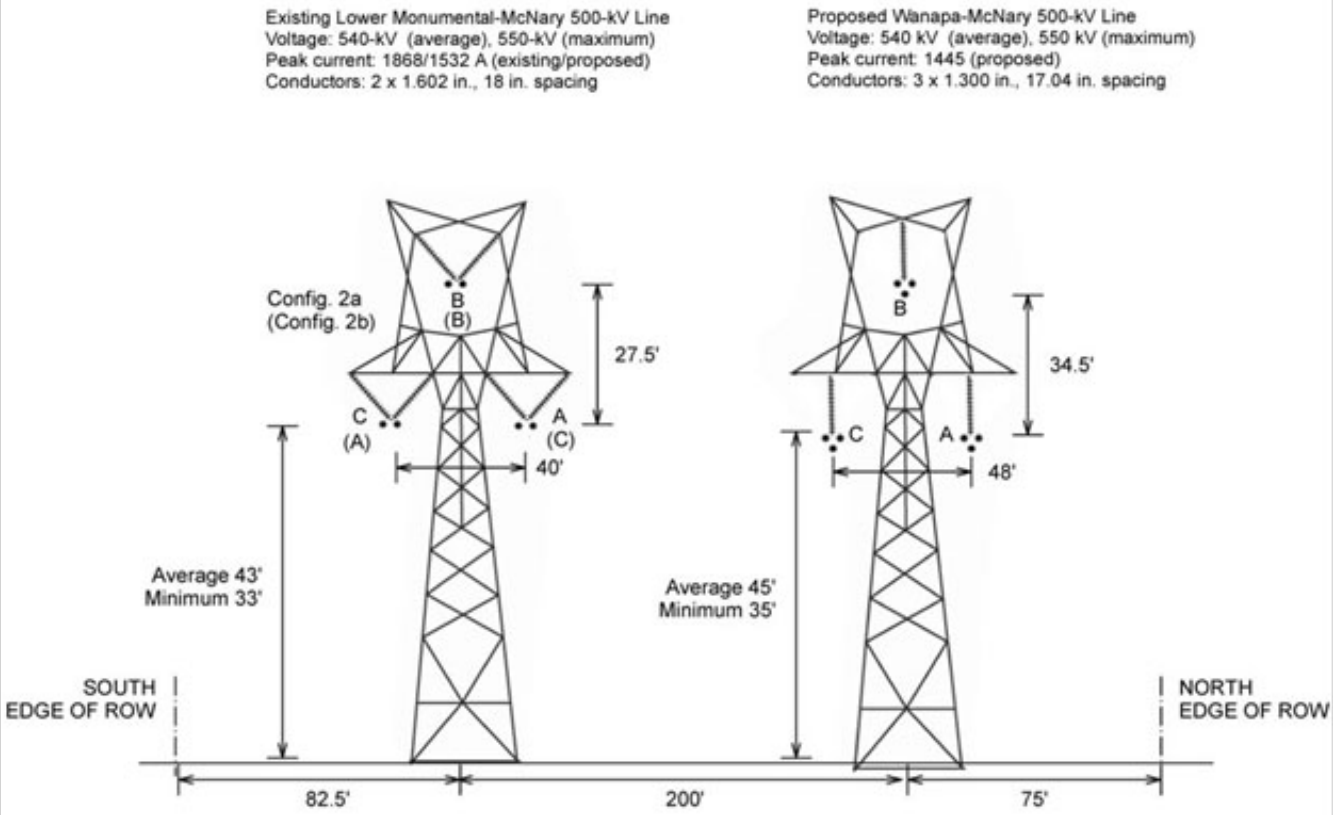
Wanapa Energy Center EIS

Figure 2.3-5

Configurations for the Proposed Wanapa-McNary 500-kV Line Proposed Line with No Parallel Lines

Source: BPA, 2003.

9/26/03



Wanapa Energy Center EIS

Figure 2.3-6

Configurations for the Proposed Wanapa-McNary 500-kV Line Proposed Line with One Parallel Line

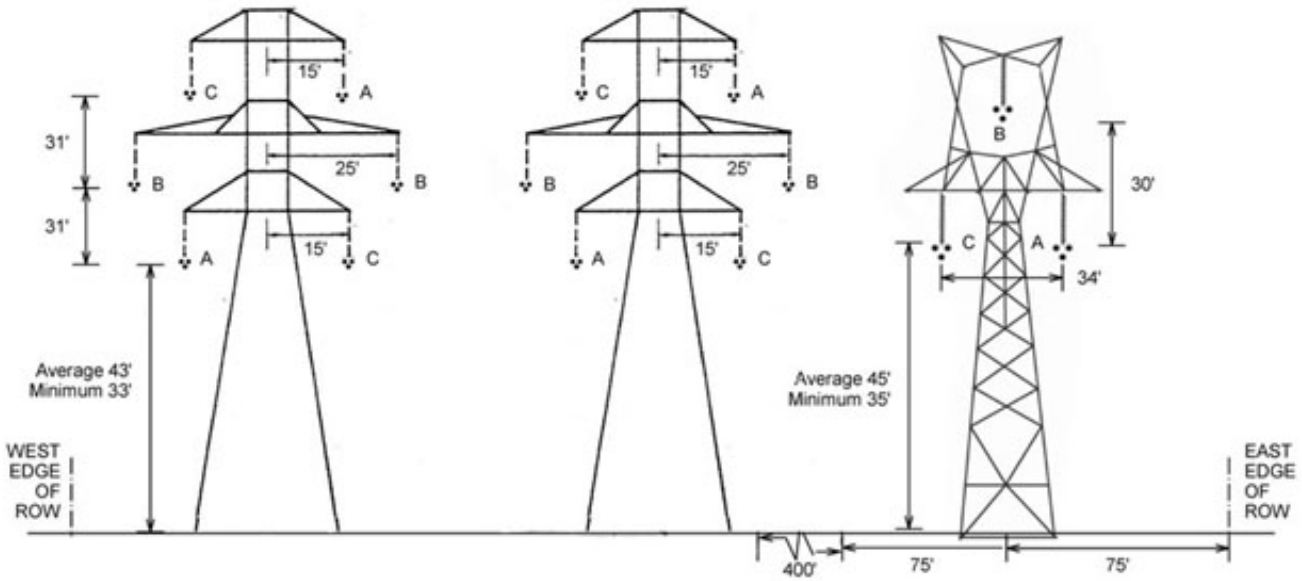
Source: BPA, 2003.

9/26/03

Existing McNary-Coyote (Slatt)/
Calpine-McNary 500-kV Double-Circuit
Voltage: 540-kV (average), 550-kV (maximum)
Peak current: -1733/591 A (existing)
-1803/591 A (proposed)
Conductors: 3 x 1.302 in., 17.04 in. spacing

Proposed BPA 500-kV line with
relocated Lower Monumental-McNary 500-kV Line
Voltage: 540-kV (average), 550-kV (maximum)
Peak current: 1532 A (proposed)
Conductors: 3 x 1.300 in., 17.04 in. spacing

Replacement of Lower Monumental-McNary 500-kV Line with
Proposed Wanapa-McNary 500-kV Line
Voltage: 540-kV (average), 550-kV (maximum)
Peak current: 1868/1445 A (existing/proposed)
Conductors: 3 x 1.302 in., 17.04 in. spacing



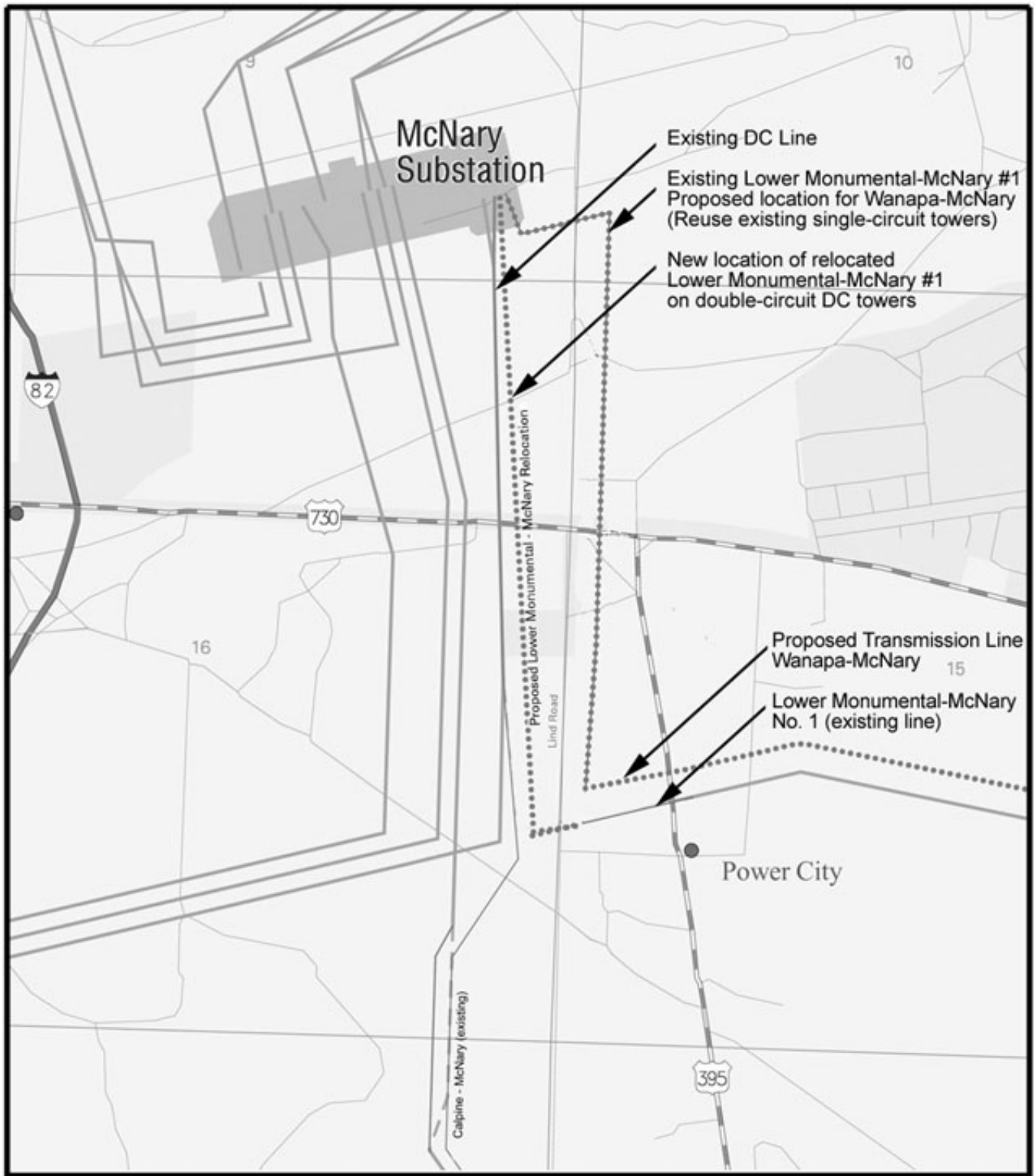
Source: BPA, 2003.

Wanapa Energy Center EIS

Figure 2.3-7

Configurations for the Proposed Wanapa-McNary 500-kV Line Proposed Line with Two Parallel Lines

9/25/03



Wanapa Energy Center EIS

Figure 2.3-8

Electrical Transmission Line Modifications at McNary Substation to Accommodate the Wanapa Energy Center Project

Source: BPA, 2003.

10/07/03

proposed Wanapa-McNary transmissions would replace the existing lower Monumental-McNary transmission line, and where a new single-circuit transmission line would be installed on double-circuit structures to carry the re-located lower Monumental-McNary transmission line. The other circuit would be reserved for a future transmission line interconnecting with the McNary Substation.

The facilities, equipment, and features to be constructed in the transmission line project include:

- About 25 steel lattice transmission structure structures, to support conductors, insulators, fiber optic cable, and ground wire;
- Counterpoise for lightning protection (buried around the structure);
- ROW purchases for transmission line corridor segments would vary from 150- to 200-foot-wide permanent ROW and access roads;
- 20 to 30 new spur roads, each approximately 250 feet long;
- Approximately 2 miles of new access roads;
- Culverts;
- New gates;
- Installation at the McNary Substation of equipment including a power circuit breaker, a disconnect switch, bus tubing and pedestals, and a substation dead end structure;
- A transmission dead end structure at both substations; and
- A switchyard at the Wanapa site, including all equipment listed above, plus a switchyard fence and rock surfacing.

The McNary Substation would be expanded about 160 x 750 feet, outside of the existing fence line on land acquired from the USACE, to accommodate the Wanapa Project.

2.3.5.2 Construction

Construction of the new electrical transmission line ROW would require obtaining 150-foot to 200-foot easements for the construction. Approximately 200 feet of new ROW width would be needed where the transmission line would be located parallel to an existing BPA transmission line.

System reliability requirements led BPA system planners to suggest a transmission line location at least 1,200 feet from the existing Lower Monumental-McNary 500-kV transmission line to protect against simultaneous dual outages of both 500-kV transmission lines. BPA system planners subsequently determined that a 1,200-foot separation would not be necessary because the consequence to overall transmission system reliability resulting from the loss of both transmission lines along this route would not be significantly worse than loss of a single transmission line. As a result, it is now proposed to locate the new transmission line about 200 feet from the existing Lower Monumental-McNary 500-kV line. Configurations for the proposed new line in relationship to existing lines are illustrated in **Figure 2.3-8**.

The construction phases of the transmission line would consist of ROW acquisition and clearing, access road construction, structure construction and installation, conductor installation, and site restoration and cleanup. Each of these phases is described in greater detail below.

Clearing

Clearing around the structures and switchyards would include removal of all brush and debris and possibly grading to level the working area. On average, an area of approximately 0.25 acre would be disturbed for each of the structures required to support the transmission lines. Therefore, a total of 6.25 acres would be cleared or disturbed for transmission line structure placement.

Access Roads

Access roads are the system of roads that BPA's construction and maintenance crews would use to get to the structures or structure sites along the line. The roads would be designed to be used by cranes, excavators, supply trucks, boom trucks, log trucks, and line trucks. The transmission line access road system would include a ROW width of 50 feet for new roads and 20 feet for existing roads. BPA prefers road grades to be 15 percent or less, depending on the erosion potential of the soil. Roads are graded to provide a 16-foot-wide travel surface (somewhat wider on curves), with

about 20- to 25-foot-wide total area disturbed (including drainage ditches), depending on site conditions (i.e., slope of road, soils, terrain, etc.). The road surface would consist of dirt, gravel, or rock.

Much of the existing transmission line corridor lies within 0.5 mile of public highways. Where the proposed transmission line parallels next to existing lines for most of the route, the proposed new line would utilize the existing access roads. The new transmission line could require some upgrades to existing access roads, construction of new access roads, construction of new access road spurs, and purchase of new access easements.

Staging Areas

Temporary staging areas would be needed along or near the proposed transmission line for construction crews to store steel structure components, conductor spools, other materials, and trucks. These materials would be delivered by truck to storage yards near the ROW.

Structure Footings

Four types of footings could be used, depending on the terrain and structure type: plate, grillage, rock anchors, or concrete footings.

Plate footings are 4-foot by 4-foot steel plates buried 10 to 12 feet deep.

Grillage footings are 12.5-foot by 12.5-foot assemblies of steel I-beams that have been welded together and buried 14 to 16 feet deep. Grillage footings are used to support heavier structures, such as dead end structures.

Rock anchor footings are used when a structure is built on bedrock. Holes are drilled into the bedrock, steel anchor rods are secured within the holes with concrete, and the structure footings are then attached to these rods. A track hoe is used to excavate the soil to allow footing placement. The excavation is usually 1 to 2 feet larger than the footing to be installed. Additional footing excavation could be required in certain soil types. The soil and rock materials removed are later used to backfill the excavation once the footings are installed. Excess material would be stockpiled and spread along the ROW.

Concrete footings are often used on a lattice steel structure when it is built in water or a wet area. There are two types of concrete footings that could be used. One type of concrete footing is steel reinforced concrete pier extending approximately 1 foot above the ground surface. The second type of concrete footing includes a steel reinforced pier with steel piles under it for further support.

Transmission Line Structures

The structures for the proposed new single-circuit portions of the 500-kV line would be lattice steel and would average 145 feet in height. The structures for the new double-circuit portions of the 500-kV line also would be lattice steel and would average 180 feet in height. The spans between the structures would be approximately 1,000 to 1,500 feet, but would mirror (as closely as possible) the existing span lengths where the new line parallels an existing line. The single-circuit structures would be similar to those of existing lines in the area. The structures would be made of galvanized steel and may appear shiny for 2 to 4 years before they dull with the weather. About 18 single-circuit and 7 double-circuit structures would be needed to carry the wires (conductors) for the proposed transmission line.

Two basic types of 500-kV steel lattice structures would be used: suspension (tangent or light-angle structures) and dead end structures. Suspension structures are used to elevate wires a safe distance above the ground on straight (tangent) or small angle on a line. The predominant structure proposed for use on this line is known as a delta design because the conductors form a triangle or delta shape. Dead end structures elevate the conductors above the ground and equalize tension of the conductors between two segments of transmission line when the line makes a turn. Dead end structures are much stronger and heavier than tangent structures and cost 3 to 4 times as much as tangent structures. Because of the high cost, engineers try to minimize the number of sharp turns and angles when designing 500-kV transmission lines.

Transmission line structures are either assembled at the installation site and lifted into place by a large crane (30- to 100-ton-capacity) or assembled at a staging area and set in place by a large sky-crane helicopter. Using helicopters enables structures to be constructed more quickly and reduces ground disturbance. Helicopter construction could be more costly than conventional crane construction, but time saved by faster structure assembly sometimes reduces the cost differential. Bonneville's selected construction contractor would decide when helicopter-assisted assembly is appropriate. The construction contractor would not be selected until completion of the ROD for the proposed project. The structures are then bolted to the footings.

Conductors, Insulators, and Ground Wires

Conductors and insulators would be installed after transmission structure construction. Workers would first attach a small steel cable called the sock line to the structures. The other end of the sock line would be attached to the conductor. As the sock line is pulled through pulleys on the structures, it would pull the conductor from large reels mounted on trucks equipped with a brake system. This allows the conductor to be unwound and pulled through the structures under tension. The sock line is usually installed by a helicopter. The conductors would be attached to the structure using glass, porcelain, or fiberglass insulators. Insulators prevent the electricity in the conductors from moving to other conductors, the structure, or the ground. The conductor would be pulled through pulleys or travelers that are attached to the bottom of these insulators on each structure. The locations where the trucks with conductor reels support the conductor installation process are called conductor-tensioning sites. These sites would likely be located every 2 to 3 miles along the transmission line corridor. A conductor-tensioning site typically disturbs an area of about 1 acre.

Two smaller wires, called overhead ground wires, would be attached to the top of the transmission structures. Overhead ground wires protect the transmission line against lightning damage. The diameter of each wire is typically 0.5 inch. BPA also could attach a 0.5-inch-diameter fiber optic cable to the transmission structures to provide a communication link. If attached, it would be hung below the conductors. A series of wires called counterpoise would be buried in the ground at each structure. These wires would establish a low resistance path to the earth for lightning protection.

Substation Facilities

At the McNary Substation, the east side of the substation would require an expansion measuring 160 x 750 feet, or about 2.75 acres. The substation expansion would be on land acquired from the USACE. Substations contain electrical equipment that enables BPA (and the applicant at the Wanapa Substation) to interconnect several different transmission lines, disconnect transmission lines for maintenance or outage conditions, and regulate voltage fluctuations. The following equipment associated with transmission line termination would be installed in either or both the Wanapa and McNary Substations at each end of the proposed project:

- A power circuit breaker;
- Substation dead end structures;

- Transmission dead end structures;
- A disconnect switch; and
- Bus tubing and bus pedestals.

Site Restoration and Cleanup

The cleared or disturbed areas that are not directly covered by transmission structures, facilities, or accessories would be reseeded with naturally occurring shrubs and grasses at the end of the construction period. Vegetation within the transmission line ROW would be kept low growing to allow safe and uninterrupted operation of the transmission line. The vegetation along the proposed transmission line predominantly consists of either low-growing shrub-steppe or agricultural crops. For this reason, little trimming or clearing would be required along the ROW during the construction phase.

2.3.5.3 Operation

The proposed transmission line would convey electricity between the power plant and the substation within the voltage range for which it was designed. During the life cycle of the project, BPA would perform routine, periodic maintenance and emergency repairs to the transmission line. For lattice steel structures, maintenance usually involves replacing insulators. Every 2 months, a helicopter would fly over the line to look for hot spots (i.e., areas where electricity may not be flowing correctly) or other problems indicating that a repair may be needed. Vegetation also is maintained along the line for safe operation and to allow access to the line. The area along the existing transmission line needs little vegetation maintenance because of the low-growing nature of a majority of the vegetation along the ROW.

2.3.6 Project Construction and Operation Work Force, Schedule

Based on a proposed commercial operation date of early October 2006, engineering and construction of the power generation components is proposed to begin about mid-September 2004. Overall, construction is estimated to take a total of 24 to 26 months. The relative construction schedules for the various project components are shown in **Figure 2.3-9.**

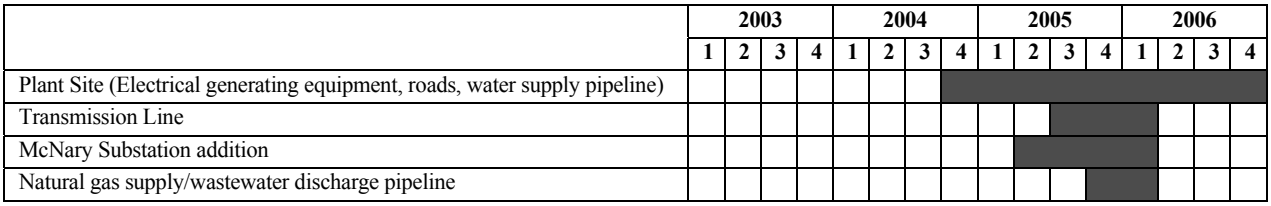


Figure 2.3-9. Schedule for Wanapa Energy Center Construction

The construction work force for the proposed power plant would range from 100 to 600 workers. It is expected that the work force would consist of a mix of specialty workers coming from other parts of the country, as well as workers from the CTUIR and the Hermiston, Umatilla, and Tri-Cities area. The estimated work force numbers and equipment required for the other project components are listed in **Table 2.3-2**.

Table 2.3-2
Summary of Construction Activities for the Proposed Wanapa Energy Center

Type of Activity	Peak Work Force Numbers	Construction Duration (Months)	Types of Equipment
Power plant and access road	600	26	Light and heavy trucks, backhoes, concrete trucks, bulldozers, graders, cranes, air compressors, welding machines, power hand tools.
Natural gas pipeline	80	3	Light and heavy trucks, backhoes, bucket-wheel excavators, bulldozers, graders, side-booms, welding trucks, farm tractors.
Water pipelines	20	3	Same as natural gas pipeline, except that welding trucks may not be needed if plastic pipeline is installed.
Electric transmission line/Substation	120	4	Cranes, light and heavy trucks, graders.
McNary Substation Expansion	50	12-18	Light and heavy trucks.

The operational work force would consist primarily of about 30 specialty workers responsible for monitoring power plant operations, conducting inspections, and making repairs.

2.3.7 Emergency Operations

A fire protection system would be installed within the buildings and yard areas at the proposed power plant site. The system would be designed to meet the requirements of the Uniform Fire Code, as amended by Oregon and the National Fire Protection Association, and all other applicable fire protection standards. The fire protection system would include a fire water system, dry chemical extinguishing system, a CO_2 extinguishing system, and portable fire extinguishers. The characteristics of the various fire protection systems would be as follows:

- Fire Water System – This system would consist of a fire water supply loop, fire hydrants, sprinkler systems, and hoses placed at appropriate locations. The primary source of water for fire suppression would come from the Port of Umatilla raw water system, as discussed in Section 2.3.3. A diesel-driven fire pump would be part of the system to ensure operations during a power failure. A backup water supply for fire suppression would be provided in the reserve capacity in the raw water storage tank.

- CO_2 Systems – This system would protect the turbine housings, mechanical/electrical control enclosures of the turbines, switchgear room, and battery room. A visual or noise alarm would sound if the system is activated.

- Portable Fire Extinguishers – The type and number of portable fire extinguishers would conform to code requirements. The extinguishers would be placed at key locations within the power plant site.

2.3.8 Project Abandonment

The proposed Wanapa Energy Center would operate on an indefinite basis, assuming that water and natural gas supplies are available and a Firm Transmission Agreement is approved by BPA. Therefore, no abandonment is anticipated for the project.

2.3.9 Project Environmental Protection Measures/Mitigation

- The generating plant would comply with state industrial noise standards at the plant fence line.

2.4 Other Alternatives Carried Forward in the Analysis

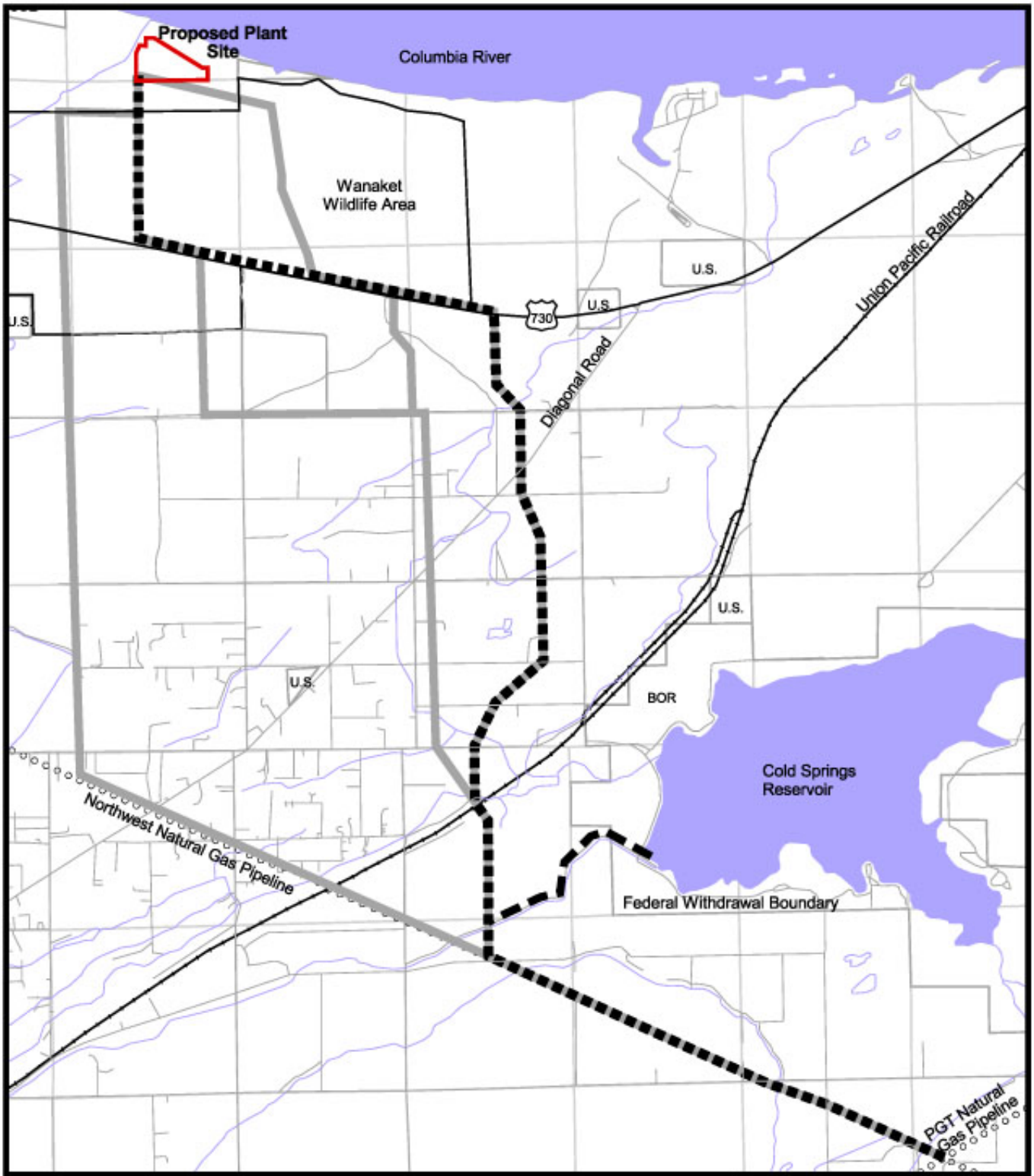
2.4.1 Gas Supply/Water Discharge Pipelines Route Alternatives

In addition to the proposed 9.9-mile-long route for the natural gas supply/wastewater discharge pipelines, four other alternative routes are evaluated. The alternative routes would be approximately the same length as the proposed route, but would follow a more eastern (Alternatives 1, 3, and 4) or more western (Alternative 2) approach to the Stanfield Compressor Station from the power plant. All four alternate routes terminate at the Stanfield Compressor Station and terminate at the proposed power plant site. The length and land requirements for each alternative are presented in **Table 2.4-1**. The alternative routes are described from north (plant site) to south (Stanfield Compressor Station).

- Alternative 1 (**Figure 2.4-1**) – From the proposed power plant location, the route would follow the Proposed Action route for approximately 1.4 miles, at which point it would continue farther eastward approximately 2.3 miles along U.S. Highway 730 before proceeding southward approximately 4.4 miles to the existing Northwest Gas ROW. Once co-located alongside the existing Northwest Gas ROW, it would follow the existing line southeastward approximately 2 miles to the interconnect point at the Stanfield Compressor Station. This alternative would follow existing roads for the majority of its length in a rural area.

- Alternative 2 (**Figure 2.4-2**) – From the proposed power plant location, the route would follow the Proposed Action route for approximately 1,000 feet, at which point it would proceed due westward for approximately 2,000 feet. It would then proceed approximately 4 miles due southward along an existing road to the existing Northwest Gas ROW. Once co-located alongside the existing Northwest Gas ROW, it would follow the existing line southeastward approximately 5.6 miles to the interconnection to the gas source pipelines at the Stanfield Compressor Station.

- Alternative 3 (**Figure 2.4-3**) – This alternative was developed to avoid existing wetlands and potential future developed wetlands on the Wanaket Wildlife Management Area. From the plant site, the pipelines would extend eastward across basalt outcrops, descend into a shallow canyon with deeper soils, and then follow and existing two-track road to an intersection with U.S. Highway 730. The pipelines would parallel U.S. Highway 730 eastward for



Legend

Alternative 1 Natural Gas Supply and Waste Water Discharge Pipelines

Waste Water Discharge Lateral Pipeline

0 4000 8000 Feet

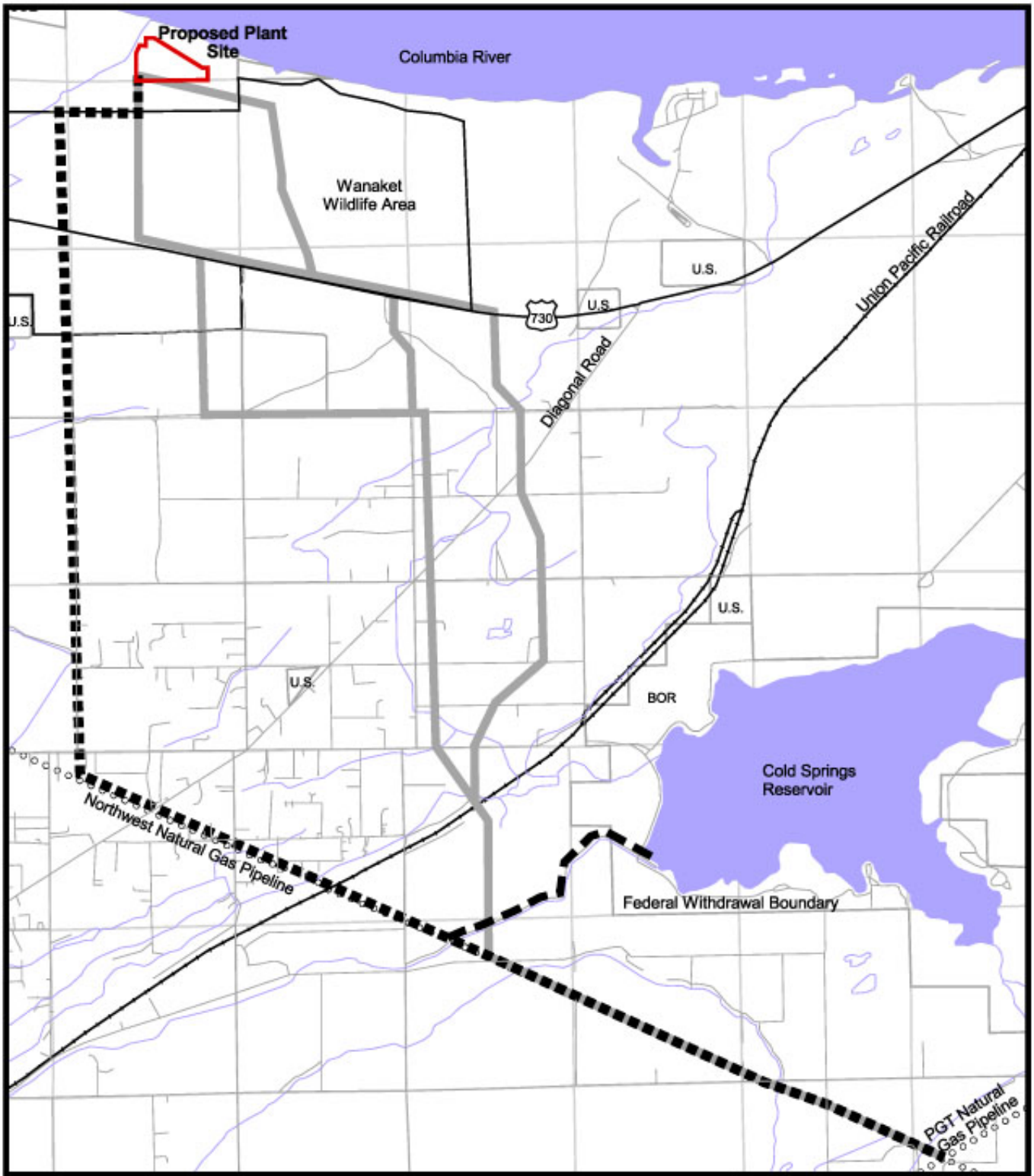
Source: ENSR, 2003.

Wanapa Energy Center EIS

Figure 2.4-1

Alternative 1 Natural Gas Supply/Waster Water Discharge Pipeline Route

09/25/03



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Alternative 1 Natural Gas Supply and Waste Water Discharge Pipelines

Waste Water Discharge Lateral Pipeline

0 4000 8000 Feet

Source: ENSR, 2003.

Wanapa Energy Center EIS

Figure 2.4-2

Alternative 2 Natural Gas Supply/Waster Water Discharge Pipeline Route

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Table 2.4-1
Component Alternative Land Requirements

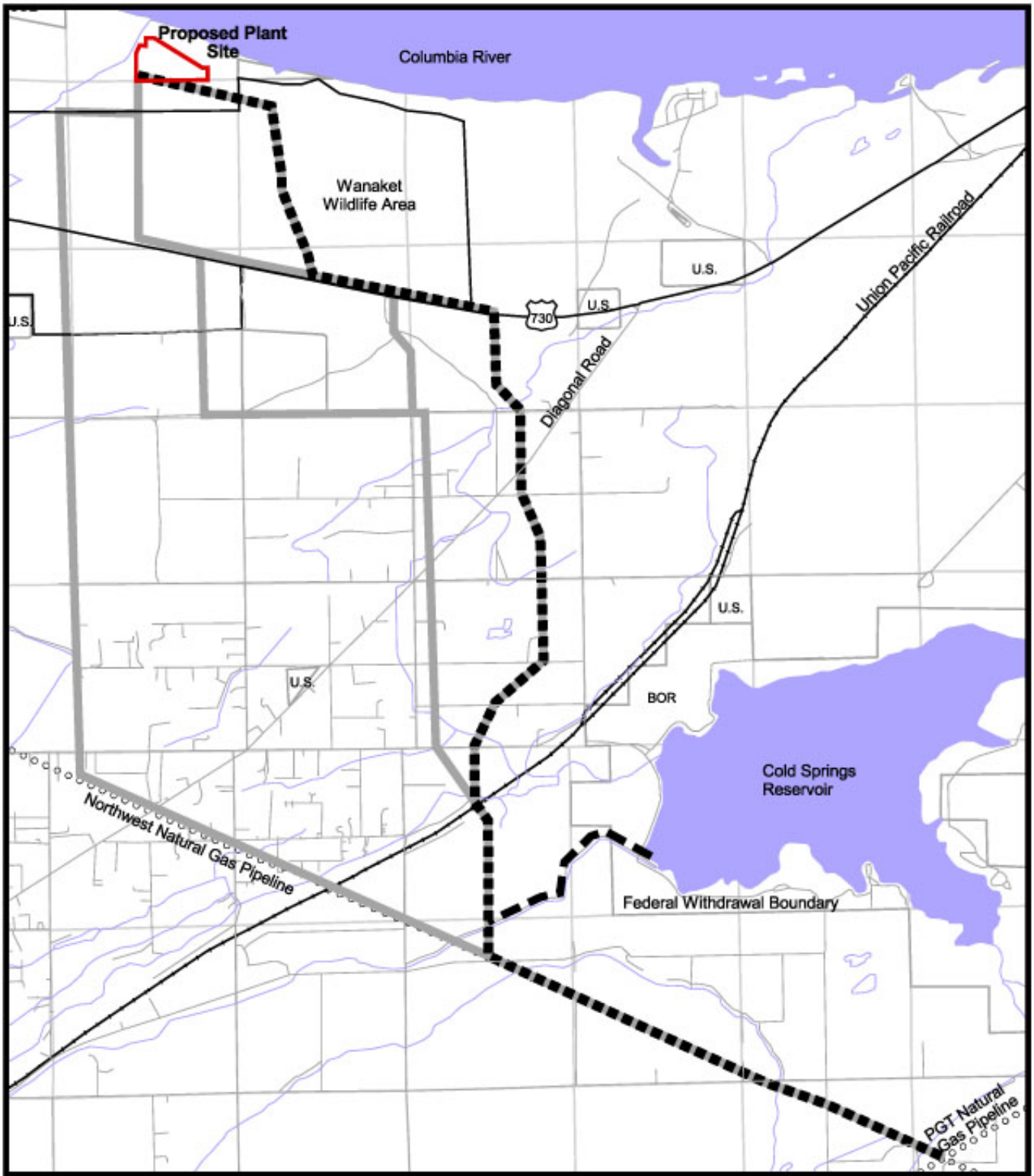
Natural Gas Supply/Wastewater Discharge Pipeline Alternatives					
	Proposed	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**
Length (miles)	9.9	10.2	10.3	10.0	9.5
Temporary Disturbance (acres)	120.4	123.4	124.4	121.4	114.9
Permanent Disturbance (acres)	0.0	0.0	0.0	0.0	0.0
Permanent ROW Easement Width (feet)	50	50	50	50	50
Permanent ROW Easement (acres)	60.1	61.7	62.2	60.7	57.5

Electrical Transmission Line Alternatives				
	Proposed	**Alternative 1**	**Alternative 2**	**Alternative 3**
Length (feet)	23,450.6	27,980.7	20,927.2	20,913.8
Length (miles)	4.4	5.3	4.0	4.0
Temporary Disturbance (acres)	80.8	96.4	72.1	72.0
Permanent Disturbance (acres)	6.5	1.0	0.7	0.7
Permanent ROW Easement Width (feet)	150	150	150	150

Assumptions: Temporary disturbance width for Electrical Lines = 150 feet.
Temporary disturbance width for Gas Lines = 100 feet.
Temporary disturbance width for Water Line = 50 feet.
Temporary disturbance width for Access Road = 50 feet.
Permanent disturbance for Electrical Lines = number power poles (1,500-foot spacing) x 0.05 acre per pole.
Permanent disturbance width for Gas Lines = 0.0 foot.
Permanent disturbance width for Water Lines = 0.0 foot.
Permanent width for Access Road = 25 feet.

approximately 1 mile, and then turn south across irrigated cropland to join the Proposed Action route to the Stanfield natural gas mainline interconnection.

- Alternative 4 (**Figure 2.4-4**) – This alternative was developed to avoid existing wetland and potential future developed wetlands on the Wanaket Wildlife Management Area. From the plant site, this alternative would follow the same route described in Alternative 3. At the intersection with U.S. Highway 730, the pipelines would parallel U.S. Highway 730 eastward for approximately 3 miles, and then turn south across irrigated cropland to join the Alternative 1 route to the Stanfield natural gas mainline interconnection.



Legend

Alternative 1 Natural Gas Supply and Waste Water Discharge Pipelines

Waste Water Discharge Lateral Pipeline

N W E S

0 4000 8000 Feet

Source: ENSR, 2003.

Wanapa Energy Center EIS

Figure 2.4-3

Alternative 3 Natural Gas Supply/Waster Water Discharge Pipeline Route

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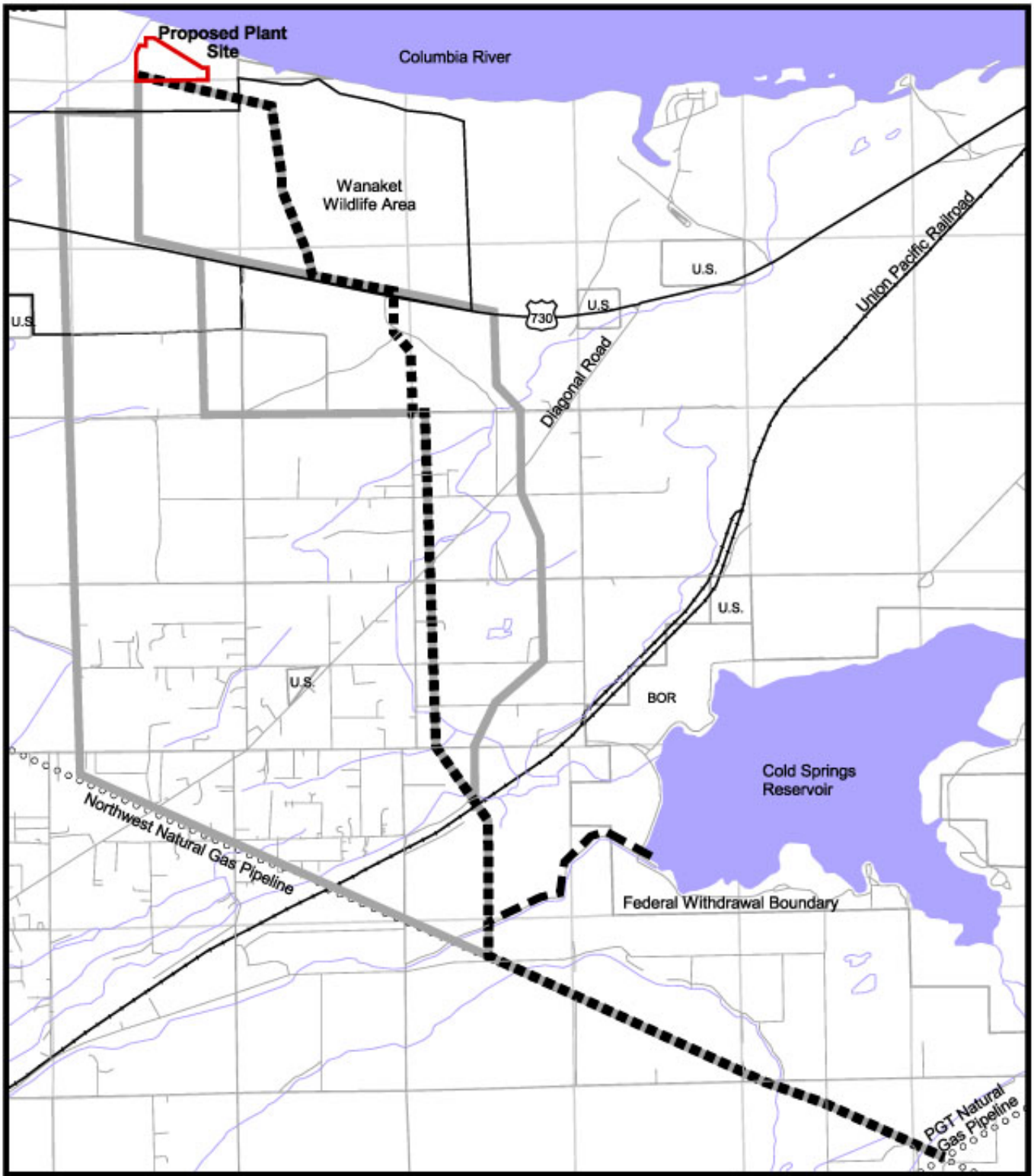

Legend

Alternative 1 Natural Gas Supply and Waste Water Discharge Pipelines

Waste Water Discharge Lateral Pipeline

N W E S

0 4000 8000 Feet

Source: ENSR, 2003.

Wanapa Energy Center EIS

Figure 2.4-4

Alternative 4 Natural Gas Supply/Waster Water Discharge Pipeline Route

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2.4.2 Transmission Line Route Alternatives

In addition to the proposed route described above, three other alternative transmission line routes from the plant site to McNary Substation are evaluated. These alternatives range from 3.7 to 4.0 miles. The three alternative electrical transmission line ROWs considered by BPA include:

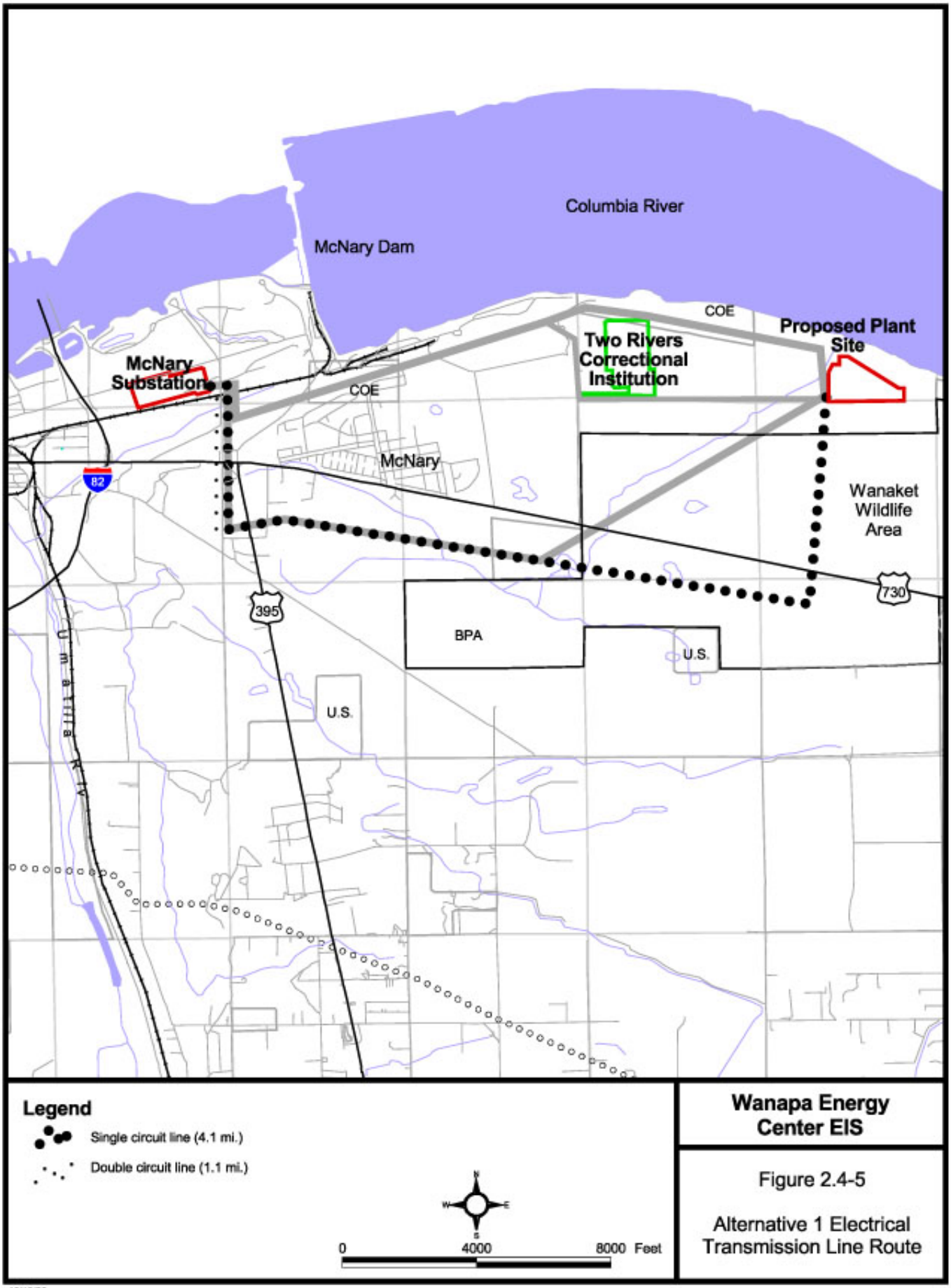
- Alternative 1 (**Figure 2.4-5**) is a combined single- and double-circuit transmission line. The route would include 21,900 feet of single-circuit and 5,800 feet of double-circuit line on new steel lattice structures (see Proposed Action). The route would traverse directly south from the project site, cross U.S. Highway 730, and then enter and follow the same alignment as the proposed route parallel to the existing BPA ROWs west/northwest and north.

- Alternative 2 (**Figure 2.4-6**) is a new single-circuit tubular steel pole transmission line in an entirely new ROW. The route would traverse west from the project site until it passes McNary Beach Access Road, then north until it meets the Alternative 3 route where it begins to traverse southwest, and then follows that same route southwest into the substation. A single tubular pole design that would reduce visual impacts is proposed for both Alternatives 2 and 3, which would both traverse the bluff on the south side of the Columbia River (**Figure 2.4-7**). The single tubular steel poles would average 135 feet in height. The spans between the poles would be approximately 600 to 1,000 feet. The structures would be made of galvanized steel and placed on concrete pier footings.

- Alternative 3 (**Figure 2.4-8**) is a new single-circuit tubular steel pole transmission line in an entirely new ROW. The route would traverse northwest from the project site until it nears and parallels the bluffs above the Columbia River, and then would traverse southwest into the substation.

2.4.3 Water Supply Alternatives

The Columbia River represents the most abundant and reliable water supply in the region. The project would obtain water from an existing municipal and industrial intake structure. No other water supply and delivery option was identified that would reduce environmental effects relative to the Proposed Action.



Wanapa Energy Center EIS

Figure 2.4-5

Alternative 1 Electrical Transmission Line Route

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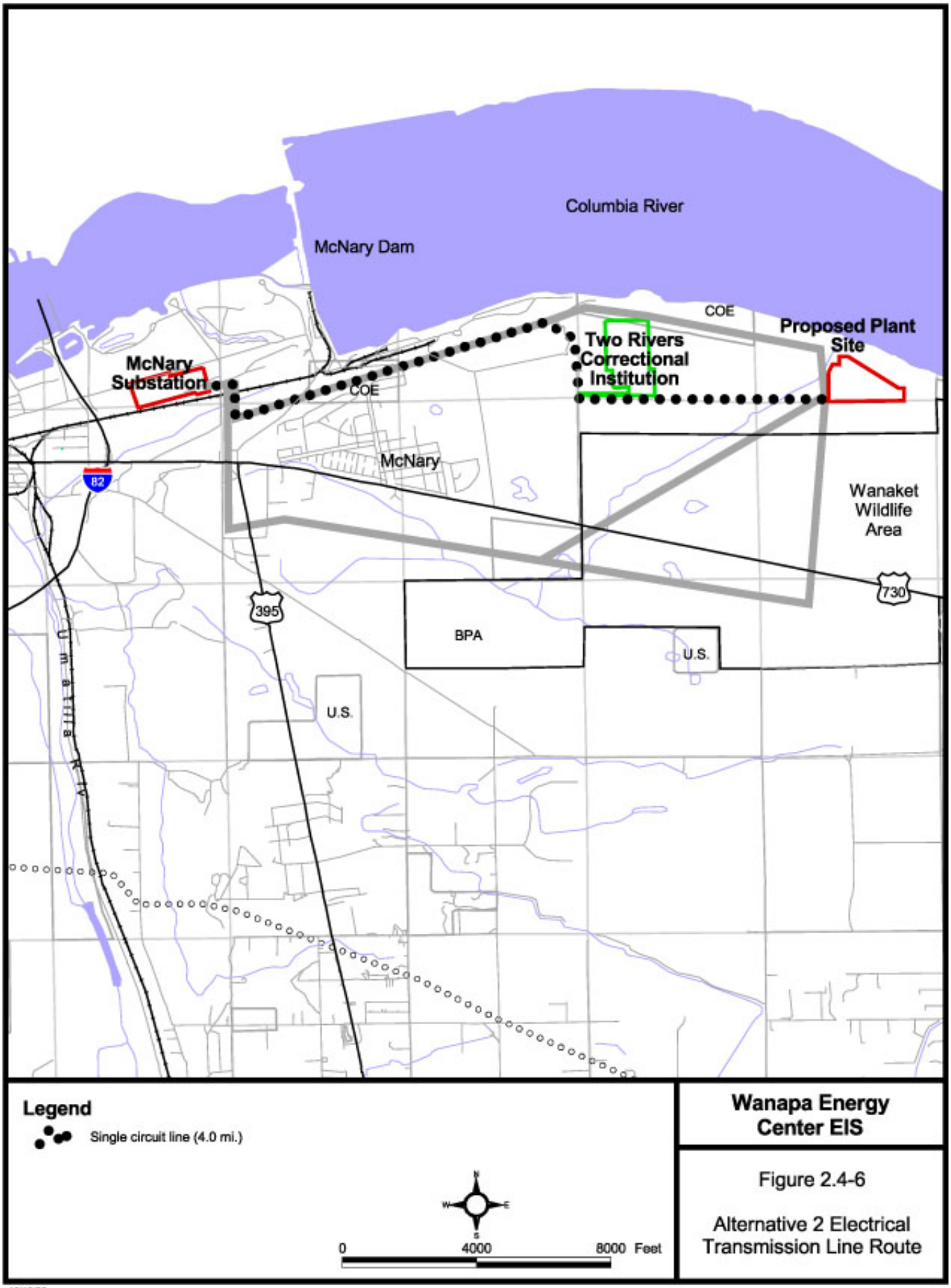

Wanapa Energy Center EIS

Figure 2.4-6

Alternative 2 Electrical Transmission Line Route

10/10/03

STRUCTURE TYPE	Single circuit 500 kV tubular
RIGHT-OF-WAY WIDTH	150 feet
AREA OF BASE	100 square feet
TYPICAL HEIGHT	135 feet
NUMBER OF STRUCTURES PER MILE (APPROX.)	4.8

Wanapa Energy Center EIS

Figure 2.4-7

Single Shaft Steel Pole Electrical Transmission Structure

Source: BPA, 2003.

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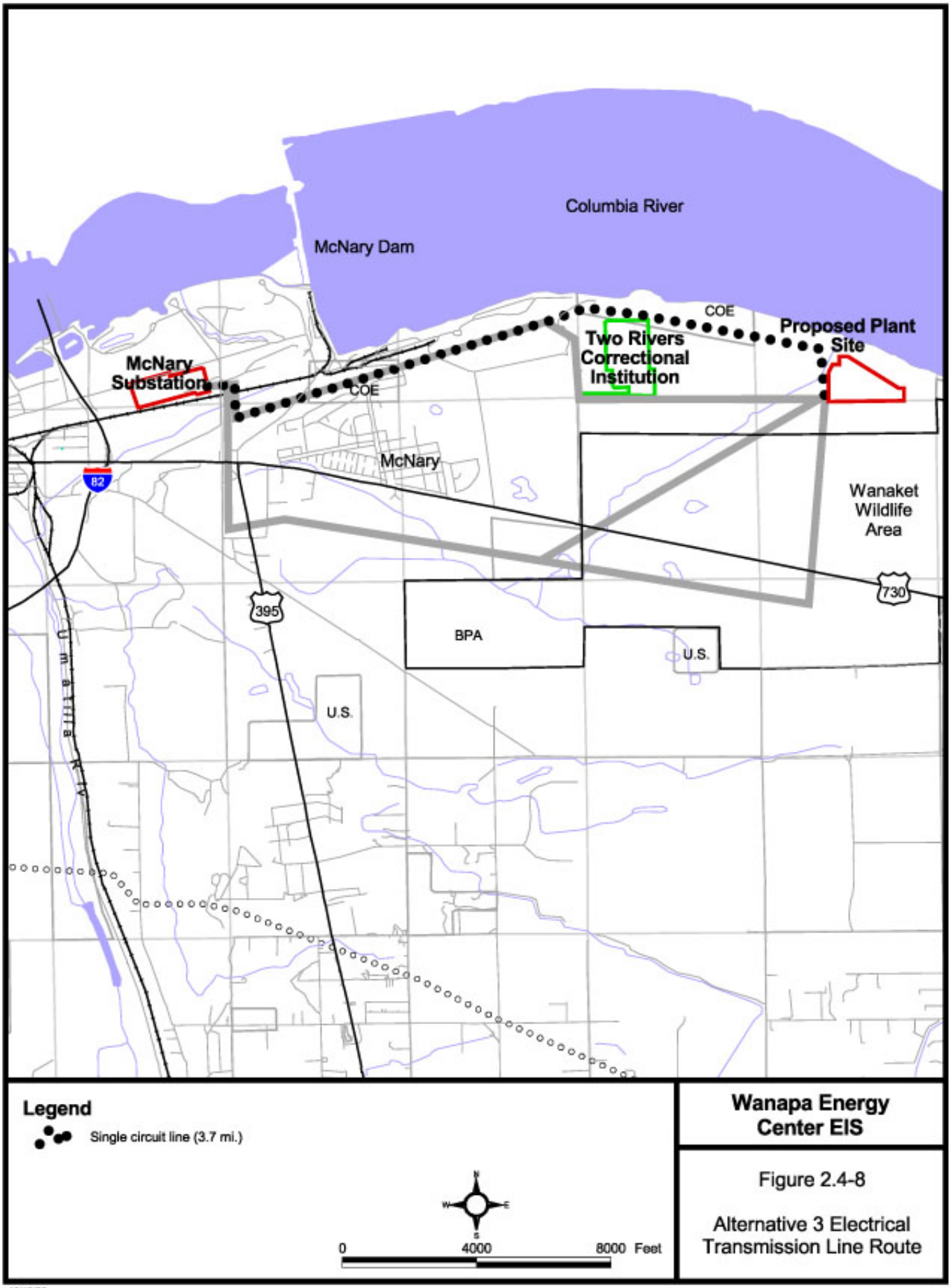

Wanapa Energy Center EIS

Figure 2.4-8

Alternative 3 Electrical Transmission Line Route

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2.4.4 Process Water Disposal Alternatives

The primary management problem for plant wastewater disposal is finding a suitable discharge location for the water year-round. Cold Springs Reservoir provides an existing, large volume surface storage option that allows the water to be reused for irrigated agriculture via the existing irrigation district canal system, and to provide water for wildlife and fishery purposes during the appropriate seasons. Other disposal options include a combination of water application for crops, and infiltration basins that would allow ponded water to percolate into underlying aquifers. This option, while potentially feasible, and currently being used by other power plants in the region, presents infrastructure and reliability concerns. These issues are discussed below under Alternatives Considered but Eliminated.

2.5 Alternatives Considered but Eliminated

2.5.1 Alternative Electrical Power Generation Systems

2.5.1.1 Wind Power Generation Systems

Wind power systems are rapidly emerging as an electrical power source in the Pacific Northwest. The proposed Wanapa Project is designed as a reliable, base-loading project capable of generating 1,200 MW. A wind power project alternative would not meet the project purpose and need because of the intermittent nature of wind power generation, and the very large land base requirements for installation of wind turbines that could not be achieved by the proposed project for the equivalent amount of electrical generating capacity.

2.5.1.2 Alternative Fuel Power Generation Systems

Coal, fuel oil, and biomass represent alternative fuels to natural gas. These alternate fuels would have to be transported by rail or truck to the Wanapa site. Because of regional air quality background conditions, the relative cost of transporting these fuels to the site, and controlling air pollution from these fuels would be substantially greater than those required for natural gas available from a nearby natural gas pipeline.

2.5.2 Alternative Power Plant Sites

Other sites in Umatilla and Morrow Counties were considered prior to selecting the proposed Wanapa Energy site. Other sites did not meet ideal conjunction of infrastructure connections provided by the Wanapa site, which include: 1) access to the BPA transmission grid; 2) access to a nearby allocated water supply; 3) access to a nearby natural gas supply source; 4) a suitable option for secondary uses of cooling system blowdown wastewater; and 5) proximity to the interstate highway system, nearby railroad service, and barge transportation on the Columbia River. Other siting factors included a rural location with a limited number of nearby residences, and the prior land use planning that promotes future industrial development near the Port of Umatilla.

Co-location of the Wanapa Energy Center with an existing power plant site was considered. It was concluded that no existing site would allow construction of a facility at the scale of the proposed project without raising new issues concerning air quality standards compliance for both the existing and new facilities.

None of these alternative sites would involve Indian trust land. Therefore, none would yield the socioeconomic benefits or the federal taxation advantages of the proposed site.

2.5.3 Alternative Natural Gas Supply/Wastewater Discharge Pipeline Routes

The project gas supply point (crossover point between the Northwest and PGT interstate pipelines at the Stanfield Compressor Station) provides the best option for obtaining gas from more than one supplier. Consequently, a direct connection with either of these pipelines alone is a less favorable option from economic and supply reliability perspectives. Because the gas supply location is fixed, there is a limited range of routing options between this supply point and the plant site. The four routes evaluated in addition to the proposed action gas pipeline route provide a range of geographic alternatives that can be compared for their relative environmental effects.

2.5.4 Water Supply Sources

Because of the very limited ground water resources in eastern Oregon, large water consumers must rely on the major surface water systems in the region, primarily the Columbia River. As indicated in the Proposed Action, the Port of Umatilla has an existing allocation from the Columbia River that can be withdrawn for municipal and industrial purposes. Unless the electric power generation

plant were moved to a different municipal/industrial intake point on the Columbia, there are no other existing approved water supply options capable of meeting the water requirements for a project of this size. An alternative considered was to establish a new water supply intake immediately north of the plant site. This alternative was rejected because of the potential new concerns related to migrating salmon, and the cost and operational requirements for a new water supply infrastructure that would have to be built within and next to the river.

2.5.5 Plant Wastewater Discharge Alternatives

A combination of agricultural application and infiltration basins was evaluated as an alternative to storage in Cold Springs Reservoir. This alternative was eliminated because of the need for new infrastructure to store water for infiltration, which would potentially consume productive land. There also is a concern about the disposal effectiveness of the infiltration basins because much of the area surrounding the plant site is underlain by many feet of basalt, which would impede downward percolation of applied water.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Land Resources

The following sections describe the affected environment for each primary natural and human resource component, and the environmental consequences of constructing and operating the project. In some instances, mitigation measures are recommended to reduce or avoid identified impacts. For purposes of this analysis, it is assumed that the Wanapa Energy Center Applicants will apply for, and receive state and federal approvals that require submittal of certain applications and associated environmental protection plans. A list of these approvals is contained on **Tables 1.3-1** and **1.4-1**. Some of the mitigation measures included in this EIS provide guidance on needed information, or applicant commitments in applications to various agencies.

3.1.1 Affected Environment

3.1.1.1 Geology and Geologic Hazards

The Draft EIS prepared for the Umatilla Generating Project (BPA 2001) provides a comprehensive summary of the underlying geology and geologic hazards for the vicinity of the McNary Substation on the Columbia River. As a consequence, this EIS tiers from the agency approved analysis contained in the Umatilla document. The following is a brief summary of the major findings of the Umatilla EIS:

- The region traversed by the Columbia River in eastern Oregon is underlain by deep (500 feet) deposits of basalt, a very erosion-resistant volcanic rock. Sands, silts, and gravels deposited by a massive flood, and lakes caused by debris dams in glacial times (13,500 to 15,000 years ago) occupy the surface of the basalt. These sands are currently developed for agriculture. Areas where the bedrock is exposed cannot be farmed because of a lack of soil.

- Four earthquakes with magnitudes on the Modified Mercalli Scale of V to VII (V = noticeable, but little structural damage; VII = some structural damage in poorly built or badly designed structures) have been recorded since 1872.

- No soil-related instability, landslides, ground-shaking, liquefaction, surface rupture, or subsidence hazards were identified that would require special structural design considerations

beyond those included in the Oregon Structural Specialty Code. The risk to facilities from ash falls from a volcanic event was considered very low.

3.1.1.2 Soils

Soil types within the project area were identified using information in the NRCS soil survey for Umatilla County (Johnson and Makinson 1988). In total, 14 soil names and 27 soil units are present within the project study area. **Table 3.1-1** provides a summary of the soil unit characteristics including susceptibility to water erosion. **Figure 3.1-1** shows the location of the various soil units within the overall project study area; **Figure 3.1-2** illustrates the location of soil units in relation to project components between the plant site and McNary Substation.

Three soil units, Starbuck rock outcrop, Starbuck very fine sandy loam, and rock outcrop xeric torriorhents complex, contain bedrock in the form of basalt in the upper layers. The depth to bedrock varies from about 12 to 20 inches. The Starbuck soil units are located within the plant site and along portions of the natural gas supply/wastewater discharge pipeline and transmission line routes. The xeric torriorhents complex is located within the natural gas supply/wastewater discharge ROW for Alternatives 3 and 4. Two other units, Quincy rock outcrop complex and Adkins fine sandy loam, also contain bedrock at depths of about 40 to 60 inches. The Adkins fine sandy loam is located along the southern end of natural gas supply/wastewater discharge pipeline routes, while the Quincy rock outcrop complex is located along a portion of natural gas supply/wastewater discharge pipeline routes (Alternatives 1 and 2).

In general, most of the soil units are well drained and relatively dry most of the time. Two units, Adkins fine sandy loam (Units 3A and 3C) are wet due to seepage from canals and irrigation. Water is mainly present during the irrigation season.

Hazards associated with water and wind erosion vary for the soil units. In terms of water erosion, units exhibiting moderate rating include the Starbuck rock outcrop complex, Starbuck very fine sandy loam and Adkins fine sandy loam. Due to a prevalence of sand in many of the soil units, numerous soils are rated as high and very high wind erosion: Starbuck very fine sandy loam, Quincy fine sand, Quincy loamy fine sand (Units 75B and E), Wanser loamy sand, Winchester sand, and Burbank loamy fine sand. One or more of these soil units are located within the water supply pipeline route, natural gas supply/wastewater discharge pipeline routes, and electric transmission line routes.

Table 3.1-1
Summary of Soil Units

Map Symbol	Soil Units	Characteristics
1B	Adkins Fine Sandy Loam, 0 to 5 Percent Slopes	Deep, well-drained soil located on the terraces of the Columbia River. It consists of fine sandy loam that is generally used for irrigated crops or as rangeland. It has slight water erosion and moderate wind erosion hazard. It is considered prime farmland.
1C	Adkins Fine Sandy Loam, 5 to 25 Percent Slopes	Same as Unit 1B except slopes are greater. It has moderate water erosion and moderate wind erosion hazard.
2B	Adkins Fine Sandy Loam, Gravelly Substratum, 0 to 5 Percent Slopes	Deep, well-drained soil located on the terraces of the Columbia River. It consists of fine sandy loam in the upper 26 inches and very gravelly fine sandy loam in the lower part to about 60 inches. It has slight water erosion and moderate wind erosion hazard. It is considered prime farmland.
2C	Adkins Fine Sandy Loam, Gravelly Substratum, 5 to 25 Percent Slopes	Same as unit 2B except slopes are greater. It has moderate water erosion and moderate wind erosion hazard.
3A	Adkins Fine Sandy Wet Loam, 0 to 3 Percent Slopes	Deep, well-drained soil located in depressional areas on the terraces of the Columbia River. It consists of fine sandy loam that is used for irrigated crops, residential development, and wildlife. Wetness is caused by irrigation and canal seepage. It has slight water erosion and moderate wind erosion hazard.
3C	Adkins Fine Sandy Wet Loam, 3 to 15 Percent Slopes	Same as Unit 3A except slopes are greater. It has moderate water erosion and moderate wind erosion hazard.
14B	Burbank Loamy Fine Sand, 0 to 5 Percent Slopes	Deep, well-drained soil located on the terraces of the Columbia River. It consists of loamy sand that is generally used for irrigated crops, rangeland, residential development, and wildlife. It has slight water erosion and high wind erosion hazard.
23	Dune Land, 0 to 30 Percent Slopes	Deep, excessively drained soil on terraces that consist of fine sand, loamy sand, and sand. Uses include limited grazing and wildlife. It has slight water erosion and very high wind erosion hazard.
47B	Koehler Loamy Fine Sand, 0 to 5 Percent Slopes	Moderately deep and somewhat excessively drained soil on the Columbia River terraces. It consists of loamy fine sand about 13 inches thick over a hardpan. Uses include irrigated crops, pasture, residential development, and rangeland. It has slight water erosion and high wind erosion hazard.
74B	Quincy Fine Sand, 0 to 5 Percent Slopes	Deep, well-drained soil located on the terraces of the Columbia River. It consists of fine sand and loamy sand that is generally used for irrigated crops, rangeland, and residential development. It has slight water erosion and very high wind erosion hazard.
75B	Quincy Loamy Fine Sand, 0 to 5 Percent Slopes	Similar to Unit 74B except that it contains more loamy sand. It has slight water erosion and high wind erosion hazard.
75E	Quincy Loamy Fine Sand, 0 to 5 Percent Slopes	Similar to Unit 75B except that slopes are greater. It has slight water erosion and high wind erosion hazard.
76B	Quincy Loam Fine Sand, Gravelly Substratum, 0 to 5 Percent	Deep, excessively drained soil consisting of loamy fine sand and fine sand in the upper 37 inches and very gravelly fine sand from 40 to 60 inches. It is used for irrigated crops, pasture, residential development, and rangeland. It has slight water erosion and high wind erosion hazard.

Table 3.1-1 (Continued)

Map Symbol	Soil Units	Characteristics
78B	Quincy Rock Outcrop Complex, 1 to 20 Percent Slopes	This unit located on the terraces of the Columbia River contains about 50 percent fine sand and 20 percent rock outcrop. Depth to bedrock is about 40 to 60 inches. It is used for rangeland and wildlife. It has slight water erosion and very high wind erosion hazard.
85F	Rock Outcrop - Xeric Torriorhents Complex, 10 to 70 Percent Slopes	Soil is located on terrace scarps and foot slopes and consists of rock outcrop (about 50 percent) and fine sandy loam, silt loam, and rock fragments. Uses include rangeland and wildlife. It has high water erosion and high wind erosion hazard.
87B	Sagehill Fine Sandy Loam, 2 to 5 Percent Slopes	Deep, well-drained soil located on the terraces of the Columbia River. It consists of fine sandy loamy sand that is generally used for irrigated crops, rangeland, residential development, and wildlife. It has slight water erosion and moderate wind erosion hazard. It is considered prime farmland.
87C	Sagehill Fine Sandy Loam, 5 to 12 Percent Slopes	Same as Unit 87B except slopes are greater and it contains silt loam in lower substratum. It has moderate water erosion and moderate wind erosion hazard.
88C	Shano Very Fine Sandy Loam, 7 to 12 Percent Slopes	Deep, well-drained soil on terraces that consists of very fine sandy loam and silt loam. Uses include irrigated crops and rangeland. It has moderate water erosion and moderate wind erosion hazard.
88D	Shano Very Fine Sandy Loam, 12 to 25 Percent Slopes	Same as Unit 88C except slopes are greater. It has high water erosion and moderate wind erosion hazard.
89C	Shano Silt Loam, 7 to 12 Percent Slopes	Deep, well-drained soil on terraces that consists of coarse silt loam. Basalt is present at about 40 to 60 inches. Uses include irrigated crops and rangeland. It has moderate water erosion and moderate wind erosion hazard.
93B	Starbuck Fine Sandy Loam, 2 to 20 Percent Slopes	Shallow, well-drained soil located on the terraces of the Columbia River that consists of fine sandy loam and basal bedrock. Depth to bedrock is about 12 to 20 inches. It is used for pasture and rangeland, recreation, and wildlife. It has moderate water erosion and moderate wind erosion hazard.
94A	Starbuck Rock Outcrop Complex, 0 to 5 Percent Slopes	This unit located on the terraces of the Columbia River contains about 55 percent very fine sandy loam and 25 percent rock outcrop (exposed basalt). Depth to bedrock is about 12 to 20 inches. It is used for pasture and rangeland, recreation, and wildlife. It has moderate water erosion and moderate wind erosion hazard.
95B	Taunton Fine Sandy Loam, 1 to 7 Percent Slopes	Moderately deep, well drained soil on the terraces of the Columbia River that consists of fine sandy loam over a cemented hardpan. Depth to hardpan is about 20 to 40 inches. It is used for irrigated crops, rangeland, residential development, and wildlife. It has slight water erosion and moderate wind erosion hazard.
119A	Wanser Loamy Fine Sand, 0 to 3 Percent Slopes	Deep, poorly drained soil in depressional areas on terraces of the Columbia River that consists of loamy fine sand and fine sand. It is used for irrigated crops, rangeland, residential development, and wildlife. It has slight water erosion and high wind erosion hazard.

Table 3.1-1 (Continued)

Map Symbol	Soil Units	Characteristics
122B	Winchester Sand, 0 to 5 Percent Slopes	Deep, well drained soil on the terraces of the Columbia River that consists of sand loamy sand, and coarse sand. It is used for irrigated crops, rangeland, residential development, and wildlife. It has slight water erosion and very high wind erosion hazard.
123B	Winchester - Quinton Complex, 0 to 5 Percent Slopes	Soil consists of about 50 percent Winchester sand and 35 percent Quinton loamy fine sand. Basalt is at a depth of about 35 inches in Quinton unit. Uses include irrigated crops, rangeland, pasture, and wildlife. It has slight water erosion and high wind erosion hazard.
126A	Xerafluvents, 0 to 3 Percent Slopes	Deep, poorly drained soil on floodplains that consist of loamy sand, very cobbly loam, and gravelly loam. Uses include pasture and wildlife. It has slight water erosion and slight wind erosion hazard.

3.1.2 Environmental Consequences and Mitigation

3.1.2.1 Geology and Geologic Hazards

The proposed plant site would be located entirely on basalt bedrock, with almost no overlying soil. Other facilities (pipelines, transmission lines) would be installed in basalt bedrock, or sandy soils that are generally not saturated and subject to subsidence or liquefaction. A field reconnaissance of the pipeline routes indicates that the proposed pipeline and transmission line alignments cross gentle slopes (less than 20 percent) and no active landslide terrain is present near any proposed components within the study area.

3.1.2.2 Soil

Soil Erosion from Surface Water Runoff

As shown in **Table 3.1-2**, the majority of the soils occupy slopes of 5 percent or less and show a slight water erosion rating. When considering an annual precipitation of less than 10 inches, runoff potential and water erosion would be minor for most of the project study area. Small areas have slopes from 5 to 25 percent with a moderate water erosion rating, as listed below. These areas could exhibit moderate erosion during or immediately after storm events.

- Water Supply Line – Starbuck very fine sandy loam (2.6 acres);
- Natural Gas Supply/Wastewater Discharge Pipeline – Adkins fine sandy loam and Starbuck-rock outcrop (24.2 acres); and
- Electric Transmission Line - Starbuck very fine sandy loam (11.1 acres).

Construction of all project components would require measures for controlling soil erosion and sediment runoff. These measures would include:

- Temporary erosion and SWPPP (see Section 3.2, Water Resources, for additional information).

Legend

Number-Name

1B-Adkins Fine Sandy Loam, 0-5% slopes
1C-Adkins Fine Sandy Loam, 5-25% slopes
2B-Adkins Fine Sandy Loam, gravelly substratum, 0-5% slopes
2C-Adkins Fine Sandy Loam, gravelly substratum, 5-25% slopes
3A-Adkins Fine Sandy Loam, loamy wet, 0-3% slopes
3C-Adkins Fine Sandy Loam, loamy wet, 3-15% slopes
14B-Burbank Loamy Fine Sand, 0-5% slopes
DAM-Concrete Dam
23-Dune Land
47B-Koehler Loamy Fine Sand, 0-5% slopes
70-Pits, Gravel
74B-Quincy Find Sand, 0-5% slopes
75B-Quincy Loamy Fine Sand, 5-25% slopes
75E-Quincy Loamy Fine Sand, 5-25% slopes
76B-Quincy Loamy Fine Sand, gravelly substratum, 0-5% slopes
78B-Quincy-Rock Outcrop Com;lex, 1-20% slopes
85F-Rock Outcrop-Xeric Torriorthents Complex, 10-70% slopes
87B-Sagehill Fine Sandy Loam, 2-5% slopes
87C-Sagehill Fine Sandy Loam, 5-12% slopes
89C-Shano Silt Loam, 7-12% slopes
88D-Shano Very Fine Sandy Loam, 2-7% slopes
88B-Shano Very Fine Sandy Loam, 7-12% slopes
88C-Shano Very Fine Sandy Loam, 12-25% slopes
93B-Starbuck Very Fine Sandy Loam, 2-20% slopes
94A-Starbuck-Rock Outcrop Complex, 0-5% slopes
95B-Taunton Fine Sandy Loam, 1-7% slopes
119A-Wanser Loamy Fine Sand, 0-3% slopes
W-Water
122B-Winchester Sand, 0-5% slopes
123B-Winchester-Quinton Complex, 0-5% slopes
126A-Xerofluvents, 0-3% slopes

Natural Gas Supply/Waste Water Discharge Pipelines Route Alternatives

N W E S

0 2000 4000 Feet

Wanapa Energy Center EIS

Figure 3.1-1

Soils-Pipeline Route Alternatives

10/07/03

Columbia River
McNary Dam
McNary Substation
Two Rivers Correctional Institution
Proposed Plant Site
McNary
Legend
Number-Name
1B-Adkins Fine Sandy Loam, 0-5% slopes
1C-Adkins Fine Sandy Loam, 5-25% slopes
2B-Adkins Fine Sandy Loam, gravelly substratum, 0-5% slopes
2C-Adkins Fine Sandy Loam, gravelly substratum, 5-25% slopes
3A-Adkins Fine Sandy Loam, loamy wet, 0-3% slopes
3C-Adkins Fine Sandy Loam, loamy wet, 3-15% slopes
14B-Burbank Loamy Fine Sand, 0-5% slopes
DAM-Concrete Dam
70-Pits, Gravel
74B-Quincy Find Sand, 0-5% slopes
75B-Quincy Loamy Fine Sand, 5-25% slopes
75E-Quincy Loamy Fine Sand, 5-25% slopes
85F-Rock Outcrop-Xeric Torriorthents Complex, 10-70% slopes
93B-Starbuck Very Fine Sandy Loam, 2-20% slopes
94A-Starbuck-Rock Outcrop Complex, 0-5% slopes
95B-Taunton Fine Sandy Loam, 1-7% slopes
119A-Wanser Loamy Fine Sand, 0-3% slopes
W-Water
Electrical Transmission Line Route Alternatives
Lower Monumental-McNary Transmission Line Relocation
0 800 1600 Feet
Wanapa Energy Center EIS
Figure 3.1-2
Soils-Transmission Line Route Alternatives

10/10/03

Table 3.1-2
Acreage of Sensitive Soils for the Wanapa Energy Center Project
Proposed Action

Soil Series	Map Symbol	Slope	Total Acres	Water Erosion Hazard		Wind Erosion Hazard			Shallow -to- Bedrock	Rock in Subsoil	Prime Farmland
				Slight	Moderate	Moderate	High	Very High			
Plant Site											
Starbuck-rock outcrop	94a	0-5	47.0	0	47.0	47.0	0	0	47.0	47.0	0
Water Supply Pipeline											
Quincy loam fine sand	75e	5-25	6.4	6.4	0	0	6.4	0	0	0	0
Starbuck very fine sandy loam	93b	2-20	2.6	0	2.6	2.6	0	0	2.6	2.6	0
Starbuck-rock outcrop	94a	0-5	11.3	0	11.3	11.3	0	0	11.3	11.3	0
Water	--		<0.1	0	0	0	0	0	0	0	0
Total Acreage			67.3	6.4	60.9	60.9	6.4	0	60.9	60.9	0
Access Road											
Starbuck-rock outcrop	94a	0-5	4.3	0	4.3	4.3	0	0	4.3	4.3	0
Gas/Water Discharge Pipelines											
Adkins fine sandy loam	1b	0-5	29.2	29.2	0	29.2	0	0	0	0	29.2
Adkins fine sandy loam, wet	3a	0-3	8.5	8.5	0	8.5	0	0	0	0	0
Adkins fine sandy loam, wet	3c	3-15	1.4	0	1.4	1.4	0	0	1.4[1]	1.4[1]	
Quincy fine sand	74b	0-5	0.8	0.8	0	0	0	0.8	0	0	0
Quincy loamy fine sand	75b	0-5	7.1	7.1	0	0	7.1	0	0	0	0
Quincy loamy fine sand	75e	5-25	0.4	0.4	0	0	0.4	0.4	0	0	
Sagehill fine sandy loam	87b	2-5	2.3	2.3	0	2.3	0	0	0	0	2.3
Starbuck-rock outcrop	94a	0-5	22.8	0	22.8	22.8	0	0	22.8	22.8	0
Taunton fine sandy loam	95b	1-7	3.8	3.8	0	3.8	0	0	0	0	0
Wanser loamy fine sand	119a	0-3	15.6	15.6	0	0	15.6	0	0	0	0
Winchester sand	122b	0-5	28.3	28.3	0	0	0	28.3	0	0	
Total Acreage			120.2	96.0	24.2	68.0	22.7	29.5	24.2	24.2	31.5
Electric Transmission Route											
Adkins fine sandy loam	1b	0-5	14.6	14.6	0	14.6	0	0	0	0	14.6
Adkins fine sandy loam, wet	3a	0-3	22.9	22.9	0	22.9	0	0	0	0	0
Burbank loamy fine sand	14b	0-5	1.3	1.3	0	0	1.3	0	1.3	1.3	0
Quincy loamy fine sand	75e	5-25	3.4	3.4	0	0	3.4	0	0	0	0
Starbuck very fine sandy loam	93b	2-20	11.1	0	11.1	11.1	0	0	11.1	11.1	0
Starbuck-rock outcrop	94.a	0-5	26.2	0	26.2	26.2	0	0	26.2	26.2	0
Water	--	--	1.6	--	--	---	--	--	--	--	--
Total Acreage			81.1	42.2	37.3	74.8	4.7	0	38.6	38.6	14.6

[1]Bedrock possible in some areas at depths of 40 to 60 inches.

- Permanent erosion control measures such as waterbars and rock-lined drainages would be installed after construction of all project components within native plant communities.

- All disturbed areas would be revegetated and restored as part of the SWPPP.

By implementing erosion control measures, surface runoff and erosion rates would be comparable to undisturbed soils.

Recommended Mitigation Measures. No mitigation measures are required beyond the SWPPP measures to reduce erosion impacts.

Wind Soil Erosion

Surface disturbance due to construction activities can contribute to wind erosion effects on soils. Soil texture, soil moisture, topography, climatic conditions, vegetative cover, and the extent and duration of surface disturbance affect wind erosion rates. The periods of highest winds in this portion of Oregon usually occur in October to November and January to April. However, high winds can occur throughout the year within this region. As shown in **Table 3.1-2**, moderate to very high wind erosion hazards exist within all project components due to an abundance of sandy soils. The following project components have high or very high wind erosion ratings. The location of these areas is shown in **Figure 3.1-1**.

- Water Supply Line – 6.4 acres of high wind erosion soils.

- Natural Gas Supply/Wastewater Discharge Pipeline Route – 22.7 acres of high wind erosion and 29.5 acres of very high wind erosion.

- Electric Transmission Line – 4.7 acres of high wind erosion.

Project-committed measures would be implemented to control or reduce wind soil erosion, involving revegetation and restoration of disturbed areas as required in the SWPPP. By implementing erosion control practices, wind erosion effects on soils would be reduced. However, surface disturbance along portions of the natural gas supply/wastewater discharge pipeline Proposed Action route would still have potential to exhibit wind erosion until the ROW is reclaimed.

Recommended Mitigation Measures. The following measures would be implemented to reduce wind erosion effects on soils.

S-1: Restrict construction traffic to the defined ROW.

S-2: Restrict the pipeline construction ROW width to 75 feet in the Wanser loamy fine sand and Winchester sand units where the natural gas supply/wastewater discharge pipeline route crosses native vegetation communities.

S-3: Use measures such as topsoil matting, planting of cover crops, or soil binder in the Wanser loamy fine sand and Winchester sand units along the southern portion of the natural gas supply/wastewater discharge pipeline routes to reduce wind erosion.

Potential Reductions in Agricultural Productivity

Construction of the natural gas supply/wastewater discharge pipelines would require grading, excavations, trenching, and backfilling. The mixing of topsoil with less productive subsoil horizons during these activities could affect soil productivity. Two areas along the Proposed Action natural gas supply/wastewater discharge pipeline route contain prime farmland soil (29.2 acres of Adkins fine sandy loam and 2.3 acres of Sagehill fine sandy loam). Other soils in the project area are used for rangeland and irrigated crops, but they are not classified as prime farmland.

Recommended Mitigation Measures. The following measures would be used to minimize effects of soil disturbance on agricultural productivity.

S-4: Segregate the stripped topsoil separately from the trench spoil;

S-5: Remove all excess large-size rock from the upper 12 inches of the soil to the extent practical in agricultural and residential areas.

Rock Management

The presence of basalt outcrops in the construction areas would require engineering decisions on the method of removal (blasting, cutting, etc.) and where to place the rock after construction is

completed. As shown in **Table 3.1-2**, shallow bedrock is present in all project components due to the Starbuck rock outcrop and Starbuck very fine sandy loam soil units.

Recommended Mitigation Measures: The following measure would be used to ensure that excess rock is not left on the soil surface where it would interfere with plant growth.

S-6: Excess pipeline trench rock would be placed in a landowner-approved location.

3.1.3 Impact Summary

The effects of project construction and facility siting and operation on geology would be minor. No geologic hazards such as subsidence, faults, or soil liquefaction occur within or near project component study areas. The prevalence of relatively gentle slopes in the project study area indicates that there is no landslide hazard.

Potential impacts of constructing the project components would include soil disturbance, increased water and wind erosion, reduced agricultural productivity, and management of rock present in excavation areas. Project construction would result in a temporary disturbance to soils, particularly associated with the gas supply/water discharge pipelines. By implementing the SWPPP and reclamation, water erosion would be minimized and returned to pre-construction conditions. The effects of soil erosion from wind would be reduced to pre-construction conditions by implementing mitigation to control dust, reduce traffic use and stabilize soil surfaces in highly erodible areas. Construction of the gas supply/water discharge pipelines would result in temporary disturbance to 32 acres of prime farmland. However, topsoil and rock management mitigation measures would ensure that effects would be short-term and minor. The presence of rock would require engineering decisions on removal and rock disposal, particularly for the plant site and gas supply/water discharge pipelines. The construction techniques and disposal methods would be designed to minimize effects on other environmental resources.

3.2 Water Resources (Surface Water and Groundwater Quantity and Quality)

3.2.1 Affected Environment

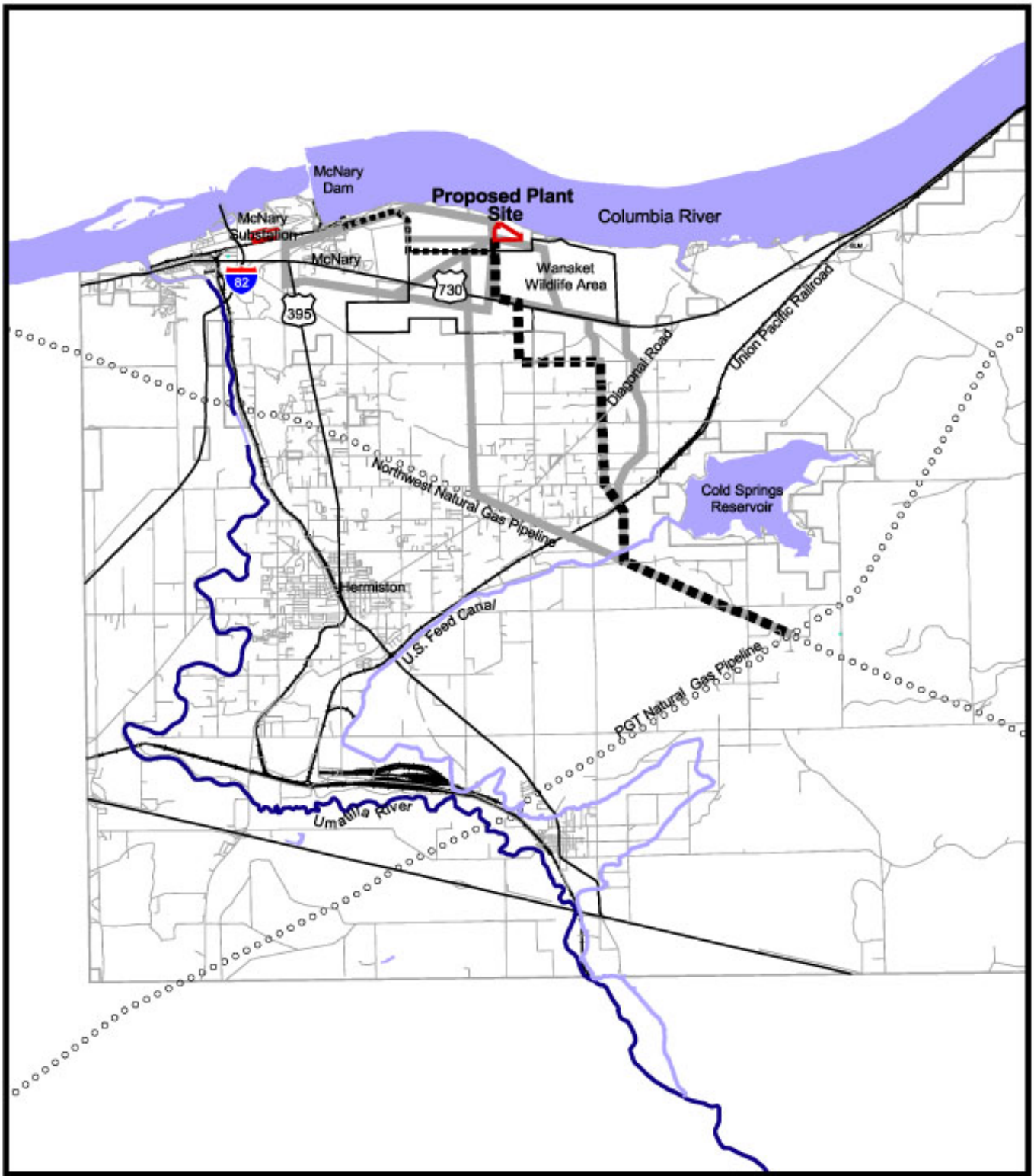
3.2.1.1 Surface Water

Regional Hydrology

The proposed generating plant site lies directly adjacent to the south bank of the Columbia River, the region's dominant surface water feature. The project site is located on a bluff overlooking the Columbia River approximately 2 miles east of McNary Dam, which is operated by the USACE for hydroelectric power. The Umatilla River is located approximately 4 miles west of the plant site and flows into the Columbia River at the City of Umatilla. The plant site is located within a small closed subbasin that includes the Wanaket Wildlife Management Area immediately south and east. The subbasin is adjacent to the Columbia-Umatilla plateau hydrologic subbasin of the Umatilla River, which is to the south and west. **Figure 3.2-1** illustrates the surface hydrologic system that includes the Columbia and Umatilla rivers.

The Columbia River discharges an average of approximately 191,000 cfs at McNary Dam which is located 2 miles to the west of the proposed plant site. Flow in the Columbia River and discharge at the dam vary seasonally and year-to-year. High flows usually occur from April to June and range from 350,000 cfs to 600,000 cfs. Low flows occur from August to November and range from 65,000 cfs to 85,000 cfs.

Cold Springs Reservoir is located approximately six miles southeast of the proposed plant site and six miles northeast of Hermiston, Oregon, off State Road 207. This reservoir is operated by the Hermiston Irrigation District (HID) and is part of the BOR's Umatilla Reclamation Project. The original Umatilla Reclamation Project was initiated by the BOR in 1905 to supply full or supplemental irrigation water to approximately 34,000 acres of agricultural land in north central Oregon. The East Division of the Umatilla Reclamation Project is the HID and consists of Cold Springs Dam and Reservoir (constructed in 1908), Feed Canal Diversion Dam and Canal and Maxwell Diversion Dam and Canal. The Feed Canal Diversion Dam is located on the Umatilla River, approximately 1.5 miles southeast of Echo, Oregon. The dam raises the water level in the riverbed to provide diversion into the 25-mile-long Feed Canal (maximum operational capability of 220 cfs per second). The Feed Canal conveys river water to the Cold Springs Reservoir.



Legend

Natural Gas and Water Discharge Pipelines

Water Supply Pipeline

N W E S

0 4000 8000 Feet

Wanapa Energy Center EIS

Figure 3.2-1

Surface Water Systems

08/25/03

Diversion continues throughout the winter and spring months until June when diversion and flow in the canal are ended. Water is released from the reservoir for irrigation use throughout the summer and early autumn months. The reservoir has a total active capacity of 44,600 acre-feet, a normal storage capacity of 38,000 acre-feet for irrigation, 1,530 acres of water surface, and 12 miles of shoreline. During the summer and fall months, water is discharged for irrigation use and flows through canals to agricultural areas. Irrigation drain water is collected in drain canals and ultimately returns to the Umatilla River near Hermiston.

Activities were initiated in the mid-1980s under the Umatilla Basin Project to restore instream flows in the Umatilla River for anadromous fish but maintain irrigation water for continued use. These activities included channel modifications, construction of fish ladders, fish traps and fish screens and construction of water exchange facilities to deliver irrigation replacement water from the Columbia River. The Columbia River Pumping Plant was built on the Columbia River just downstream of the Sand Station Recreation Area and the Columbia-Cold Springs Canal was constructed to convey water from Lake Wallula, which is created by McNary Dam, to Cold Springs Reservoir.

Local Hydrology

The proposed power plant site is currently undeveloped and has no defined natural drainage channels or subbasin outlets. The site is located on a bluff overlooking the Columbia River with an approximate height of 160 feet above normal river level. The area is considered semi-arid, receiving 8 to 10 inches of rainfall annually with most precipitation occurring between October and April. The site is relatively flat with thin but permeable soils – normal precipitation would percolate into the ground or evaporate. Excessive volumes of run-off would probably enter the Wanaket Wildlife Management Area and accumulate in wetland ponds.

Surface Water Quality

Oregon DEQ's 2002 303(d) list identifies Oregon waterbodies that are impaired and not meeting state water quality standards. The section of the Columbia River above McNary Dam is on the 2002 303(d) list for exceeding temperature standards in the summer – it is not listed for any other parameter. Cold Springs Reservoir does not appear on the Oregon DEQ's 2002 303(d) list. Several sections of the Umatilla River appear on the 2002 303(d) list. The impairment parameters listed are dissolved oxygen, iron, and manganese.

Samples from the Columbia River were collected at the Port of Umatilla's intake in January and February 2002 and June 2003 and analyzed for critical parameters. **Table 3.2-1** presents this data and applicable Oregon water quality standards. Samples of Cold Springs Reservoir were collected in August 2003 and analyzed. Data associated with water quality standards are presented in **Table 3.2-2**. It is assumed that water in Cold Springs Reservoir is a combination of Columbia River water, Umatilla River water, and surface run-off.

Surface Water Management

Flows in all major rivers, reservoirs and other drainages are extensively managed. Most surface water in the Umatilla Basin is appropriated for agricultural use. The Columbia River is utilized for a variety of beneficial uses including hydropower, irrigation, recreation, water supply, navigation and fish and wildlife use. Oregon and Washington have a moratorium currently in place on granting new water rights, except under certain conditions.

The Port of Umatilla diverts water from the Columbia River into the regional water supply system under an existing municipal water use permit from the State of Oregon (Permit No. 49497, 1979). This permit is currently under an extension application, which would extend the permit date. The Port of Umatilla's raw water system serves the City of Hermiston and industrial users in northwestern Umatilla County. Committed uses (prior to this proposed project) represent a total of 23.4 cfs from a total water right of 155 cfs. The Port's intake system is located at the Port of Umatilla Dock (RM 293 in the Columbia River), upstream of the boat launch ramp above McNary Dam. The intake was built in 1995 and consists of four intake bays, three of which currently house pumps and discharge piping. Intake bays are screened (0.125 mesh) and are designed for 0.4 cfs approach velocities. Actual withdrawal rates vary, depending on seasonal and operational water demand.

3.2.1.2 Groundwater

The proposed project area is underlain by Columbia River basalt with a confined "deep" aquifer. Groundwater flow is indicated to be generally from south to north, toward the Columbia River. Other areas of central Oregon, to the west and south, have been designated "critical groundwater areas" due to extensive withdrawals and subsequent impacts to groundwater availability and quality. Many aquifers have been extensively used for irrigation which, due to slow recharge, has

Table 3.2-1
Water Quality Sampling Results for the Columbia River
(Winter and Spring) and Comparisons with Water Quality Standards

Analytes	Units	Average of Detected Analytes Winter 2001-2002	Average of Detected Analytes Spring 2003	Average of Detected Analytes Winter and Spring	Lowest Applicable Aquatic Life Water Quality Standard
Total Recoverable Aluminum - Al	ug/L	131	300	215	
Dissolved Aluminum - Al	ug/L	NA	9.3	9.3	
Total Recoverable Antimony - Sb	ug/L	0.144	0.143	0.143	
Dissolved Antimony - Sb	ug/L	NA	0.136	0.136	1,600 [1]
Total Recoverable Arsenic - As	ug/L	1.09	0.95	1.02	
Dissolved Arsenic - As	ug/L	NA	0.78	0.78	
Total Recoverable Barium - Ba	ug/L	27.3	20.0	23.7	
Dissolved Barium - Ba	ug/L	NA	17.5	17.5	
Total Recoverable Beryllium - Be	ug/L	0.007	0.023	0.015	
Dissolved Beryllium - Be	ug/L	NA	<0.020	<0.020	5.3 [1]
Total Recoverable Boron - B	ug/L	13.60	6.18	9.89	
Dissolved Boron - B	ug/L	NA	5.9	5.9	
Total Recoverable Cadmium - Cd	ug/L	0.014	0.019	0.017	
Dissolved Cadmium - Cd	ug/L	NA	0.008	0.008	1.1 [1]
Total Recoverable Chromium - Cr	ug/L	0.26	0.19	0.23	
Dissolved Chromium - Cr	ug/L	NA	<0.07	<0.07	
Total Recoverable Cobalt - Co	ug/L	0.10	0.17	0.14	
Dissolved Cobalt - Co	ug/L	NA	<0.05	<0.05	
Total Recoverable Copper - Cu	ug/L	1.28	1.60	1.44	
Dissolved Copper - Cu	ug/L	NA	1.04	1.04	12 [1]
Total Recoverable Iron - Fe	ug/L	162	276	219	
Dissolved Iron - Fe	ug/L	NA	8.1	8.1	1,000 [1]

Table 3.2-1 (Continued)

Analytes	Units	Average of Detected Analytes Winter 2001-2002	Average of Detected Analytes Spring 2003	Average of Detected Analytes Winter and Spring	Lowest Applicable Aquatic Life Water Quality Standard
Total Recoverable Lead - Pb	ug/L	0.174	0.663	0.419	
Dissolved Lead - Pb	ug/L	NA	0.141	0.141	3.2 [1]
Total Recoverable Lithium - Li	ug/L	3.92	2.08	3.00	
Dissolved Lithium - Li	ug/L	NA	1.79	1.79	
Total Recoverable Manganese - Mn	ug/L	7.34	15.73	11.54	
Dissolved Manganese - Mn	ug/L	NA	0.93	0.93	
Total Recoverable Mercury - Hg	ug/L	0.0023	0.0019	0.0021	
Dissolved Mercury - Hg	ug/L	NA	0.00056	0.00056	0.012 [1]
Total Recoverable Molybdenum - Mo	ug/L	0.97	0.63	0.80	
Dissolved Molybdenum - Mo	ug/L	NA	0.64	0.64	
Total Recoverable Nickel - Ni	ug/L	0.22	0.11	0.16	
Dissolved Nickel - Ni	ug/L	NA	<0.04	<0.04	160 [1]
Total Recoverable Selenium - Se	ug/L	0.146	<0.30	0.146	
Dissolved Selenium - Se	ug/L	NA	<0.30	<0.30	35 [1]
Total Recoverable Silver - Ag	ug/L	0.002	<0.015	0.002	
Dissolved Silver - Ag	ug/L	NA	<0.015	<0.015	0.12 [1]
Total Recoverable Strontium - Sr	ug/L	107	65.0	86.0	
Dissolved Strontium - Sr	ug/L	NA	65.7	65.7	
Total Recoverable Thallium - Th	ug/L	0.026	<0.020	0.026	
Dissolved Thallium - Th	ug/L	NA	<0.020	<0.020	40 [1]
Total Recoverable Tin - Sn	ug/L	0.03	<0.10	0.03	
Dissolved Tin - Sn	ug/L	NA	<0.10	<0.10	
Total Recoverable Titanium - Ti	ug/L	7.08	19.8	13.46	
Dissolved Titanium - Ti	ug/L	NA	12.0	12.0	

Table 3.2-1 (Continued)

Analytes	Units	Average of Detected Analytes Winter 2001-2002	Average of Detected Analytes Spring 2003	Average of Detected Analytes Winter and Spring	Lowest Applicable Aquatic Life Water Quality Standard
Total Recoverable Tungsten - W	ug/L	0.07	0.04	0.06	
Dissolved Tungsten - W	ug/L	NA	0.039	0.039	
Total Recoverable Vanadium - V	ug/L	1.77	1.60	1.69	
Dissolved Vanadium - V	ug/L	NA	1.10	1.10	
Total Recoverable Zinc - Zn	ug/L	1.77	3.65	2.71	
Dissolved Zinc - Zn	ug/L	NA	1.21	1.21	110 [1]
Alkalinity as $CaCO_3$, Total	mg/L	75	45	60	20 [2]
Ammonia as Nitrogen	mg/L	0.05	0.07	0.06	
Bicarbonate as $CaCO_3$	mg/L	75	45	60	
Biochemical Oxygen Demand (BOD)	mg/L	<4	<4	<4	
Calcium	mg/L	22.4	13	17.7	
Carbonate as $CaCO_3$	mg/L	<2	<2	<2	
Chemical Oxygen Demand (COD)	mg/L	<5	9	9	
Chloride	mg/L	3.8	1.6	2.7	230 [1]
Conductivity	umhos/cm	194	103	149	
Fecal Coliform	MPN/100 ml	9	6	8	
Fluoride	mg/L	<0.2	<0.2	<0.2	
Magnesium	mg/L	6.63	4	5.07	
Nitrate as Nitrogen	mg/L	0.4	<0.1	0	
Nitrite as Nitrogen	mg/L	<0.1	<0.1	<0.1	
Nitrogen, Total Kjeldahl (TKN)	mg/L	0.2	0.1	0.2	
Nitrogen, Total Organic	mg/L	0.15	0.1	0.13	
Oil and Grease	mg/L	<5.0	<5.0	<5.0	
Orthophosphate as Phosphorus	mg/L	0.03	0.01	0.02	

Table 3.2-1 (Continued)

Analytes	Units	Average of Detected Analytes Winter 2001-2002	Average of Detected Analytes Spring 2003	Average of Detected Analytes Winter and Spring	Lowest Applicable Aquatic Life Water Quality Standard
Orthophosphate as Phosphorus, Filtered	mg/L	0.02	0.01	0.01	
pH	pH units	7.95	7.8	7.86	7 - 8.5 [3]
Phenolics, Total	mg/L	<0.01	<0.01	<0.1	2.56 [1]
Phosphorus, Total	mg/L	0.03	0.04	0.04	
Phosphorus, Total Dissolved	mg/L	0.04	0.02	0.03	
Potassium	mg/L	<2.0	<2.0	<2.0	
Silica, Reactive Dissolved	mg/L	3.95	8.9	6.42	
Silicon, Filtered	mg/L	11.8	7.72	9.7	
Silicon, Total	mg/L	6.26	15.74	11.00	
Sodium	mg/L	8.51	4.14	6.33	
Sulfate	mg/L	15.8	7.6	11.7	
Total Dissolved Solids (TDS)	mg/L	101	72	87	
Total Organic Carbon	mg/L	1.1	2.3	1.7	
Total Suspended Solids (TSS)	mg/L	9	8.5	8.8	
Turbidity	NTU	2.3	6.4	4.4	

[1]Protection of Aquatic Life - Fresh Chronic Criteria.
[2]Standard is for minimum alkalinity.
[3]ORS 468 - Umatilla Basin - 340-041-0645 2 (d) (A).

NA = data not available/analysis not conducted.

Table 3.2-2
Comparison of Cold Springs Reservoir Water Quality with Estimated Effluent Quality

Analyte	Units	Reservoir (average)	Estimated Effluent	Lowest Applicable Aquatic Life Water Quality Standard
Total Recoverable Antimony – Sb	µg/l	0.112	0.700	
Dissolved Antimony – Sb	µg/l	0.114		1,600
Total Recoverable Beryllium – Be	µg/l	0.033	0.042	
Dissolved Beryllium – Be	µg/l	0.025		5.3
Total Recoverable Cadmium – Cd	µg/l	0.014	0.074	
Dissolved Cadmium – Cd	µg/l	>0.008		1.1
Total Recoverable Copper – Cu	µg/l	2.03	5.80	
Dissolved Copper – Cu	µg/l	1.05		12
Total Recoverable Iron – Fe	µg/l	979	685	
Dissolved Iron – Fe	µg/l	19.7		1,000
Total Recoverable Lead – Pb	µg/l	0.511	0.800	
Dissolved Lead – Pb	µg/l	0.016		3.2
Total Recoverable Mercury – Hg	µg/l	0.00193	0.00160	
Dissolved Mercury – Hg	µg/l	0.00054		0.012
Total Recoverable Nickel – Ni	µg/l	0.65	1.50	
Dissolved Nickel - Ni	µg/l	0.09		160
Total Recoverable Selenium – Se	µg/l	0.45	7.00	
Dissolved Selenium – Se	µg/l	0.42		35
Total Recoverable Silver – Ag	µg/l	0.020	0.011	
Dissolved Silver – Ag	µg/l	0.017		0.12

Table 3.2-2 (Continued)

Analyte	Units	Reservoir (average)	Estimated Effluent	Lowest Applicable Aquatic Life Water Quality Standard
Total Recoverable Thallium – Th	µg/l	0.191	0.074	
Dissolved Thallium - Th	µg/l	0.172		40
Total Recoverable Zinc – Zn	µg/l	2.33	8.9	
Dissolved Zinc - Zn	µg/l	0.13		110
Alkalinity	mg/l	78	188	20[1]
Chloride	mg/l	9.8	20.0	230
pH	S.U.	9.12	7.5-8.5	7 – 8.5
Phenolics	mg/l	0.01	0.053	2.56

[1]Minimum concentration.

resulted in rapidly dropping water levels for the last forty years. The project site is not located in one of the state's critical groundwater areas. Groundwater may be initially encountered at 75 to 100 feet below ground surface.

3.2.2 Environmental Consequences and Mitigation

3.2.2.1 Surface Water

Water Diversion from the Columbia River

Water for the proposed project would be supplied by the Port of Umatilla's regional water supply system. Under an existing water right, the Port of Umatilla pumps water from the Columbia River to various municipal, industrial and agricultural users. A pump would be added to the existing intake structure and a pipeline would be constructed to convey water to the proposed project.

Maximum average water demand at the proposed project would be 23.2 cfs. Average annual water demand would be 17 cfs.

Flow in the Columbia River is usually in the range of 65,000 to 85,000 cfs during the low flow period in the fall. The water diverted for this project would represent approximately 0.03 percent of river flow during low flow periods. The percentage diverted would be considerably lower in high flow periods. Because the Columbia River is extensively dammed, peak flows are reduced and low flows are increased which means river flow does not fluctuate as much. The lowest flow recorded in recent years was 48,000 cfs in 1977. Even if this extremely low flow period occurred again, the maximum rate of water diverted for this project would represent 0.05 percent of overall river flow.

Several species of fish in the Columbia River are listed under the ESA. Fish populations are at less than one-third of historic numbers. The Tribes' treaty reserved right to fish is negatively impacted, eroding the Tribes' culture, impacting the health of Tribal members, and violating their treaty rights. The proposed project is designed to avoid an overall negative impact on fish that results from adding to new cumulative depletions of Columbia River in-stream flows. The project achieves this goal by using only existing water rights and mitigation.

The small change in river flow due to the proposed project would not reduce beneficial uses of the river or water quality. Beneficial uses include hydropower generation, navigation, municipal and

industrial supply, agricultural use and protection of fish and wildlife. There would be no effect on downstream water users and no measurable reduction in water levels. River water quality also would not be affected by this amount of withdrawal.

The proposed power plant would be designed with a number of components and systems incorporating water re-use and reduced water consumption. The plant would incorporate a recirculating cooling system that includes cooling towers with high-efficiency drift eliminators. The cooling system would be operated at the highest level of cycles possible without jeopardizing system components, which reduces the volume of raw water required as makeup. All wastewater streams generated within the facility would be routed to the cooling system as makeup to reduce the volume of raw water required.

Recommended Mitigation Measures: No measures beyond those included in the proposed project are recommended.

Wastewater Discharge to Cold Springs Reservoir

The proposed facility would generate wastewater that is primarily comprised of cooling tower blowdown. The plant also would generate small quantities of process wastewater, sanitary sewage and storm water. Process wastewater would include boiler blowdown, filter backwash, residual streams from water treatment processes and washwater. Process wastewater would be piped to the cooling system as makeup, which will reduce the quantity of raw water required.

Cooling system blowdown consists primarily of raw water that has been subjected to a heat load and undergone evaporation of most of the water to the atmosphere. When the water is evaporated off, the dissolved solids that were present are left behind. Thus, the concentration of dissolved ions increases proportionately with the number of "cycles" at which the system operates. The higher the number of cycles means the lower the volume of blowdown and the lower the rate of makeup addition that is required. If a system is operated at six cycles, then the concentration of dissolved solids in the blowdown will be multiplied approximately six times that of the raw water concentration. The efficiency of the cooling system and its associated cost of operation are determined by the number of cycles.

Columbia River water is considered good quality makeup – typically, total dissolved solids concentrations are approximately 100 milligrams per liter (mg/l). The cooling system would be

designed to operate at six cycles – as a result, dissolved ion concentrations in the blowdown would be approximately six times the concentrations in the raw water. Temperatures of the wastewater discharge would be controlled within the range of 70 to 75°F.

Very small quantities of water treatment chemicals would be added to the cooling system for corrosion protection, deposit control, pH control and prevention of microbiological growth. These chemicals will include sulfuric acid, sodium hypochlorite (bleach solution), and mixtures of inorganic phosphates, organic phosphates and polymers. All of these chemicals are regarded as non-toxic in the quantities to be used. Feed rates are usually in the range of 1 to 20 parts per million (ppm) and concentrations in the final blowdown are considerably lower due to chemical reactions, evaporation, and absorption onto suspended solids and system surfaces.

Plant discharge rates would average 1.8 million gallons per day (mgd) or 2.8 cfs with a maximum flow rate of 2.4 mgd or 3.7 cfs. Plant discharge water would be conveyed to Cold Springs Reservoir via a 9-mile pipeline – it would discharge into the end of the Feed Canal immediately upstream of the reservoir. During the months of November through June, water from the Umatilla River also would be flowing in the canal and would mix with plant effluent before entering the reservoir. The maximum flow rate of 3.7 cfs would represent 1.7 percent of the maximum flow capacity of the Feed Canal. During the remainder of the year, plant effluent would be the only flow in the canal. During the summer months, water level in the reservoir is drawn down for agricultural use – as the water level approaches very low volume, water quality in the reservoir decreases due to wind effect on shallow areas, sediment interaction, biological growth and higher turbidity. Even at the reservoir's lowest or "dead pool" level of approximately 6,600 acre-feet, the average inflow of plant discharge water would represent an incremental addition of 0.08 percent of the total reservoir volume on a daily basis. Under normal operating circumstances, the volume of plant discharge would have minimal effect on reservoir water quality and would supplement the volume of stored water for irrigation use.

The Cold Springs Reservoir was sampled in August 2003 to collect information on existing water quality in the reservoir and enable an initial evaluation of the potential impact of the plant's discharge. At the time of sampling, the level of the reservoir had been drawn down very low due to summer withdrawals for irrigation. Columbia River water was being added to the reservoir at the time of sampling to supplement available water. It is expected that water quality in the reservoir would be poorest during the late summer and early autumn months when the level is at its lowest. Six locations were sampled on the reservoir and the results of these samples were averaged and

compared with the estimated effluent quality. Of particular interest were the parameters that have water quality standards associated with aquatic life beneficial use (see **Table 3.2-2**).

In evaluating metals concentrations, it was found that in most locations, most metals concentrations were slightly to somewhat higher in the effluent than in the reservoir. For several metals such as iron, mercury and silver, concentrations in the effluent are estimated to be lower than existing concentrations in the reservoir. No metals concentrations in either the reservoir or the effluent approach any applicable water quality standard. Recoverable metals concentrations were compared to the water quality standards which are expressed as dissolved metals concentrations; this represents a more conservative and protective analysis since dissolved concentrations are almost always less than recoverable concentrations. Because the reservoir appears to exceed the water quality standard for pH at this time of year, the addition of the effluent should help reduce the pH and bring the reservoir pH closer to the standard.

Organic compounds were not specifically analyzed. However, total phenolic compounds were analyzed at all locations at the reservoir and were estimated for the plant effluent. Total phenolic compounds can often be an indicator of the presence of other significant organic compounds. The average concentration of phenolics in the reservoir was 0.01 microgram per liter (µg/l); the estimated concentration in the plant effluent is 0.053 µg/l. The applicable water quality standard (chronic criterion) is 2.56 µg/l. The concentrations in the reservoir and effluent represent very low levels of organic compounds. The plant operation will not add any organic compounds.

Because participants in the Wanapa Energy Center have requested to deliver water to the Cold Springs Reservoir, a federal irrigation project administered by the BOR, the BOR must decide whether to accept this water in conjunction with existing uses and rights pertaining to this reservoir. The USFWS administers the Cold Springs Reservoir National Wildlife Refuge, which includes the reservoir surface area and adjacent lands. The ongoing management for waterfowl, fisheries, and threatened and endangered species will be considered in the BOR decision.

The discharge to the reservoir would be permitted under the NPDES program, administered by USEPA Region 10. An application would be developed and submitted to USEPA with a copy to the Oregon DEQ. USEPA would have primary authority for review and approval of the permit since the proposed plant is on tribal trust land. The application would include detailed information on plant processes and water treatment, estimated effluent quality and the water quality status of Cold Springs Reservoir. It would be demonstrated that the addition of the effluent to the reservoir

would not significantly impact water quality in the reservoir. Preliminary evaluation of estimated water quality data indicates that water quality standards can be maintained. **Table 3.2-3** shows estimated concentrations of various parameters in the plant effluent after 6 cycles of concentration based on analysis of raw water. No parameters exceed a state water quality standard. However, if it is determined that effluent quality can significantly impact water quality in the reservoir in some other way, the plant effluent would be treated adequately before discharge to maintain water quality standards in the reservoir.

The NPDES permit, issued by USEPA, would include specific requirements for monitoring the plant effluent and mass/concentration limits for particular parameters. These limits would be imposed for any parameter that might prevent the attainment of a water quality standard applicable to the reservoir. Results of monitoring would be reported to the USEPA and Oregon DEQ on a monthly basis. Since the plant effluent would be strictly monitored for potential impacts under the NPDES permit, no significant adverse effect on surface water quality would occur.

Recommended Mitigation Measures. No measures beyond those included in the proposed project are recommended.

Construction Storm Water Management

Construction of the power plant, pipelines, and transmission lines would require disturbance of soils and could result in transport of sediment during rain events. This potential transport of sediment and water could enter nearby drainages or wetlands and cause an adverse effect on surface water quality. The potential is somewhat limited due to the relative flatness of the terrain and existing vegetation, which could slow or stop sediment movement. However, in construction areas immediately adjacent to surface water drainages or wetlands, there would be increased potential for affecting storm water quality.

Construction activities utilize vehicles, equipment, chemicals and oils in conducting day-to-day project construction. The use of these components can sometimes result in leaks or spills to the ground, which could potentially cause surface water contamination. In addition, a construction site would have chemical toilets in various locations available for use by the construction crews. Although highly unlikely, the chemical toilets can develop leaks, which could potentially result in contamination of surface water, especially during storm events.

Table 3.2-3
Estimated Quality of the Plant Discharge for Six Cycles of Concentration

	Average of Raw Water Sampling Results (Samples Collected 12/21/01, 1/9/02, 1/17/02 from Columbia River)	**Average Concentration[1]**	**Maximum Concentration[1]**
Discharge Temp. °F[2]		**70**	**96**
Plant Makeup, MGD		**11**	**15**
Plant Discharge, MGD		**2**	**2.4**
Plant Discharge, gpm		**1,250**	**1,667**
(total recoverable metals in ug/L)			
Aluminum	131	200.3	207.2
Antimony	0.144	0.7	0.8
Arsenic	1.090	6.9	7.1
Barium	27.3	139.2	143.9
Beryllium	0.007	0.042	0.044
Boron	13.6	75.4	78.0
Cadimum	0.014	0.074	0.076
Chromium	0.26	2.1	2.1
Cobalt	0.1	0.6	0.6
Copper	1.28	5.8	6.0
Iron	162	685.3	708.7
Lead	0.174	0.8	0.8
Lithium	3.92	18.1	18.7
Manganese	7.34	41.1	42.5
Mercury	2.3	1.6	1.6
Molybdenum	0.97	5.2	5.3
Nickel	0.22	1.5	1.6
Selenium	0.146	7.0	7.3
Silver	0.002	0.011	0.011
Strontium	107	564.1	583.3
Thallium	0.026	0.074	0.076
Tin	0.030	0.053	0.055
Titanium	7.080	41.2	42.6
Tungsten	0.070	0.4	0.4
Vanadium	1.770	10.9	11.2
Zinc	1.770	8.9	9.2

Table 3.2-3 (Continued)

	Average of Raw Water Sampling Results (Samples Collected 12/21/01, 1/9/02, 1/17/02 from Columbia River)	**Average Concentration[1]**	**Maximum Concentration[1]**
Discharge Temp. °F[2]		**70**	**96**
Plant Makeup, MGD		**11**	**15**
Plant Discharge, MGD		**2**	**2.4**
Plant Discharge, gpm		**1,250**	**1,667**
(Units = mg/L unless otherwise noted)			
M. Alkalinity as CaCO3	75	188	191
Ammonia as N	0.05	0.024	0.02
Bicarbonate as CaCO3	75	415	428
Calcium	22.4	119	123
Chemical Oxygen Demand	<5	-	-
Chloride	3.8	20	21
Spec Conductivity (mS/cm)	194	-	-
Fluoride	<0.2	1.1	1.1
Magnesium	6.63	35	36
Nitrate as N	0.4	2.0	2.0
Oil and Grease	<5.0	<1	<1
ortho Phosphate as P	0.03	0.007	0.006
Filtered Phosphate as P	0.02	-	-
pH (pH units)	7.95	7.5 - 8.5	7.5 - 8.5
Phenolics	<0.01	0.053	0.05
Filtered Phosphorus as P	0.03	-	-
Total Phosphorus as P	0.04	0.21	0.22
Potassium	<2.0	11	11
Silicate, reactive, dissolved	11.8	63	65
Sodium	8.51	78	72
Sulfate	15.8	425	401
Total Dissolved Solids	101	1,586	1,589
Total Organic Carbon	1.1	-	-
Total Suspended Solids	9	43	44
Turbidity (NTU)	2.3	-	-

[1]Plant water has adjusted quality for Al, Fe, and Hg. FeCl3 and NaOH fed to clarifier. All filter backwash is recycled.
[2]The Discharge temperature is based on the cooling tower blowdown temperature.

The proposed project would have several programs to minimize the potential for construction activities to impact surface water quality. Under federal and state regulations, the project would be required to develop and implement a SWPPP for the construction phase. The SWPPP would identify all the possible activities and incidents that could contaminate storm water or surface water and would contain Best Management Practices (BMPs) that would be implemented to prevent contamination. In addition, the proposed project would be required to implement an Erosion Control Plan that would be specifically focused on procedures and practices to prevent transport of sediment. Examples of BMPs and related measures include installation of silt fences, installation of hay bales in storm water channels, installation of a storm water retention pond to collect storm water generated on the plant site, procedures for handling chemicals and oils, emergency response procedures and maintenance of spill response equipment. All construction personnel, including contractors, would be trained on these plans and would be expected to implement all appropriate measures. The construction areas would be inspected on a biweekly basis or after a storm event for implemented prevention and management measures, evidence of leaks or spills and developing erosion areas. These inspections would be documented and identified problems would be addressed immediately.

Recommended Mitigation Measures. No measures beyond those included in the proposed project are recommended.

Pipeline Hydrostatic Test Water

In addition, the proposed project may generate hydrostatic test water in the later phases of the construction schedule. Water is used to fill certain plant pipelines and tanks to confirm their structural integrity and prove that they will not leak. Raw water from the Columbia River would be used for this purpose – the resulting water, after testing, may have very small concentrations of oil and suspended solids. Depending on where and when the hydrostatic testing occurs, the water may be disposed of in the power plant's cooling water system, may be hauled off and disposed of by a licensed contractor or discharged under the plant's NPDES discharge permit. Discharge under the permit would require that the hydrostatic test water meet specific discharge limits.

Recommended Mitigation Measures. No measures beyond those included in the proposed project are recommended.

Operation Storm Water Management

Storm water from the proposed project would be collected in storm drains, storm sewers and surface swales and channels. These structures would drain to a retention pond designed to store water from a 25-year, 24-hour storm event. Accumulated storm water would be pumped to the cooling system for re-use or allowed to evaporate. Storm water that is collected in the power block area would be routed to oil/water separators before draining to the retention pond. The oil phase collected in the oil/water separators would be removed by a licensed contractor on a periodic basis. The oil/water separators and retention pond would be inspected on a regular basis for operating condition, oil and solids accumulation and available capacity. Since storm water would either be recycled or evaporated, it would have no effect on surface or groundwater quality. Access roads to the facility would be constructed and maintained according to Umatilla County standards and/or CTUIR standards. Exposure of contaminants to storm water would be negligible.

Under federal regulations, the proposed project also would be required to develop and implement a SWPPP for the operating phase. The SWPPP would identify all the possible activities and incidents that could contaminate storm water or surface water and would contain BMPs that would be implemented to prevent contamination. BMPs would include procedures for handling chemicals and oils, erosion control measures, preventive maintenance programs, structural controls such as rip-rap and berms and non-structural controls such as training and inspections. All plant personnel would be trained annually on these plans and would be expected to implement all appropriate measures.

Recommended Mitigation Measures. No measures beyond those included in the proposed project are recommended.

Sanitary Sewage Management

Because the plant would be designed to operate with a small staff of operating personnel, the volume of sanitary sewage generated on a daily basis would be relatively small, less than 1,000 gallons per day. Sanitary sewage would be pumped to the Umatilla water treatment facility. As an alternative, it may be piped to a septic tank and leach field located on site. This septic system would be designed and installed according to the Umatilla County's engineering standards and regulations. It would be inspected on a regular basis and cleaned out when necessary. Treated sewage from the septic system would slowly percolate into the ground and would not have a

significant adverse effect on groundwater or surface water quality. Alternatively, the sanitary waste could be pumped to the Umatilla water treatment facility.

Recommended Mitigation Measures: No measures beyond those included in the proposed project are recommended.

Chemical Spills

Chemicals and oils would be stored at the proposed facility in aboveground tanks, containers or drums. All storage containers would be located inside buildings and/or in secondary containment. Secondary containment would be designed to hold the entire contents of the container if a spill or leak occurred. If a spill or leak occurred outside secondary containment during transport of the container or filling of a tank, the spill would flow into the storm water collection system and the storm water retention pond. The pond would contain the spill until clean-up could be implemented. The proposed plant also would have spill response equipment on hand to be able to contain and clean up spills immediately. Spills to the ground surface would be cleaned up immediately by trained plant personnel. A chemical or oil spill at the proposed power plant would not adversely affect surface or groundwater quality.

Recommended Mitigation Measures: No measures beyond those included in the proposed project are recommended.

3.2.2.2 Groundwater

No groundwater use or discharges to groundwater are proposed. Therefore, no groundwater quality impacts are predicted.

3.2.3 Impact Summary

Project construction would result in localized disturbance to surface soils at the plant site, pipeline corridors, access road, and transmission line route. By implementing erosion control measures as part of the SWPPP, no water quality impacts would occur in intermittent streams or canals located within or near the project study area. No perennial streams are present in the project study area. As part of gas pipeline construction, Columbia River water would be used for hydrostatic testing. The withdrawal quantity, which is part of an existing water right (Port of Umatilla regional water

supply system), would not result in a measurable change in Columbia River flow. If hydrostatic test water is discharged to intermittent drainages or upland areas, water quality would meet NPDES requirements.

The impacts of project operation on water resources involve water withdrawal, water discharge, and management of chemical spills or leaks. Approximately 17 cfs (average) or 23 cfs (maximum) of Columbia River water under an existing water right would be used for plant operation. The water withdrawal amount would represent less than 0.1 percent of Columbia River flow during the low-flow period. Plant water effluent (average of 2.8 cfs and maximum of 3.7 cfs) would be treated and piped to the end of the canal that discharges to Cold Springs Reservoir. Due to the relatively small discharge quantity, the incremental daily change in reservoir volume, even at its lowest level, would be less than 0.1 percent. By meeting NPDES requirements, discharge water would not affect water quality in the reservoir. Storm water and sanitary sewage management would be required during plant operation to ensure that there would be no impacts on surface water near the plant site. The potential effects of a chemical spill at the plant site would be minimized by implementing a spill response plan.

Project construction and operation would not affect groundwater resources, since aquifers are located at least 75 feet below the surface. Groundwater would not be used for water sources or discharge purposes.

3.3 Biological Resources

3.3.1 Existing Environment

3.3.1.1 Vegetation/Land Cover

The study area for vegetation includes the areas proposed for new project surface disturbance and adjacent land. To estimate the effects on natural vegetation communities as well as human land uses, an overall land cover map (**Figure 3.3-1**) was prepared that encompasses all project components plus a 0.5 mile buffer on all sides. The map was based on recent (mid-1990s) aerial photography, and land cover types were verified by ground reconnaissance surveys. A second map (**Figure 3.3-2**) provides a more detailed view of the land cover between the plant site and the McNary substation.

The regional vegetation is located in the Steppe Region of northeastern Oregon. The dominant vegetation community is a shrub-steppe with big sagebrush (Franklin and Dyrness 1973). These natural communities have been highly modified by the development of irrigated and dryland agriculture wherever soils are sufficiently deep to support agricultural crops and adequate natural precipitation or irrigation water are available.

Land cover types were categorized in accordance with the criteria established by the Oregon Department of Fish and Wildlife (ODFW) for mitigation of wildlife habitat. These categories are defined by their vegetation assemblages as well as their value as wildlife habitat. The land cover types potentially affected by project components are discussed below.

Shrub-steppe

(ODFW Category 4 – Shrub-steppe, moderately grazed or weedy [SS4]). Shrub-steppe communities occur extensively across basalt outcrops on the Wanaket Wildlife Area south of the plant site where agricultural development is not possible because of shallow soils (Starbuck Rock Outcrop Complex, Quincy-Rock Outcrop Complex). The dominant species in basalt outcrop areas are stiff sagebrush and Sandberg bluegrass. Big sagebrush is the dominant species in pockets of deeper soils in depressions in the basalt. In 2001, a wildfire burned across the northern and eastern portion of the Wanaket Wildlife Area, removing the shrub and grass cover. The current community in the burned area is dominated by cheatgrass, filaree, and weedy mustards. Small patches of big

sagebrush with an understory of cheatgrass are located along the margins of croplands between U.S. Highway 730 and the Stanfield compressor station. Because of the low annual precipitation and the cheatgrass competitive advantage for soil moisture, the recovery of the shrub component on the Wanaket Wildlife Area is expected to be long-term (likely 25 to 50 years). This habitat provides feeding and nesting areas for birds adapted to disturbed areas (e.g., meadowlark), and habitat for several species of small mammals (mice and rabbits).

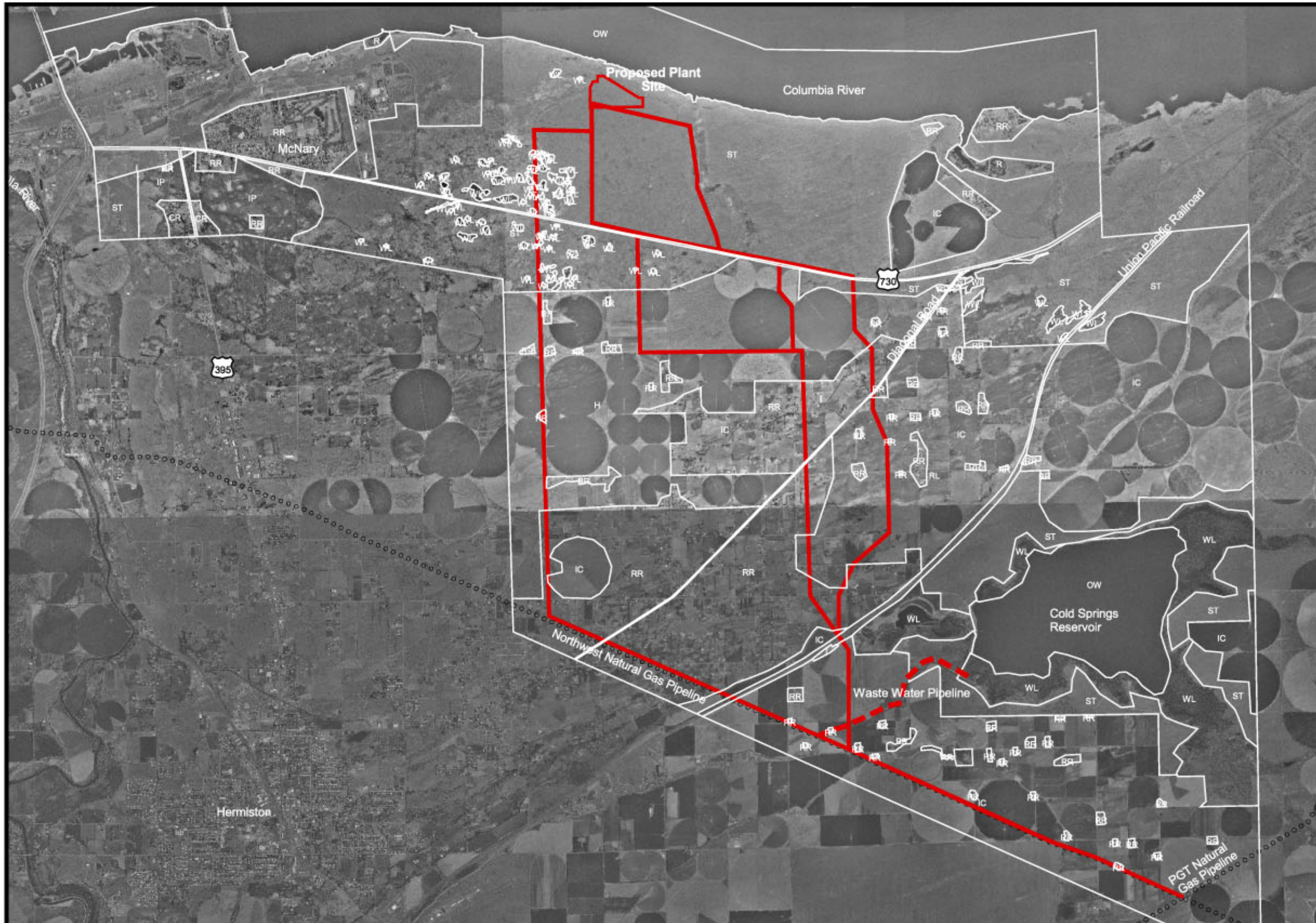
Wetlands

(ODFW Category 3 - Permanent Ponds [WP3]). As part of a mitigation program for the inundation caused by the McNary Hydroelectric Facility (CTUIR and BPA 2001a), a series of ponds were developed on the Wanaket Wildlife Area. These ponds are located in depressions in basalt outcrops, and are fed by water pumped from the Columbia River. The water is pumped over the basalt bluff into an irrigation pipeline that extends toward the southwest. Water is then released from the pipeline into about 15 miles of canals that drain into the individual ponds. Water rights allow the CTUIR to apply a total of 4,764 acre-feet per water per month from March 1 to October 31. Overall water withdrawal does not exceed 7.8 cubic feet per second. The Wanaket Wildlife Area contains about 160 acres of emergent wetlands. Ponds range in size from 0.25 to 10.5 acres. Woody vegetation includes Russian olive, cottonwood, peach-leaf and Columbia River willows. Emergent vegetation rooted along the margins of ponds include cattails and bulrushes. Patches of inland salt grass, reed canary grass, and creeping spike rush occupy seasonally wet soils. These wetlands provide feeding and rearing habitat for shore birds and waterfowl.

Other mapped wetland areas include: 1) an area around an irrigation water regulating pond below the Cold Springs Reservoir; 2) irrigated pasture south of McNary, which is an irrigation-induced wetland caused by cropland drainage further to the east (see below); and 3) the fringe of cottonwood trees, Russian olive, peach-leaf willow, sand bar willow, and leadplant around Cold Springs Reservoir.

Open Water

(ODFW Category 2). The Columbia River channel, and the surface of Cold Springs Reservoir are open water features within the study area. Both areas provide fisheries habitat, and resting and feeding areas for waterfowl and shorebirds.



Legend

Abbreviation-Name

CR - Commercial & Residential
H - Highway
I - Industrial
IC - Irrigated Cropland
IP - Irrigated Pasture
OW - Water
R - Recreation
RL - Railroad
RR - Rural Residential
ST - Shrub Steppe
WL - Wetland

Natural Gas Supply/Waste Water Discharge Pipelines Route Alternatives

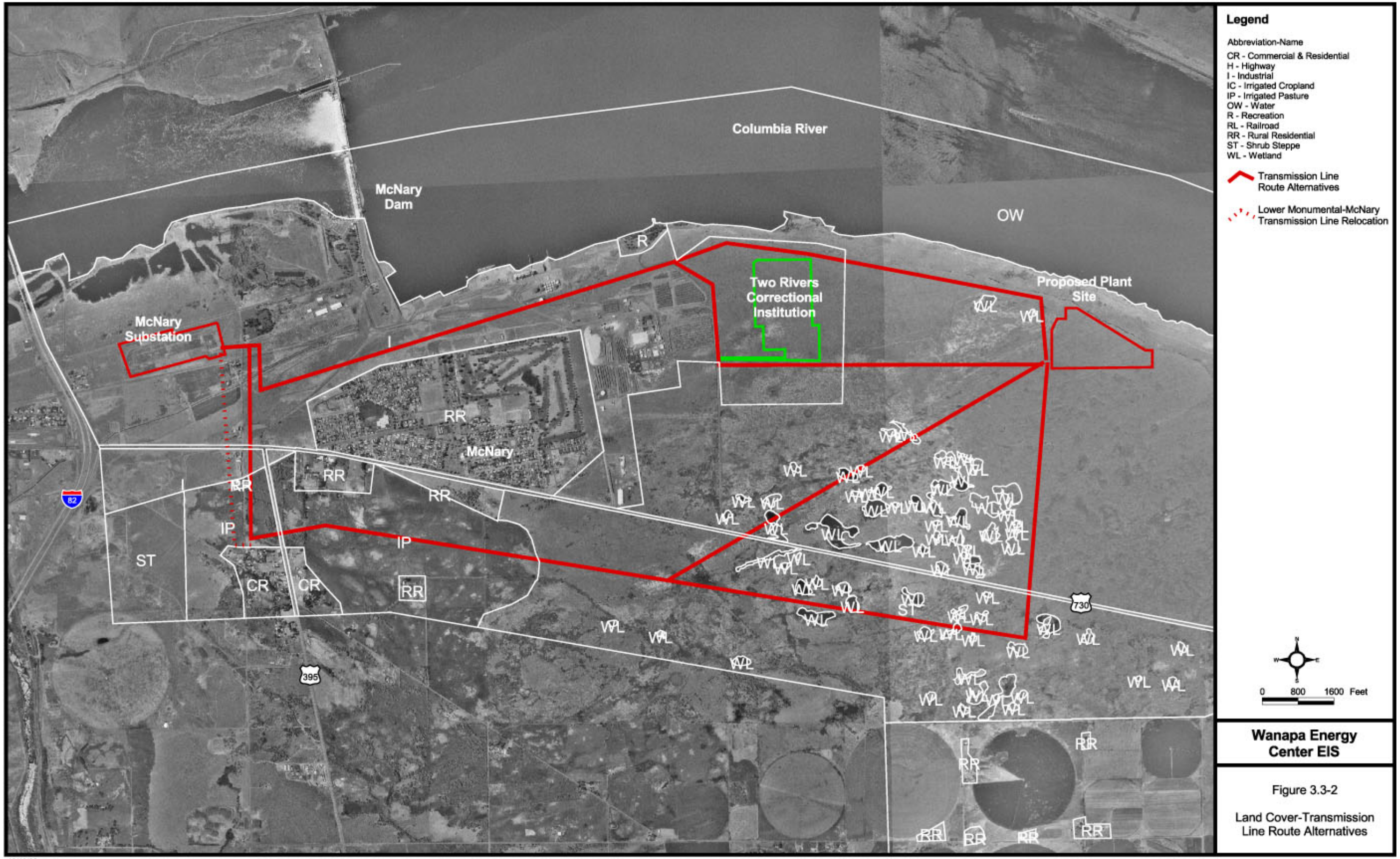
0 2000 4000 Feet

Wanapa Energy Center EIS

Figure 3.3-1

Land Cover-Pipeline Route Alternatives

10/07/03



Wanapa Energy Center EIS

Figure 3.3-2

Land Cover-Transmission Line Route Alternatives

10/10/03

Irrigated Cropland

(ODFW Category 4 - Irrigated pasture and row crops [AW4]). Irrigated cropland occurs on deep sandy soils in the central portion of the study area that would be crossed by the natural gas and discharge water pipelines between U.S. Highway 730 and the Stanfield compressor station. Cold Springs Reservoir represents the primary water supply for this agricultural area. Grain, corn, and hay crops are grown under center pivot irrigation systems and in rectangular fields watered by furrow irrigation. Grain field stubble provides feeding areas for waterfowl and game birds (pheasants), and field tree windbreaks provide nesting and perching habitat for a variety of song birds and raptors.

Irrigated Pasture

(ODFW Category 4 - Irrigated pasture and row crops [AW4]). Irrigated pasture occurs primarily in the western portion of the study area, south of McNary. This area is watered by agricultural drains, and has been invaded by Russian olive and cottonwood trees in areas that remain perennially wet. This pasture area is an irrigation-induced wetland, where soils remain saturated over long periods of time. Understory species include bulrush, spike rush, and a variety of pasture grasses.

Other Land Cover Categories

The following human land use categories are present in the study area:

- Industrial. The industrial zone south of McNary Dam, which includes the Port of Umatilla, the BPA McNary Substation, an oil terminal, a lumber and wood chip facility, several small warehouse buildings and businesses, and the TRCI.

- Commercial/Residential. Mixed commercial and residential areas located on both sides of U.S. Highway 395 between Hermiston and the U.S. Highway 395/U.S. Highway 730 intersection.

- Rural Residential. The residential development at McNary, and the adjacent golf course; a large area of small acreage rural residences on both sides of Diagonal Road between Hermiston

and the Diagonal Road/U.S. Highway 730 intersection; residential developments near Hat Rock State Park; and individual farmsteads within blocks of irrigated cropland.

- Recreation. McNary Beach Park and Hat Rock State Park.

- Highway. The major roadways crossing the study area: U.S. Highway 730, U.S. Highway 395, and Diagonal Road.

- Railroad. The Union Pacific Railroad (UPRR) road that runs between Hermiston and the south bank of the Columbia River.

Noxious and Invasive Weeds

Since agricultural development began in the late 1800s, a variety of exotic plant species have become established in croplands and rangelands, and have been distributed by irrigation and animals into adjacent native communities. These species compete with and displace native species. A noxious weed list has been developed for the Wanaket Wildife Management Area (CTUIR and BPA 2001b), which is likely representative for the study area as a whole. Invasive annual species include cheatgrass, tumblemustard, Russian thistle, and yellow starthistle. Perennial species that form large patches, and spread by underground rhizomes include perennial pepperweed, Swansonpea, diffuse and Russian knapweeds, and musk and Canada thistles. Russian olive is a small exotic tree species that rapidly invades seasonally wet areas, and grows and reproduces very quickly. Annual weed species represent a fire-hazard during dry seasons. The perennial weed species are usually controlled with herbicides with varying degrees of success. Long-established patches of thistles and knapweed are nearly impossible to eradicate because of their widespread root systems, and their capacity to spread vegetatively from rhizomes when disturbed.

3.3.1.2 Aquatic Species

The study area for aquatic species includes the Columbia River, Wanaket Wildlife Area, Cold Springs Reservoir, and the Umatilla River. The following information summarizes baseline conditions for aquatic species in aquatic habitats within the project study area.

Columbia River

Fisheries. The Columbia River upstream of the McNary Dam supports a mixture of cold water and warm water fisheries. Cold water fish species that are present in the Columbia River upstream and downstream of the McNary Dam include chinook salmon, coho salmon, steelhead, sockeye salmon, walleye, and white sturgeon. Warm water species include gizzard shad, smallmouth bass, largemouth bass, crappies, and channel catfish. In addition, bull trout (*Salvelinus malma*) potentially use the mainstem Columbia River as a movement corridor between tributaries.

Salmon, steelhead and white sturgeon are anadromous species, which spend their adult stage in the Pacific Ocean and migrate into the Columbia River drainage for spawning and juvenile rearing. The migration of white sturgeon was significantly impacted by the construction of mainstem dams. Above Bonneville Dam, surgeon now generally spend their entire life within the mainstem reservoirs. Juvenile salmon and steelhead however migrate to the Pacific Ocean before returning to fresh water. Based on adult counts at the McNary Dam, chinook salmon and steelhead usually are the most abundant salmon species. Adult counts for the year 2001 and the 10-year average from 1991 to 2000 are provided in **Table 3.3-1**. The counts represent a total for the months of April through October. The increased numbers of adult salmon in 2001 compared to the 10-year average is largely due to good juvenile outmigration and ocean conditions during the previous years.

Table 3.3-1
Adult Salmon Counts at the McNary Dam, 1991-2001

Species	2001	1991-2000 (Average)
Chinook salmon (adults)	437,120	112,616
Chinook salmon (juveniles)	52,664	21,441
Steelhead (hatchery stocked)	398,784	122,089
Steelhead (wild)	94,384	14,634
Sockeye salmon	97,188	40,062
Coho salmon (adults)	22,919	3,070
Coho salmon (juveniles)	1,812	376

Source: USACE 2002.

Salmon species use the mainstem portion of the Columbia River as a migratory route for both adult and juvenile life stages as well as for juvenile rearing. The timing of adult migration occurs during

spring, summer, and fall and varies by species and run. Outmigration of smolts (i.e., movement downstream towards the ocean) occurs during the spring and summer months. Additional information on the salmon species and bull trout is provided in the Threatened and Endangered Aquatic Species section.

The Columbia River fisheries represent a source of substance, a gift of religion, and a foundation of culture for the Tribes. In their treaties, the Tribes reserved the rights to continue fishing on the Columbia River at all usual and accustomed fishing sites.

Wanaket Wildlife Area

The Wanaket Wildlife Area contains 60 ponds or wetland habitats that range in size from approximately 0.25 to 10.5 acres (CTUIR and BPA 2001b). Fisheries in the ponds are limited to carp and mosquitofish. Fish populations in the ponds are limited due to low water levels from 1995 to 1997 when construction and maintenance improvements were completed. Future management plans for the ponds do not include stocking and maintenance of fish species for recreational fishing, since this use is not consistent with the intent of the Wildlife Mitigation Program and funding.

Cold Springs Reservoir

Fish populations in Cold Springs Reservoir are comprised of warm water species. Fish species includes largemouth bass, white crappie, bluegill, yellow perch, and brown bullhead (ODFW 1997). Fishing occurs along the Inlet Canal and Cold Springs Dam. Sampling by the ODFW in 1997 indicated that white crappie and carp were the most abundant fish species, followed by largemouth bass, brown bullhead, yellow perch, and bluegill.

Umatilla River

The Umatilla River contains a mixture of cold water and warm water species. The section of the river near Hermiston is considered a migratory corridor for spring-run chinook salmon, fall-run chinook salmon, coho salmon, and steelhead. These species are present in the spring, fall, or winter. Relatively high temperatures limit the presence of these cold water species in the summer. Creel census data for these species has varied considerably during the past 10 years, with harvest numbers per species ranging from 1 to 1,759 in the lower Umatilla River (ODFW 2003). In recent

years, the largest harvests included fall-run chinook and spring-run chinook salmon. Warm water species in the lower Umatilla River consist of largemouth bass, smallmouth bass, black crappie, yellow perch, and brown bullhead. These fish originate from McKay Reservoir, which is located in a tributary (McKay Creek) to the Umatilla River. Redband trout occasionally may enter the river from McKay Reservoir. However, as discussed for the salmon species, summer temperatures limit use to sporadic occurrence.

3.3.1.3 Wildlife

Wildlife habitat within the project study area consists primarily of a fragmented patchwork of irrigated agricultural lands, grasslands, and remnant areas of shrub-steppe. Although shrub-steppe habitat is considered an important habitat type for area wildlife, the shrub-steppe habitat within the project area has received considerable habitat fragmentation resulting from increased development and human presence within the area. The quality of this habitat has been further degraded by the encroachment of nonnative weed species to the area. Other wildlife habitats within the area include wetland and riparian habitats. Riparian woodlands within the study area occur primarily along the banks of ephemeral and perennial creeks, lakes, ponds, and drainages. Wetlands within the study area are limited to small depressional areas and areas along the edges of ephemeral and perennial water bodies.

Wildlife habitat was characterized based on a review of aerial maps and a site reconnaissance of the project component areas. Wildlife use was determined through a literature review, agency contacts, and on-site surveys for sensitive species. The following information summarizes wildlife use in the project study area.

Game Species

Big game species in the project study area include mule deer and elk. Mule deer occur throughout the year in all habitat types located within the project study area. However, higher quality habitats and increased densities of deer would typically occur within riparian habitat that provide adequate shrub layers for both food and shelter. Within the project study area, mule deer occur at relatively low densities. Mule deer numbers within the Wanaket Wildlife Area approximate 30 animals annually. The Wanaket Wildlife Area and Cold Springs National Wildlife Refuge provide wintering habitat for mule deer. Up to 75 to 80 mule deer have been reported on the Wanaket Wildlife Area during winter (Quaempts 2003). Elk use within the project area would be limited

primarily to the Cold Springs National Wildlife Refuge in the southeast portion of the study area. On rare occasions elk may wonder off the Cold Springs National Wildlife Refuge to surrounding habitats. One elk was observed in the Wanaket Wildlife Area several years ago. Elk primarily gaze on grasses and forbs, but also utilize woody vegetation in the winter months.

Game bird species present in cropland and shrub-steppe habitats include California quail, ring-necked pheasant, and mourning dove. Hungarian partridge and chukar also occur along the Columbia River (Quaempts 2003). California quail and ring-necked pheasant are hunted on the Wanaket Wildlife Area.

Wetland areas in the Wanaket Wildlife Area and Cold Springs Reservoir provide habitat for waterfowl and shorebirds. Relatively large numbers of ducks and geese utilize Cold Springs Reservoir from October through February. Based on aerial waterfowl surveys during the fall and winter of 2002-2003, mallard and pintail accounted for most of the dabbling ducks with smaller numbers of gadwell, American widgeon, green-winged teal, and northern shoveler. Diving duck species such as canvasback, scaup, buttlehead, goldeneye, redhead, and merganser were generally lower in numbers than the dabbling species. Wintering geese mainly are represented by Canada geese with a few white-fronted geese. Small numbers of tundra swans also were observed. The greatest number of waterfowl was observed during February with 22,207 ducks, 6,720 geese, and 10 swans being tallied. Nearly 5,000 of these birds were observed on Memorial Marsh. Waterfowl counts for the period 1981 through 2002 have ranged from 12,300 in 2000/2001 to 162,610 in 1986/1987 (Allen 2003).

Waterfowl also represent an important biological component of the Wanaket Wildlife Area. From 1993-2002, a total of 18 duck species and 4 goose species have been documented on the Wildlife area (**Table 3.3-2**). The most common duck species that were observed include mallard, widgeon, and green-winged teal. Other duck species that are commonly observed on the Wildlife area include northern shoveler, pintail, bufflehead, gadwall, ringneck, and goldeneye. Wintering geese that have been observed on the Wildlife area include Canada and snow geese (Quaempts 2003).

Non-game Species

A diversity of non-game species (e.g., small mammals, raptors, passerines, amphibians, and reptiles) occupy a variety of trophic levels and habitat types within the project study area. Non-game species include an assortment of small mammals including shrews, bats, squirrels,

Table 3.3-2
Wanaket Wildlife Area Hunter Use and Harvest Summary

Species Harvested	1993-94	1994-95	1995-96[1]	1996-97[2]	1997-98	1998-99	1999-00	2000-01	2001 - 02[3]	Total	Annual Average	Percent of Harvest
Geese												
Canada	5	31	7	0	5	14	38	9	1	109	14	31
Lesser Canada	16	62	14	25	19	9	43	21	2	209	26	59
Taverner Canada		10	7		6	3	8			34	4	10
White-Fronted		1								1	2	5
Snow												
Ross												
Ducks												
Mallard	279	921	2806	1109	1693	1198	1036	1206	206	10248	1281	72.4
Pintail	13	18	44	11	53	59	41	63	18	302	38	2.1
Gadwall	3	5	23	20	34	63	56	35	11	239	30	1.7
G.W. Teal	27	31	201	74	133	145	83	115	28	809	101	5.7
Wigeon	20	60	210	77	258	185	205	147	23	1162	145	8.2
Shoveler	6	56	53	11	92	100	68	41	7	427	53	3.0
Scaup	9	14	24	7	23	22	16	8		123	15	0.9
Redhead	0	2	6	3	3	10	6	2		32	4	0.2
BW Teal						4		2	1	6	1	0.0
Bufflehead	10	18	22	19	57	28	71	14	1	239	30	1.7
Goldeneye	0	13	10	20	25	30	41	9	1	148	19	1.0
Cinnamon Teal	2	3	9	5	4	2	10	4	2	39	5	0.3
Canvasback	0	5	3	1	1	2	2	3		17	2	0.1
Ringneck	1	13	56	16	14	32	62	20	8	214	27	1.5
Ruddy	1	7	14	1	5	3	8	3		42	5	0.3
Merganser	1		5	4	2	4	0	5	1	21	3	0.1
Woodduck	2		9	4	14	19	10	5		63	8	0.4
Unknown						7	2	9		18	2	0.1
Upland												
Pheasant	38	97	121	162	185	196	105	89	57	993	124	7.0
Quail	25	118	169	242	256	328	172	228	59	1538	192	10.9
Snipe	1				4	9	1	11	7	26	3	0.2
Coot	1	2	7	3	25	24	19	11	2	92	12	0.7
TOTAL GEESE	21	104	28	25	30	26	89	30	3	353	44	
TOTAL DUCKS	374	1166	3495	1382	2411	1913	1717	1691	308	14149	1769	
TOTAL UPLAND BIRDS	65	217	297	407	470	557	297	339	125	2649	331	

Hunter Effort	1993-94	1994-95	1995-96[1]	1996-97[2]	1997-98	1998-99	1999-00	2000-01	2001 - 02[3]	Total	Annual Average
# Hunters	487	696	1419	846	1400	1267	1312	1098	299	8525	928
Ave. Hours Per Hunter	3.4	4.3	4.4	4.2	3.8	4.3	3.3	3.8	3.1	3.9	4.1
Total Hours	1670	2748	6223	3551	5306	5448	4272	4142	773	33360	3652

[1]In the 1995-96 Waterfowl Season, duck harvest limits were increased from 4 to 6 birds.

[2]In the 1996-97 Waterfowl Season, duck harvest limits were increased to 7 birds. However, morning waterfowl hunts were reduced from 30 to 16 hunters.

[3]In 2001 - 02, the north side of Wanaket was closed to hunting, reducing the number of hunters and the harvest. Additionally, harvest reporting was voluntary/optional.

rabbits, rats, and mice. These small mammals provide a substantial prey base for the areas predators including mammals (coyote, fox, badger, skunk), raptors (eagles, buteos, accipiters, owls), and reptile species. A number of reptile (turtles, lizards) and amphibian (toads, frogs) species also occur within the project study area. A number of these species depend on the limited riparian and wetland habitats within the project study area.

Water birds that occur within the project study area include great blue heron, killdeer, common snipe, greater and lesser yellowlegs, sandpiper species, gulls and tern species, black-necked stilt, American avocet, Wilson's phalarope, long-billed dowitcher, and white pelican. Two great blue heron rookeries have been documented on the Cold Springs Reservoir refuge in Memorial Marsh and along Cold Springs Creek (Allen 2003).

Non-game birds encompass a variety of passerine and raptor species. Non-game birds include a diversity of neotropical migrants - birds that breed in North America and winter in the neotropical region of South America. These birds are considered integral to natural communities and act as a environmental indicators based their sensitivity to environmental changes. Common bird species that occur within the project study area include horned lark, meadowlark, American robin, song sparrow, white-crowned sparrow, brown-headed cowbird, and Brewer's blackbird.

Habitat within the project study area also supports a variety of raptor species within the project study area. Species observed in the Wanaket Wildlife Area and Cold Spring National Wildlife Refuge include bald eagle, red-tailed hawk, northern harrier, American kestrel, barn owl, great-horned owl, and burrowing owl (Allen 2003; Quaempts 2003). Other raptor species that have been observed within the project study area include Swainson's hawk, rough-legged hawk, Cooper's hawk, sharp-shinned hawk, osprey, short-eared owl, and screech owl (Allen 2003). Mature trees within the study area provide potential nesting habitat for many of these raptor species. Breeding generally occurs from March through June depending upon the species. Additional distribution and habitat information for the bald eagle is discussed in the Threatened and Endangered Wildlife Species.

3.3.1.4 Special Status Species

On July 8, 2003, the BIA wrote letters to NOAA and the USFWS requesting an updated list of species to be considered in the analysis of the Wanapa Energy Center. In letters dated July 23,

2003, NOAA and USFWS provided updated species lists. These lists were reviewed to determine which species could potentially affected by project construction and operation.

Federal Species

Federally listed fish species in the middle Columbia River include chinook salmon, sockeye salmon, steelhead, and bull trout (**Table 3.3-3**). The following information summarizes the distribution, habitat use, and life history characteristics for each species and their ESU, if applicable.

Table 3.3-3
Federally Listed or Proposed Species in the Middle Columbia River

Species	ESU	Federal Status	Responsible Agency
Chinook salmon	Upper Columbia River spring-run	Endangered	NOAA
	Snake River spring/summer-run	Threatened	NOAA
	Snake River fall-run	Threatened	NOAA
Sockeye salmon	Snake River (Salmon River)	Endangered	NOAA
Steelhead	Middle Columbia River	Threatened	NOAA
	Upper Columbia River	Endangered	NOAA
	Snake River Basin	Threatened	NOAA
Bull trout	Not applicable	Threatened	USFWS

Salmon and Steelhead Trout. Three chinook salmon ESUs utilize the Middle Columbia River as a migratory route for adults and juveniles: Upper Columbia River spring-run, Snake River spring/summer-run, and Snake River fall-run. Critical habitat was designated for the three ESUs, which are located upstream of the proposed Wanapa Energy Facility. The timing of the adult spawning runs into the Columbia River drainage occurs during the spring, summer, and fall. Juvenile chinook salmon may spend from 3 months to 2 years in freshwater before they migrate downstream in the Columbia River to the Pacific Ocean.

The Snake River sockeye salmon ESU utilizes the Columbia River as a migratory route for adult spawners and juveniles. Critical habitat was designated in the Snake River drainage, which is located upstream of the proposed Wanapa Energy Facility. The migration period generally ranges

from June through August for adult spawning runs and juvenile outmigration. Juvenile sockeye salmon usually spend 1 to 2 years in freshwater and then they migrate to the Pacific Ocean. After 1 to 3 years, they return to the Columbia River for their spawning migration.

Three steelhead ESUs utilize the Middle Columbia River as a migratory route. The Middle Columbia ESU occupies the Columbia River Basin from above the Wind River in Washington and the Hood River in Oregon including the Yakima River in Washington (NMFS 2002a). The Middle Columbia River also lies within critical habitat designated for the Middle Columbia steelhead ESU. All steelhead in the Columbia River Basin are summer-run, inland steelhead. Life history characteristics of most Middle Columbia steelhead rear for 2 years and spend 1 to 2 years in the ocean before they re-enter freshwater. Adults can remain in freshwater for up to a year before they spawn. Nonadromous Columbia River redband trout can coexist with the anadromous within this ESU (NMFS 2002a). The Upper Columbia River ESU and Snake River ESU occupy habitats located upstream of the Middle Columbia River (i.e., upstream from the Yakima River for the Upper Columbia ESU and the Snake River Basin in Washington, Oregon, and Idaho for the Snake River ESU).

The Middle Columbia River above and below the McNary Dam also is considered essential fish habitat (EFH) for salmon species, as regulated under the Magnuson-Stevens Fishery Conservation and Magnuson Act (NMFS 2002b). Freshwater EFH includes all streams, lakes, wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas located upstream of certain impassable man-made barriers and naturally impassable barriers. EFH is defined as those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity. All habitat that was historically used by coho and chinook salmon is designated as EFH.

The occurrence of four federally listed salmon species (i.e., spring-run chinook salmon, fall-run chinook salmon, coho salmon, and steelhead) in the Umatilla River) is discussed in the Umatilla River Fisheries section.

Bull Trout. The Columbia River near the McNary Dam is located within the Columbia River Distinct Populations Segment (DPS) for bull trout. The Columbia River Basin Bull Trout DPS includes all naturally spawning populations in the Columbia River Basin within the U.S. and its tributaries, excluding bull trout found in the Jarbidge River in Nevada. Adults and subadult bull trout use the Columbia River for foraging and overwintering. Movement out of tributaries into the

Columbia River usually occurs in the early summer and seems to coincide with snowmelt runoff. Movement back into tributaries seems to occur mainly in September through November after spawning is completed (Rhew 2002). Bull trout spawning and rearing is restricted to relatively pristine cold streams usually within the headwater reaches (Rieman and McIntyre 1993). However, adults can reside in reservoirs, lakes, and coastal areas.

Bald Eagle. Individual bald eagles are observed annually at the Wanaket Wildlife Area during the winter. No historic or active communal roost sites, winter roosts, winter concentration areas have been identified within the area proposed for project facilities. The nearest historic bald eagle winter roost is located approximately 2 miles east of the plant site at Hat Rock State Park. A detailed impact assessment for this species is presented in Appendix A, Impact Assessment for the Bald Eagle.

3.3.1.5 Sensitive State Species

A total of 19 terrestrial and aquatic special status species was identified as potentially occurring within the project area (Quaempts 2002; USFWS 2003; Oregon Natural Heritage Program 2002). These species, their associated habitat, and their potential for occurrence within the project study area are summarized in Appendix A, **Table A-1**. Occurrence potential within the study area was evaluated for each species based on its habitat requirements and/or known distribution. Based on these evaluations, four terrestrial species (Washington ground squirrel, white-tailed jackrabbit, yellow-billed cuckoo, black-throated sparrow) and two aquatic species (blotched tiger salamander and Columbia spoted frog) were eliminated from detailed analysis. The remaining 13 species are analyzed in the following sections.

Two amphibian/reptile surveys were conducted from April 29 through May 1 and May 22 through 24, 2002, in the Wanaket Wildlife wetlands. The purpose of the surveys was to determine if the federal candidate Columbia spotted frog (*Rana luteiventris*) or four state-sensitive species, blotched tiger salamander (*Ambystoma trigrinum melanosticum*), western painted turtle (*Chrysemys picta*), northern leopard frog (*Rana pipiens*), western toad (*Bufo boreas*), and Woodhouse toad (*Bufo woodhousii*), are present. Of 69 wetlands examined as potential habitat for the sensitive species, 53 had water and were surveyed at least once for amphibians and reptiles. None of the sensitive frog or salamander species were observed in any of the wetlands. Western painted turtle was observed in 24 wetlands (Appendix A, **Tables A-2** and **A-3**. Sixteen wetlands contained frog species such as bull frog, Great Basin spadefoot, and Pacific tree frog.

3.3.2 Environmental Consequences and Mitigation

3.3.2.1 Vegetation/Land Cover

Upland Native Vegetation Disturbance and Recovery

The proposed power plant would occupy approximately 47 acres of a 195-acre site. Construction of the access road would remove approximately 4 acres. Vegetation within the power plant footprint and most of the access road consists of grassland-steppe habitat that has been burned. This shrub-steppe habitat for these project components is considered low quality due to the loss of shrub species as a result of the burn in 2001.

Construction of the gas, discharge water, and intake water pipelines would result in temporary disturbance to vegetation and wildlife habitat. Vegetation would be removed within a 100-foot width for the gas and discharge pipelines, and a 50-foot-width for the water intake pipeline. The estimated disturbance to vegetation types in acres is listed in **Table 3.3-4**. The majority of the disturbance would occur in irrigated cropland. Approximately 22 acres of grassland-steppe and shrub-steppe habitat would be disturbed during pipeline construction. Most of this disturbance area is grassland-steppe, with smaller patches of shrub-steppe. After construction is completed, the disturbed areas would be reclaimed using a seed mix recommended by the Natural Resource Conservation District in Pendleton for native grasses or the CTUIR Wanaket Wildlife Management Area staff. The estimated recovery period for grasses would be one growing season. Shrubs would require 25 to 50 years to naturally recolonize the affected areas.

Table 3.3-4
Proposed Action Construction Disturbance (Acres) to Vegetation and Wildlife Habitat for the Gas/Water Discharge and Water Intake Pipelines

Vegetation/Wildlife Habitat	Gas/Water Discharge Pipelines	Water Intake Pipeline	Access Road
Grassland and shrub-steppe	21.7	1.7	8.5
Irrigated cropland	75.7	0	0
Wetland	<0.1	0	0
Rural residential	21.9	0	0
Industrial	0	1.7	0
Highway/railroad	1.1	0	0
Total	120.4	3.4	8.5

Construction of the transmission line would remove vegetation at the power pole sites and cause temporary surface compaction from vehicle and equipment use. The types of vegetation and wildlife habitat in the transmission ROW are listed in **Table 3.3-5**. The majority of the affected habitat would consist of grassland and shrub-steppe and irrigated cropland. Vegetation would recover from surface compaction within the first growing season. Permanent vegetation removal would occur at tower sites. Each site would require a temporary work area of 0.25 acre and a permanent area of 0.05 acre. In total, tower construction would result in temporary disturbance to 6.3 acres and permanent removal of 1.3 acres for the towers. No permanent disturbance would occur in wetland habitat. Short-term disturbance to cover and foraging areas for wildlife would occur as a result of transmission line construction.

Table 3.3-5
Proposed Action Construction Disturbance (Acres) to Vegetation and Wildlife Habitat for the Transmission Line ROW

Vegetation/Wildlife Habitat	Acres
Grassland and shrub-steppe	40.9
Irrigated pasture	34.8
Wetland	2.5
Rural residential	0.2
Industrial	21.7
Highway	0.9
Total	101.0

Recommended Mitigation Measures.

VLC-1. The revegetation mixture applied to disturbed soils on the Wanaket Wildlife Area would conform to the future management objectives for the site as described by the Wildlife Area Management Plan (CTUIR and BPA 2001b).

Wetlands Disturbance and Recovery

The proposed pipeline would be routed around the small (less than 1 acre) pond on the Wanaket Wildlife Area south of U.S. Highway 730 (**Figure 3.3-1**). The north-south pipeline trench would

be excavated in basalt bedrock, and would intercept and potentially change the general drainage pattern that flows from west to east because water would flow into the trench rather than following existing drainage channels. Where the pipeline intercepts the canals and natural drainage that feeds the Wanaket Wildlife Area wetland ponds, the pipeline trench would be backfilled with low permeability soil, and trench plugs would be placed at frequent intervals to prevent overland water flow from being diverted by the wetland trench. After project completion, the pipeline ROW would be monitored to verify that the natural drainage is restored. If the surface drainage is determined to have been modified, the pipeline operator would return to restore and redirect drainage channels.

Recommended Mitigation Measures. No measures beyond those included in the proposed project are recommended.

Noxious Weeds

There is a high potential that seeds and rhizomes would be transported by excavation equipment wheels, tracks, and blades. Of particular concern is moving weeds into agricultural fields that are currently weed free, or expanding the range of weeds into native plant communities.

Recommended Mitigation Measures.

VLC-2. A pre-construction weed inventory would be completed along the approved pipeline route to determine the location of weed populations within and adjacent to the construction ROW. Excavation equipment would be cleaned (air pressure hoses, or wash stations) after crossing weed infestation areas and entering weed-free areas. All soil excavated from weed-infested areas would be replaced in the same location.

VLC-3. Any hay used as mulch would be certified as weed-free prior to application.

Cooling Tower Drift

Cooling water vapor and droplets would drift from the towers and be deposited on surface soils and vegetation. Based on air quality analyses, drift could occur within an approximate 0.25-mile radius from the towers. Vegetation within the drift area would mainly include grasses and weedy species. Wetland vegetation is present at two sites located approximately 400 and 1,300 feet east of

the west tower. The total solids concentration for the drift plume is approximately 1,600 mg/l. Chemical components in the drift consist of calcium, magnesium, potassium, sulfates, phosphates, and other minerals. Studies on effects of saline drift on vegetation has shown that crops such as cotton, alfalfa, and cantaloupe were not affected at deposition rates of 6,908 kilogram/kilometer^2 (BPA 2001). This effect level is more than 300 times higher than the estimated deposition rate for the Wanapa Project. It is assumed that native grasses and wetland plant species would be affected at similar or higher concentrations as shown for the crop species. Therefore, cooling tower drift is not expected to affect vegetation.

3.3.2.2 Aquatic Species

Diversion of Water from the Columbia River

Water for the proposed power plant would be obtained from the Port of Umatilla's regional raw water supply system under an existing municipal water right and use permit (Permit #49497). Water withdrawal for the project would be 10 to 13 million gallons per day, which represents 12 to 13 percent of the Port of Umatilla total water right. No water would be discharged into the Columbia River as part of project operation. The potential impacts of water withdrawal (up to 62 cfs) on Columbia River federally listed salmon species for the Port of Umatilla's water supply were analyzed in a Biological Assessment (CH2M Hill 1993). Since the proposed water volume for the Wanapa Project is within the Port's water volume capacity, no new water rights in the Columbia River would be required. Depletions were accounted for in previous NEPA and Section 7 analyses. As indicated in the Umatilla Generating Project EIS (BPA 2001), the Port of Umatilla withdrawal volume represents an extremely small portion of Columbia River base flows (less than 0.005 percent of low flow conditions).

The intake system would follow the NMFS criteria for minimizing impingement and entrainment impacts on Columbia River salmon species. The maximum approach velocity of water would be 0.4 cfs and the intake screen would consist of 0.125-inch openings. No new construction would be required for the intake area. In summary, water withdrawal from the Columbia River for this project would not be likely to adversely affect federally listed salmon species and the bull trout and their critical habitat.

Wastewater Discharge to Cold Springs Reservoir

The discharge of cooling water would contribute approximately 2.8 cfs (average) or 3.7 cfs (maximum) to Cold Springs Reservoir via the Feed Canal. The addition of water to the reservoir would be a beneficial impact to aquatic habitat for fish species and wildlife such as waterfowl and shorebirds.

3.3.2.3 Wildlife

Potential impacts to terrestrial wildlife species from the Proposed Action can be classified as short term and long term. Short-term impacts consist of habitat removal and activities associated with project construction. Long-term impacts would consist of changes to wildlife habitat. The severity of both short- and long-term impacts would depend on factors such as the sensitivity of the species impacted, seasonal use patterns, type and timing of project activities, and physical parameters (e.g., topography, cover, forage, climate). Direct impacts to wildlife species would include limited direct mortalities from project construction and operation, habitat loss or alteration, incremental habitat fragmentation, and animal displacement. Indirect impacts would include increased noise, additional human presence, and the potential for increased vehicle-related mortalities.

Potential impacts to wildlife species from the Proposed Action would result from the conversion of approximately 47 acres of shrub-steppe habitat to industrial use from the construction of the electric power generation facility. Clearing and grading would alter 71 acres of a native habitat (i.e., grassland and shrub-steppe) from the construction of supplemental wastewater and gas pipelines, transmission lines, and other ancillary facilities (i.e., water intake pipeline and access roads).

Wildlife habitat is low quality in areas that were burned north of U.S. Highway 730. ODFW classifications for the grassland-steppe and shrub-steppe habitat south of U.S. Highway 730 and the other habitat types are Category 4, which are important but not essential habitats for wildlife.

Game Species

Direct impacts to mule deer would include the incremental loss of potential forage (native vegetation and previously disturbed vegetation) and would result in an incremental increase in habitat fragmentation within the proposed surface disturbance areas. However, these incremental

losses of vegetation would represent a small percentage (less than 1 percent) of the overall available habitat within the project region. The loss of available vegetation would be long term (greater than 20 years). However, herbaceous species may become established within 3 to 5 years, depending on reclamation success, coupled with future weather conditions. However, in most instances, suitable habitat adjacent to the disturbed areas would be available for this species until grasses and woody vegetation were reestablished within the disturbance areas.

Indirect impacts would result from increased noise levels and human presence during surface disturbance activities. Disturbance would be greatest during the construction period due to presence of heavy equipment, traffic, and increased human activity. The duration of construction-related noise and human activity would vary depending upon the project component and type of activity. Overall, noise disturbance from construction activities would be short-term (approximately 3 months each for the transmission line and gas/water discharge pipelines and approximately 26 months for the power plant). Mule deer would likely decrease their use within areas during surface disturbance activities. However, this displacement would be short-term and animals would return to the project area following construction activities.

Potential impacts to small game from the Proposed Action would result in the incremental loss of habitat and increased habitat fragmentation until vegetation became reestablished. Potential direct impacts to small game species could include nest or burrow abandonment or loss of eggs or young. Indirect impacts could include the temporary displacement of small game from the disturbance areas as a result of increased noise and human presence. Displacement of small game animals from disturbance areas would be short-term and animals would return to the disturbance areas following construction activities.

Noise-related disturbances from power plant operation could potentially result in long-term impacts to game species. However, the total extent of habitat lost as a result of wildlife avoidance response is impossible to predict since the degree this response varies from species to species and even varies between different individuals of the same species. Also, after initial avoidance from human activity and noise producing areas, certain wildlife species may acclimate to the activity and begin to reoccupy areas formerly avoided. For example, during the first few years of the power plant operation, it is likely that deer would be displaced from a larger area than the actual disturbance area at the power plant site due to avoidance response. However, deer have demonstrated the ability to acclimate to a variety of human development activities (e.g., mining) as long as human harassment levels do not increase substantially. It is possible, therefore, that the

extent of deer displacement would approximate the actual disturbance area after the first few years of the power plant's operation. This response also may be similar to other game species that inhabit the project area.

Non-game Species

Direct impacts to non-game species from surface disturbance activities would result in the incremental long-term loss of habitat and increased fragmentation until vegetation became reestablished. Potential impacts also would result in mortalities of less mobile or burrowing non-game species (e.g., small mammals, birds, reptiles, amphibians, invertebrates) as a result of crushing from vehicles and equipment. Other impacts would include the short-term displacement of some of the more mobile species (e.g., medium-sized mammals, adult birds) as a result of increased noise levels and human presence during surface disturbance activities. Although the habitats adjacent to the proposed disturbance area may support some displaced animals, species that are at or near carrying capacity could suffer some increased mortalities.

If surface disturbance activities were to occur during the breeding season for passerines (approximately March 1 through June 30), impacts would result in nest or territory abandonment or the loss of eggs or young, resulting in the loss of productivity for the breeding season. However, impacts to nesting birds would depend on the nest location relative to the proposed disturbance area, the phase of the breeding period, and the level and duration of the disturbance.

Direct impacts to nesting raptors that are located within or adjacent to the project area, would include abandonment of a breeding territory or nest site or the potential loss of eggs or young as a result of surface disturbance activities (e.g., ground disturbance, noise, human presence). These losses, if they were to occur, would reduce productivity for that breeding season. However, the degree of these potential impacts would depend on a number of variables including the location of the nest site, the species' relative sensitivity, breeding phenology, and possible topographic shielding. Potential impacts to nesting raptors from construction activities could be minimized through related mitigation measures identified below. Noise-related disturbances from power plant operation would be the same as discussed above for game species.

The new 4.4-mile, 500-kV electrical transmission line segment would incrementally increase the collision potential for migrating and foraging bird species (e.g., raptors, ducks, passerines [Avian Power Line Interaction Committee (APLIC) 1994]). However, collision potential typically depends

on variables such as the line location in relation to high-use habitat area (e.g., nesting, foraging, and roosting), line orientation to flight patterns and movement corridors, species composition, visibility, and line design. The Proposed Action transmission route crosses four wetlands in the Wanaket Wildlife Area. The route segment located within the Wanaket Wildlife Area also is located within flyways for waterfowl that utilize numerous other wetlands on either side of the route. The types of birds most likely to collide with the transmission lines are waterfowl such as ducks and geese, great blue herons, and birds that form tight flocks such as blackbirds (Parsons Brinckerhoff Quade & Douglas 2002). Potential impacts to bird species from potential collision could be reduced through related mitigation measures identified below.

While electrical power lines can pose a potential electrocution hazard for birds, such as raptors, configurations less than 1 kV or greater than 69 kV typically do not present an electrocution hazard, based on conductor placement and orientation (APLIC 1996). Consequently, no electrocution impacts would be anticipated from the operation of the proposed 500-kV transmission line.

Recommended Mitigation Measures. The following measures are proposed to reduce potential impacts to wildlife from pipeline construction.

W-1: Prior to construction activities during the raptor breeding season (March 1 - June 30), breeding raptor surveys would be conducted by a qualified biologist through areas of suitable nesting habitat to identify any potentially active nest sites within 0.5 mile from the project area. If applicable, appropriate protection measures, including seasonal constraints and establishment of buffer areas would be implemented at active nest sites until the young have fledged and have dispersed from the nest area. These measures will be implemented on a site-specific and species-specific basis, in coordination with CTUIR and Wanaket Wildlife Area biologists.

W-2: Standard, safe designs as outlined in Mitigating Bird Collision with Power Lines (APLIC 1994) would be incorporated in the design of the electrical distribution lines to prevent collision to foraging and migrating bird species with the project area, in coordination with CTUIR and Wanaket Wildlife Area biologists. Design features would include the configuration of the route to avoid partitioning foraging and resting habitat, alignment of overhead groundwire to the same height as the conductors, and the use of markers to increase the visibility of the lines to birds.

3.3.2.4 Special Status Wildlife Species

The impact analysis for special status wildlife resources focused on those species that were identified as potentially occurring within the project area (see Appendix A, **Table A-1**). Consequently, project-related impacts for 13 special status species are discussed below.

Federal Species

Bald Eagle. No direct or indirect impacts to breeding or roosting bald eagles would be anticipated from project construction. No historic or active communal roost sites, winter roosts, winter concentration areas have been identified within the project area. The nearest historic bald eagle winter roost area occurs approximately 2 miles east of the plant site at Hat Rock State Park. However, individual bald eagles have been observed annually at the Wanaket Wildlife Area during the winter (Quaempts 2003). Consequently, eagles could occasionally forage on the Wanaket Wildlife Area. Impacts to foraging eagles from project development and operation would include alternation (removal of the shrub component) from approximately 71 acres of potential foraging habitat (i.e., grassland, shrub-steppe, and wetland habitats) from the construction of water supply, wastewater, and gas pipelines, electrical transmission lines, and ancillary facilities until reclamation is completed and vegetation is reestablished. Approximately 47 acres of potential foraging habitat would be removed by the construction of the power plant facility. Other impacts could also include the short-term displacement of this species as a result of increased noise levels and human presence during surface disturbance activities and operation of the power plant facility. However, based on the distance of known roost sites from the project area, marginal foraging habitat at the proposed power plant site, and amount and foraging habitat within the project region, potential impacts to the bald eagle from the project would be low.

State-Sensitive Species

Sensitive species that occur primarily in grassland and shrub-steppe habitats within the project area include long-billed curlew, grasshopper sparrow, loggerhead shrike, and western burrowing owl. Sensitive raptor species that were identified for the project area include ferruginous hawk, Swainson's hawk, and American peregrine falcon. Impacts to these species would result in the incremental long-term alteration of approximately 71 acres of habitat from the construction of water and gas pipelines, electrical transmission lines, and ancillary facilities until reclamation is completed and vegetation is reestablished. Approximately 47 acres of habitat would be removed by

the construction of the power plant facility. Impacts also could include the short-term displacement of these species as a result of increased noise levels and human presence during surface disturbance activities and operation of the plant facility. If surface disturbance activities were to occur during the breeding season for these birds (approximately March 1 through June 30), impacts could result in nest or territory abandonment or the loss of eggs or young, resulting in the loss of productivity for the breeding season. Two known burrowing owl nests occur along the proposed water and gas pipeline route on the Wanaket Wildlife Area. Potential impacts to these species from construction activities could be minimized through related mitigation measures identified below.

The American white pelican occurs primarily within wetland habitats within the project area. Impacts to this species would result from the temporary disturbance of approximately 2.6 acres of potentially suitable foraging wetland habitat during transmission line construction. Impacts also could include the short-term displacement of these species as a result of increased noise levels and human presence during surface disturbance activities and operation of the power plant facility. However, occurrence by this species would be limited to migrating and foraging individuals moving through the project area. Consequently, impacts to this species from construction and operation of the project would be low.

Sensitive species that occur primarily in or near wetland and riparian habitats within the project area include western painted turtle, western toad, Woodhouse's toad, and northern leopard frog. Impacts to these species would result from the temporary disturbance of approximately 2.6 acres of potentially suitable habitat for these species during transmission line construction.

Recommended Mitigation Measures. Mitigation measures that would be applicable for special status raptor species would include W-1. Additional mitigation measures that would minimize potential impacts to special status species as a result of project construction include:

W-3: Prior to construction activities during the avian breeding season (March 1 - June 30), avian breeding surveys for long-billed curlew, grasshopper sparrow, loggerhead shrike, and western burrowing owl would be conducted by a qualified biologist through areas of suitable nesting habitat to identify any potentially active nest sites within 0.25 mile from the project area. If applicable, appropriate protection measures, including seasonal constraints and establishment of buffer areas would be implemented at active nest sites until the young have fledged and have dispersed from the nest area. These measures would be implemented on a site-specific and species-specific basis, in coordination with CTUIR Wanaket Wildlife Area biologists.

W-4: Prior to construction activities through suitable breeding habitat for special status reptile and amphibian species, occurrence surveys for western painted turtle, western toad, Woodhouse's toad, and northern leopard frog would be conducted by a qualified biologist to determine presence. If present, appropriate protection measures could include rerouting the pipeline ROW to avoid breeding habitat, in coordination with CTUIR and Wanaket Wildlife Area biologists.

3.3.3 Impact Summary

3.3.3.1 Vegetation

Project construction would result in vegetation disturbance to 47 acres at the plant site, 9 acres within access road ROW, 120 acres within the gas supply/water discharge ROW, and 101 acres within the electric transmission line ROW. The majority of the disturbance would be to grassland-steppe, shrub-steppe, and irrigated cropland. Vegetation removal would be permanent at the plant site. By implementing reclamation procedures, grassland and irrigated crop species would return by the next growing season. Recovery of shrub species would take an estimated 25 to 50 years. Impacts to wetlands would be eliminated by avoiding one wetland proposed to be crossed by the gas/water discharge pipeline and implementing drainage control measures within the pipeline ROW. Noxious weed control measures would be required to minimize the introduction and spread of noxious weed species in the disturbance areas.

Project operation would deposit vapor and droplets on vegetation such as grasses, weedy, and wetland species within an approximate 0.25-mile radius around the power plant. By assuming effect-levels would be similar to studies with crop species, cooling tower drift would not be expected to affect vegetation in the fallout area.

3.3.3.2 Fisheries

Project construction would result in localized surface disturbance near wetlands, drainage canals, or intermittent drainages. These water bodies support fish and invertebrate species; no fish species are present. By implementing erosion control measures, sediment input to surface water resources would be minor. Therefore, impacts to aquatic habitat would be minor.

Project water use and discharge were evaluated for fisheries in the Columbia River, Cold Springs Reservoir, and the Umatilla River. Water withdrawal from the Columbia River would occur under an existing water right (Permit #49497). The impacts to fish species (including listed salmon, steelhead, and bull trout) in the Columbia River were accounted for in previous NEPA and Section 7 analyses (CH2M Hill 1993). Water discharge to Cold Springs Reservoir would provide a beneficial impact to fish and aquatic habitat in Cold Springs Reservoir by providing additional water. No direct impacts to the Umatilla River would be anticipated.

3.3.3.3 Wildlife

Power plant construction would permanently remove 47 acres of natural wildlife habitat. Construction of ancillary facilities would alter (remove the shrub-component) on approximately 71 acres over the long-term (25 to 50 years). However, habitat quality within the project study area would be considered low, based on recent fires on the Wanaket Wildlife Area, the amount of existing habitat fragmentation from agricultural residential, and industrial activities in the study area, and the establishment of nonnative weed species to the area. Other impacts would include an incremental increase in habitat fragmentation; limited mortality of small, less mobile species; and temporary displacement of wildlife from the construction area as a result of increased noise and human presence.

3.3.3.4 Special Status Species

Project surface disturbance activities would permanently remove 47 acres, and remove the shrub component from 71 acres of shrub-steppe habitat that represents potentially suitable foraging habitat for the bald eagle, ferruginous hawk, Swainson's hawk, and American peregrine falcon. These same activities would reduce the potential foraging and nesting habitat for the long-billed curlew, grasshopper sparrow, loggerhead shrike, and western burrowing owl. The western burrowing owl is known to have historically nested in the vicinity of the plant site. Transmission line construction could temporarily disturb 2.6 acres of potentially suitable wetland habitat for American white pelican, western painted turtle, western toad, Woodhouse's toad, and northern leopard frog. Other impacts could include the short-term displacement of these species from the project area as a result of increased noise levels and human presence during surface disturbance activities and operation of the power plant facility. However, impacts to these species from project construction and operation would be low, based on the known distribution of these species within the project area, available remaining habitat on adjacent areas, low overall habitat quality within the project area, and mitigation measures that have been developed for these species.

3.4 Air Resources

The proposed power plant would be a major source of air emissions and require a construction permit under the federally mandated PSD regulations. Since the source would be located on land governed by the Confederated Tribes of the Umatilla Indian Reservation, the PSD permit must be submitted to and approved by the regional office of the USEPA (Region X) in Seattle, Washington.

The PSD application requires analysis of best available control technologies and an assessment of impacts of the plant's maximum emissions on the federal ambient air quality standards (Title 40 of the CFR, paragraph 52.21 [40 CFR 52.21]). That application has been submitted to Region X of the USEPA, and it demonstrates that the proposed facility will employ the BACT for all air pollutants and will not cause or contribute to any exceedences of all applicable ambient air quality standards. The facility also will be required to install monitoring equipment and maintain operations to ensure that it will comply with emission limits established in the PSD permit.

The proposed power plant site is located in an area that is currently designated as "attainment" for all state and national ambient air quality standards. Meeting these standards indicates that the air quality of the area with the proposed Wanapa Energy Center will meet or exceeds all ambient air quality standards set to protect human health, plant and vegetation health, and will allow for future growth of farming and industrial activities in the area. The air quality analysis included within the completed PSD application demonstrates that:

- The proposed facility will not significantly deteriorate the quality of the air surrounding the proposed site;

- The emissions from the proposed operation (when added to the natural background levels of pollutants, existing farming and industrial activities, existing mobile sources of emissions, and recently permitted industrial sources) would not cause or contribute to ambient pollution levels that exceed the ambient air quality standards;

- The facility will employ BACT that meets or exceeds all recently permitted sources of electrical power in the northwest; and

- The facility will not lead to deterioration of air quality in nearby pristine areas, such as the Columbia River Gorge, Mount Hood, Mount Adams, Eagle Cap, Goat Rocks, and the Strawberry Mountains.

Under the federal regulations these demonstrations are required for all pollutants for which the source is major. The PSD permit application first identifies the major emissions, the emission units, the control technologies, the emission rates (both short-term and annual average emissions), and a dispersion modeling analysis that compares facility impacts to the applicable standards. After the application has been reviewed and public comments allowed and incorporated, the Region X office will issue a PSD permit to construct the facility in accord with the accepted application. Any changes to the facility design or operation that affect emissions or impacts would need to be addressed in a revision or update to the PSD permit, depending on the expected change in emissions or impacts. The permitting process itself is designed to ensure that the air quality impacts from this project are acceptable and are minimized to the extent that is reasonably possible.

It should again be noted that the construction and operation of the Wanapa Energy Center will not impact existing industrial or farming activities and will, in fact, allow room for future growth and development of farming and industrial activities near the proposed site. Moreover, the proposed Wanapa Energy Center is a dramatic improvement over existing methods of electric generation, such as the nearby Boardman Coal Electric Generation Facility as seen below in **Table 3.4-1**.

Table 3.4-1
Comparison of Annual Emissions per Megawatt (MW) of Electricity Produced

Pollutant	Wanapa Energy Center Emissions (tons/MW)[1]	Boardman Coal Facility Emissions (tons/MW)[2]	Improvement
Sulfur Oxides	60.1	101,500.0	99.9%
Nitrogen Dioxide	318.2	42,290.0	99.2%
Particulate Matter	542.8	3,520.0	90.3%
Carbon Monoxide	146.4	2,556.7	94.3%
Volatile Organic Compounds	133.5	306.7	56.5%

[1]Based on a plant-wide electric generation capacity of 1,485 MW.
[2]Based on a plant-wide electric generation capacity of 600 MW.

3.4.1 Affected Environment

Northeastern Oregon has a dry continental climate, typical of locations in the intermountain western U.S. The location has generally low relative humidity, but has distinct seasonal changes in meteorological conditions.

3.4.1.1 Climate

Daily temperatures in January average slightly above freezing, with a wide daily range of temperatures. Temperatures are seldom below 0°F. July temperatures average around 74°F, and a typical summer has only a few days with temperatures above 100°F. The area is very dry with annual average precipitation of slightly more than 23 centimeters (9 inches). Conditions are generally dry in the summer, and most of the precipitation occurs during the winter months (November, December, January, and February). Summertime thunderstorms can occasionally produce intense, short-period rainfall that lead to localized flash flooding on rare occasions. On an annual average a total of 7.8 inches of snowfall occurs in the area, largely during the winter months. Occasionally, (5 years out of a 20-year record) the area will have no snowfall during an entire winter season; however, the area has seen rare heavy snowfall, up to about 25 inches in 1 month (January 1950).

Table 3.4-2 provides a listing of monthly mean and maximum temperatures as well as average precipitation for the Umatilla site.

Wind patterns are most important for assessing impacts of emissions. The region near the Columbia River shows a bimodal distribution of wind direction, with winds “channeled” roughly parallel to the east-west direction of the Columbia River Valley itself. With the prevailing direction of an eastward movement of storms in the area, there is a clear west-southwesterly wind component, and the easterly winds are driven largely by the colder air flow down the river valley at night. Occasional strong storms in the area show a preference for the strongest winds from the west, with the passage of low pressure systems and associated cold fronts, but strong winds can occur from any direction, particularly those related to summertime showers and thunderstorms.

Table 3.4-2
Temperature and Precipitation Data for Umatilla, Oregon[1]

Month	Temperature (°F)					Mean Precipitation (in.)	
	Avg. Max.	Daily Avg.	Avg. Min.	Highest	Lowest	Total	Snowfall
Jan	39.2	31.4	23.6	65	-22	1.20	4.7
Feb	48.1	38.5	28.9	68	-23	0.90	1.4
Mar	56.4	44.2	32.1	80	10	0.82	0.1
Apr	67.0	53.2	39.4	88	22	0.54	0.0
May	74.8	60.8	47.0	98	26	0.79	0.0
Jun	82.1	67.7	53.4	108	38	0.77	0.0
Jul	90.3	74.3	58.3	110	36	0.26	0.0
Aug	88.0	72.5	57.0	114	42	0.27	0.0
Sep	80.6	64.5	48.2	101	31	0.35	0.0
Oct	66.2	52.4	39.0	87	19	0.82	0.0
Nov	50.7	41.3	31.7	77	-6	1.03	0.2
Dec	42.7	35.7	28.6	67	-7	1.40	1.3
Annual	65.5	53.0	40.6	114	-23	9.15	7.8

[1]Source: General Climate Summary, Umatilla, Oregon 1948-1965 (www.dri.edu).

3.4.1.2 Air Quality

Local Air Quality

The air quality in the area is determined by ambient ground-level concentrations of specific pollutants. The air quality regulatory program in the U.S. (as well as within individual states and air pollution control regions) has defined acceptable standards for ambient air quality. These standards protect human health and the health of plants and vegetation. Air quality conditions are determined either through direct measurements with approved instrumentation or by indirectly modeling air quality impacts from the major sources or source groups in an area.

Monitoring data are available for a site approximately 12 miles west of the proposed plant location, and were collected by Portland General Electric at the Coyote Springs Plant near Boardman, Oregon. **Table 3.4-3** lists the air quality conditions at that location for nitrogen dioxide (NO_2), SO_2, and PM_{10}. Impacts of CO emissions are not considered significant (from this proposed source) and therefore ambient CO data are not presented. These data were collected in 1994-1995

and are considered representative of background ambient air quality conditions that include natural background concentrations of these pollutants and also includes area mobile traffic and farming activities. The table demonstrates that the existing background ambient air quality conditions are well below the applicable ambient air quality standards.

Table 3.4-3
Coyote Springs Plant On-site Air Quality Data and Ambient Air Quality Standards

Pollutant	Averaging Period	Maximum Concentration ($\mu g/m^3$)	Highest Second-High Concentration[1] ($\mu g/m^3$)	Ambient Standards ($\mu g/m^3$)
NO_2	Annual	13	--	100
SO_2	Annual	3	--	80
	24-hour	26	26	365[1]
	3-hour	55	52	1,300[1]
PM_{10}	Annual	20	--	50
	24-hour	105	81	150[1]

[1]Highest Second-High Concentration, which applies to 3-hour and 24-hour standards.

The Clean Air Act of 1970 mandated that the USEPA establish ambient ceilings for certain pollutants based on the effects of those pollutant levels on public health and welfare. USEPA promulgated standards for SO_2, NO_2, CO, particulate matter (which was originally based on total suspended particulate matter, but has been replaced by PM_{10}), ozone (O_3), and lead (Pb).

Attainment Status

Section 107 of the Clean Air Act Amendments of 1990 (CAA) requires USEPA and affected regulatory agencies to evaluate attainment of the national ambient air quality standards. Areas may be designated as non-attainment, as unclassified (for areas with insufficient data, but likely attainment), and as attainment for each specific criteria pollutant (NO_2, SO_2, PM_{10}, CO, O_3, and Pb). The unclassified areas are treated as attainment areas.

The proposed power plant is located in Umatilla County, which is currently designated and treated as an area that is in attainment for all criteria air pollutants. The nearest non-attainment areas to the plant include:

- The Wallula, Washington area, for PM_{10};
- The LaGrande, Oregon area for PM_{10}; and
- The Spokane, Washington area for CO.

Hazardous Air Pollutants

The CAA, Title III, require the evaluation of a selected list of major sources and their emissions of a specific list of hazardous air pollutants (HAPs). If a proposed facility will emit more than 10 tons/year of any one of the listed HAPs or more than 25 tons/year of the total HAP emissions, then it may be required to comply with emission limits established under the implementing regulations (40 CFR Part 63) or under the case-by-case permit review (CAA Section 112(g)). Emissions data show that the facility is a major source of HAPs, and it is expected that it will need to comply with the standards for combustion turbines (40 CFR 63 Subpart YYYY) when promulgated.

Site Configuration and Surrounding Terrain

The layout of the proposed facility and its relation to nearby terrain features can have an important impact on calculated ground-level concentrations. The terrain immediately around the plant site is fairly flat, with a steep drop in elevation from the edge of the facility to the McNary Dam Reservoir along the Columbia River. Higher terrain is seen along the northern edge of the Reservoir, approximately 8 kilometers (km) north and northeast of the proposed facility. The dispersion modeling analysis incorporates the terrain features, specifically the elevation of each identified receptor grid point, into the model. Since the prevailing winds are generally toward the east-northeast, and there is little increase in elevation in that direction, the topographic features are generally conducive to adequate dispersion of pollutant emissions from this source.

Buildings on the site can create wake effects, especially in strong winds, leading to increased ground-level concentrations near the plant site. If the power plant plumes are trapped into the building wakes, the result can lead to high concentrations near the fence line. The facility may employ Good Engineering Practice stack heights to minimize or eliminate the effects of building

wake effects. These building effects on dispersion are incorporated into the dispersion modeling analysis.

Land Use

The nature of land use and surface characteristics have an effect on micrometeorological dispersion characteristics near the site. These characteristics are incorporated into dispersion models to better estimate the dispersion nature of the atmosphere around the site. The sectors around the proposed Wanapa Energy Center have been characterized as water or grassland; and those parameters have been included in the dispersion model to provide an accurate depiction of impacts.

3.4.2 Environmental Consequences and Mitigation

The construction and operation of the proposed facility would lead to emission of air contaminants and potential impacts on ambient air quality near the plant site and in the region. These matters are addressed in the air permit application (Trinity 2003), and the results of those analyses are summarized in this section. Other sources of data are cited where appropriate. The major emissions from the facility include:

- Emissions from the combustion of natural gas in the turbines and in the duct burners;
- Emissions of particulate emissions resulting from "drift" droplets in the water vapor plume of the cooling tower;
- Production of a visible plume from the cooling tower;
- Generation of localized fog near the plant site;
- Contribution to the world-wide production of atmospheric gases that may enhance global warming; and
- Generation of emissions related to construction, including the combustion of fuel from heavy equipment and the generation of fugitive dust from soil handing and exposed areas.

3.4.2.1 Emissions and Compliance with Regulatory Standards

Emissions from the Combustion Turbines and Duct Burners

The combustion of natural gas in the turbines generates a very hot exhaust plume, which, in turn, is used to generate steam for operating a steam turbine that is tied to a generator to produce electricity. The performance of the steam turbine can be enhanced by further heating the exhaust plume with a duct burner. The steam turbine generates power from heat that would normally be lost from the turbine exhaust. This method of electric generation produces as much electricity as possible with the same amount of fuel burned since the facility will take advantage of the hot exhaust gases to produce additional energy in the steam turbines. This additional electricity produced in the steam turbines does not create any additional emissions to the atmosphere. The combined exhaust from the turbine and its associated duct burner are routed to a single stack. Under normal maximum load operations the exhaust plume is about 164°F (346°K) as it exits the stack. The ambient conditions (temperature especially) affect the combustion conditions in the turbine and thereby affect the constituents of the exhaust plume. The emission rates also vary with the "load" on the turbine and the use of the duct burner.

The emissions and impacts of turbine/duct burner operation are the major air quality issue related to obtaining a permit for the facility. The maximum emission rates for each of the criteria pollutants are summarized in **Table 3.4-4**. The emission rates have been demonstrated to comply with BACT requirements, other emission limits, and meet all applicable ambient standards as discussed in the following sections. The permit application included an analysis of emission rates and impacts for each of three ambient temperatures (maximum 109°F, average 52.2°F, and minimum –20°F), at loads ranging from 100 percent to 50 percent of the turbine rating, and both with and without supplemental duct firing at 100 percent load. The maximum short-term impacts were determined to occur at normal temperatures under full load with duct firing. Annual maximum emissions include all four units, at full capacity on the turbines, with duct firing for a combined level of 6,800 hours per year facility-wide. These emission rates were used in modeling the impacts from the proposed facility, because they showed the highest impact.

Table 3.4-4
Summary of Emission Rates of Criteria Air Pollutants from Combustion Turbine/Duct Burner Sources

Pollutant	Emission Rate (ppmvd @ 15% O_2)	Emission rate per CTG (lb/hour)	Combined Units (ton/year)
NO_x	2.0	17.17	236.29
SO_2	0.5 gr/100 standard cubic feet (scf) in gas	3.25	44.66
PM_{10}	Not established	31.04	395.00
CO	2.0	10.5	108.70
H_2SO_4 Mist	Not established	2.49	34.31
VOC	Not established	17.41	99.15

Emissions of NO_x and CO are mitigated for the combustion turbine/duct burner sources, in response to the requirements of the BACT analysis. Project design includes installation of a SCR system for NO_x emissions. SCR includes: 1) ammonia injection into the exhaust gases prior to emission to the atmosphere and 2) a specially designed catalyst bed in the exhaust stream that promotes the formation of gaseous molecular nitrogen and water vapor from the ammonia and NO_x mixture. The proposed project also includes installation of a catalyst for control of carbon monoxide emissions. The air permitting process provides a thorough technical review of the emission rates and costs for installing these controls. These controls reduce emissions to levels that are as low or lower than controls that are currently applied to new identical sources across the U.S. No other cost effective control technologies would achieve similar or lower emissions.

Table 3.4-5 provides a comparison of control technologies utilized in recently permitted facilities in both Oregon and Washington. This table again demonstrates that the proposed Wanapa Energy Center will be controlled by control technologies that are equal to, or better than, similar, newly permitted power plants.

The proposed power plant air permit application demonstrates compliance with the full range of applicable requirements, with the proposed emission rates, as discussed below.

Table 3.4-5
Comparison of Emissions Controls of Recently Built and Proposed Power Plants

Facility	Nitrogen Oxides Emissions and Controls	Carbon Monoxide Emissions and Controls
Wanapa Energy Center	**2.0 ppm – Selective Catalytic Reduction**	**2.0 ppm – Oxidation Catalyst System**
Wallula Power Plant	2.5 ppm – Selective Catalytic Reduction	2.0 ppm – Oxidation Catalyst System
Port Westward, PGE	2.5 ppm – Selective Catalytic Reduction	4.9 ppm – Oxidation Catalyst System
Umatilla Generating	2.5 ppm – Selective Catalytic Reduction	6.0 ppm – Oxidation Catalyst System
Summit Westward, Westward Energy	2.5 ppm – Selective Catalytic Reduction	4.0 ppm – Oxidation Catalyst System
Plymouth Generating	2.0 ppm – Selective Catalytic Reduction	2.0 ppm – Oxidation Catalyst System
Fredrickson Power	3.0 ppm – Selective Catalytic Reduction	7.0 ppm – Oxidation Catalyst System
Satsop Power	2.5 ppm – Selective Catalytic Reduction	2.0 ppm – Oxidation Catalyst System
Sumas Energy 2	2.0 ppm – Selective Catalytic Reduction	2.0 ppm – Oxidation Catalyst System

New Source Performance Standards

The USEPA has promulgated a set of national emission standards for a selected list of major sources, under Title 40 of the CFR, Part 60 (40 CFR 60). Various subparts of that rule apply to the proposed project.

- Subpart Da (Standards of Performance for Electric Utility Steam Generating Units)

  This subpart lists emission standards for particulate matter, NO_2 and SO_2, along with monitoring requirements, testing, reporting, and recordkeeping requirements. The standards apply to units with a heat input capacity greater than 250 Million British Thermal Units (MMBtu) per hour. The heat recovery steam generating units, including the duct burners, have a heat input capacity of 546.2 MMBtu/hour at the highest operating scenario. The emission

standards for Particulate Matter do not apply to gas-fired boilers. The emission standards for SO_2 are met by firing natural gas that has a maximum sulfur content of 0.5 grain per 100 dry standard cubic feet. The NO_x emission standards are 0.2 lb/MMBtu on a rolling 30-day average. Each unit at the proposed facility duct firing meets this limit at about 0.064 lb/MMBtu.

The New Source Performance Standards also require monitoring for NO_x, and the facility is proposing to install a continuous emissions monitor for NO_x emissions (along with oxygen and CO_2) in accord with the regulation. Compliance testing will be required for NO_x and particulate matter along with opacity. Records of emissions data will be maintained on site for 2 years. Reports will include quarterly reports of excess emissions (if they occur).

- Subpart GG (Standards of Performance for Stationary Gas Turbines)

  This subpart lists emission limits for SO_2 and NO_x for combustion turbines. The NO_x standard is based on a formulation in the rule, providing an emission rate based on the size of the turbine and on fuel-bound nitrogen. The calculated limit is 203 parts per million by volume, dry (ppmvd) at 15 percent oxygen, while the proposed limit is 2.0 ppmvd at 15 percent oxygen, well within the requirement. The SO_2 limit is based on a fuel sulfur content (0.8 percent by weight), and the natural gas sulfur content is about 0.003 percent sulfur by weight, based on 1 grain per 100 scf of natural gas. Again the sulfur compliance is well within the required limits.

  The facility will propose and plan to institute a custom fuel monitoring program, as allowed under the regulation. Fuel sulfur content data will be reported to USEPA Region X in accord with an accepted schedule. The continuous emission monitor for nitrogen oxides will meet any monitoring requirements for NO_x emissions for this source. An initial compliance test will be conducted as required by the regulation.

Permitting Under the PSD Program

The PSD program, as promulgated under 40 CFR 52 (paragraph 52.21) applies to the proposed project. A PSD application has been submitted in accord with those requirements. PSD review is triggered initially for the source and subsequently by pollutant, for those pollutants that are emitted

above a specified significant emission rate. The PSD process is conducted in the following sequence:

- Is the proposed facility a major source?

  A new source is major if it has the potential to emit any of the regulated pollutants above the established major source threshold. The threshold is 100 tons/year for a list of source categories and 250 tons/year if the source is not listed. Since the facility includes a steam electric generation unit, which is a listed source category, the major source threshold is 100 tons/year of any (at least one) criteria pollutant. The proposed plant exceeds the major source threshold for NO_x, PM_{10}, and CO. Therefore the construction of the facility requires the issuance of a PSD permit from the relevant regulatory agency (USEPA, Region X).

- Is the facility in an attainment/unclassified area?

  For a source that is proposing to be located in an area that is classified as attainment, or as unclassified, the PSD regulations apply. If the source were locating in an area that is non-attainment for one or more pollutants, the New Source Review requirements for non-attainment areas would apply. The proposed area is attainment or unclassified for all criteria pollutants, and therefore the PSD regulations would apply.

- What pollutants are emitted above the significant emission rate?

  Significant emission rates are established for each of the criteria air pollutants, as well as for additional regulated pollutants. The significant emission rate for NO_x, SO_2, and VOCs is 40 tons/year; for CO it is 100 tons/year; for PM_{10} it is 15 tons/year, for lead it is 0.6 ton/year. The significant emission rates are established for sulfuric acid mist, hydrogen sulfide, total reduced sulfur compounds, and others. The proposed facility exceeds the significant emission rate for NO_x, SO_2, CO, PM_{10}, VOCs, and sulfuric acid mist.

PSD regulations require several analyses that must be completed for the pollutants emitted above the significant emission rate. Those analyses include an air quality impact analysis, a BACT analysis, a review of background concentrations, and a summary of regulatory requirements.

Emissions from Other Sources

Besides the emissions from the Combustion Turbine and Duct Burner sources, the application included modeling of emissions from support units at the site. Chief among those sources are the individual cooling tower cells that are installed in one cooling tower to the southeast of the main combustion sources. Cooling towers dissipate heat from the heat recovery steam generating system by evaporation of cooling water into the atmosphere. This evaporation cools the cooling water droplets in the cooling tower. As the cooling tower operates it generates a small amount of "drift," in the form of small droplets that are entrained into a plume of water vapor from each cooling tower cell. The drift is minimized by installing very efficient cooling tower drift eliminators, which for this project have a drift rate of 0.0005 percent of the total circulating cooling water.

The water vapor is not a regulated emission; however, the drift droplets will contain a small amount of suspended and dissolved solids (usually inert salts) that lead to the formation of particulate matter (PM_{10}) after the drift droplet is evaporated. The cooling tower drift is therefore a source of PM_{10} emissions that are regulated by the air permit. Each cell represents a source of PM_{10} emissions (no other pollutant emissions) that were included in the model. The total cooling tower emission rate is 1.82 pounds/hour of PM_{10} or 8 tons/year of PM_{10}. Those emissions as well as the cooling tower "stack" parameters were included in the modeling analysis.

The application also addressed emissions of "refrigeration modules" that were attached to each unit. However, those units will not be installed. The modeling results included those impacts, which would generally be very small in comparison to the turbine/duct burner emissions, and would be limited to periods when the associated inlet chilling operations were being used. Modeling results have not been modified to account for this reduction in emissions, largely because the expected changes from removing those sources would be very small and would reduce ambient impacts.

Other Federal Permitting Requirements

The proposed facility will be reviewed for applicability under several additional federal programs. These are listed in **Table 3.4-6**, along with expected applicability of each standard or program. In some cases the standards are not finalized, or the final design or emission rates may lead to a different interpretation. The PSD permit application has identified these requirements and included commitments to meet the applicable requirements as the project is installed and begins operation.

Table 3.4-6
Other Federal Applicable Requirements for Air Quality

Federal Program	Applicability
Acid Rain Program	
40 CFR Parts 72 and 75	The facility will be subject and will need to obtain an acid rain permit. The facility must obtain allowances for SO_2 emissions and must conduct monitoring, reporting, and recordkeeping for SO_2 and NO_x as required by the regulations.
Title V Operating Permit	
40 CFR Part 71	The facility emits over 100 tons/year of any criteria air pollutant, and will be required to obtain a Federal Operating Permit under 40 CFR 71. A complete and timely application must be submitted to USEPA Region X within 12 months of the start of operation.
Compliance Assurance Monitoring	
40 CFR Part 64	The facility would need to develop a compliance assurance monitoring (CAM) plan for each pollutant that: 1) has a federally enforceable limit, 2) uses a control device to achieve that limit, and 3) has a pre-control potential to emit more than the major source threshold for that permit. The facility will not need a CAM plan for NO_x emissions because the monitoring is required by the acid rain program, but it will need a CAM plan to monitor its CO emissions.
Risk Management Program	
40 CFR Part 68	The program requires a risk management plan for sources that store or maintain on site a quantity of a listed substance that is above the stated threshold. The only concern is the ammonia storage for the operation of the SCR. Since the facility is planning to use aqueous ammonia, with a concentration less than 19 percent by weight, this program will not apply.
National Emission Standards for Hazardous Air Pollutants	
40 CFR Part 63	A federal standard for Maximum Achievable Control Technology (MACT) has been proposed for combustion turbines (Subpart YYYY). As proposed the facility would need to comply with the final standard when it begins operation. Specific standards will be finalized by USEPA at a later date, and the facility has indicated that it will comply with those standards.
CAA Section 112(g)	This case-by-case MACT standard applies to major sources of HAPs for which no applicable standard has been promulgated. Since the facility has made a commitment to comply with the final MACT standards, as indicated above, it will not need to conduct a full 112(g) analysis, if the standard is final and the facility is in compliance immediately after startup.
Ozone Depleting Compounds	
40 CFR Part 82	The facility will need to comply with requirements for handling, storing, and disposing of a regulated list of ozone-depleting compounds.

3.4.2.2 Project Air Quality Effects

Construction Equipment Emissions and Fugitive Dust

During construction the activities will include disturbance of the land surfaces and storage of materials and soil piles on site, as well as from operation of heavy diesel fired equipment. These short-term emissions are exempt from permitting requirements on the site.

Construction emissions include exhaust from diesel engines. The total emissions from this equipment is expected to be very small in comparison to the total vehicular traffic in the region. To reduce combustion emissions, idling of construction equipment would be minimized (shut off when not operating) and engine tune-ups are required for any equipment that is maintained on site for more than 60 days.

Fugitive dust would be generated by grading, excavation, and soil handling, including storage piles. Some of the dust particles would be carried off the plant site during windy and dry conditions. Since these emissions occur at ground level, and involve particles that are relatively large, the impact of these emissions is felt very near the plant site. Impacts will rapidly decrease with distance from the site.

The following measures will be employed to mitigate fugitive emissions:

- During construction in dry weather, and during windy periods when site generated dust plumes are observed off site, the facility will water the disturbed construction areas twice daily. Haul roads that carry active traffic will be watered twice daily.

- Stored soil piles will be stabilized with water to create a crust layer that impeded emissions of fugitive dust.

- Vehicle speeds on unpaved project areas would be limited to 20 miles per hour (30 km/hour).

Plant Operations

Because the PSD review triggers this analysis, a formal series of modeling efforts were performed and included in the PSD application. Three separate impact, or modeling, analyses may be required, including:

- A "significance analysis" that evaluates only the emissions from the proposed project, and is used to determine whether the project's impacts are "significant." The source parameters are used, along with characterizations of building downwash, stack data, established receptors at the fenceline and around the site, and meteorological data to determine the maximum impact for each triggered pollutant. Impacts that are above the monitoring significance threshold also require collection of ambient air quality data that is representative of site conditions at the time of the permit application. A significant impact area is determined in this analysis as well, based on the maximum distance to the significant impact level (at the established receptors) plus 50 km.

- An analysis of compliance with National Ambient Air Quality Standards (NAAQS). For those impacts above the significant impact threshold, perform an analysis of impacts on NAAQS is required. This impact analysis is a cumulative dispersion modeling analysis, which includes: 1) emissions from the proposed source; 2) emissions from existing sources (including existing farming, natural, mobile, and industrial emissions); and 3) emissions from recently permitted industrial sources. The impacts are analyzed using the dispersion modeling data for comparison to ambient standards for all pollutants that have impacts above the significant impact threshold.

- An analysis of consumption of PSD increments. For those pollutants with impacts above the significant impact level, a baseline area and baseline date are determined. All major and minor sources within the significant impact area, that received permits to increase emissions since the baseline date, are included in analysis of PSD increment consumption. PSD increments exist for NO_2, SO_2, and PM_{10}. Other pollutants are not regulated by PSD increments. The modeled impacts from these sources, including the reduction in emissions from any enforceable changes to emissions since the baseline date, are then compared to the established PSD increments for both the Class II areas and Class I (pristine areas such as National Parks) areas.

- An analysis of air quality related values at Class I areas. For the nearby Class I areas, the modeling effort should address specific values such as impacts on visibility and on acid

deposition. This analysis applies to Class I areas, and is not restricted by ambient air quality impacts.

Ambient air quality impacts were analyzed for the range of applicable requirements. For the turbine and duct burner sources, the analysis selected the individual cases in which the impacts were greatest. (Occasionally, the impacts are greatest when the source is not at full operation, because the plume rise is lessened, even though the emissions also are reduced.) The regulatory guideline model, ISCST3 PRIME, was used to provide this screening analysis, and select those cases for which the maximum impacts were determined.

The full impact analyses were conducted with the regulatory guideline AERMOD-PRIME model, because model development data show that this model is superior to ISCST3 in its assessment of winds around terrain features. Five years of meteorological data (wind speed, wind direction, temperature) that were collected at the Umatilla Army Depot (1995-1999) were used in conjunction with upper air data, from the Hanford Nuclear site and from Spokane Washington, to model these impacts. The Umatilla site is less than 5 miles (8 km) from the proposed plant site, and with no intervening topography, would provide representative meteorological wind data for modeling purposes. Atmospheric stability category data were not available from the Umatilla site, and were developed from the nearby National Weather Service Station at Walla Walla, Washington.

Specific sources were modeled as separate point sources, including each of the four turbine/duct firing stacks, and each of the cooling tower cells.

Table 3.4-7 provides the results of the significant impact analysis, which would address the emissions from only the proposed plant. This table shows the maximum modeled impact, along with the significant impact threshold, and the monitoring impact threshold. The results show that the proposed facility has an insignificant impact for SO_2 and CO emissions but subsequent analyses must be conducted for NO_2 and PM_{10}. The table also shows that the impact for PM_{10} emissions is above the monitoring impact threshold, normally requiring a monitoring program for PM_{10}. However, there are sufficient PM_{10} ambient data in the region to provide a representative background concentration of PM_{10} levels.

Based on these results, the impacts were analyzed for comparison to the NAAQS and PSD increments for NO_2 and for PM_{10}.

Table 3.4-7
Significant Impact Analysis

Pollutant	Averaging Period	Maximum Modeled Concentration ($\mu g/m^3$)	Significant Impact Threshold ($\mu g/m^3$)	Significant Impact for this Pollutant?	Monitoring Impact Threshold ($\mu g/m^3$)
NO_2	Annual	1.88	1	Yes	14
SO_2	Annual	0.21	1	No	None
SO_2	24-hour	1.72	5	No	13
SO_2	3-hour	6.82	25	No	None
PM_{10}	Annual	8.73	1	Yes	None
PM_{10}	24-hour	28.52	5	Yes	10
CO	8-hour	17.86	500	No	575
CO	1-hour	84.55	2,000	No	None

The analysis for compliance with the NAAQS was conducted using the same meteorological data set and receptor grid that were established for the significant impact analysis. The model included emissions from existing and recently proposed nearby industrial sources, along with accepted estimates of background concentrations, which includes natural background pollutant concentrations, existing farming operations, and existing mobile sources of emissions. All known sources were included in this analysis.

The analysis for compliance with PSD increment consumption identified those sources that consume PSD increment also were conducted. The AERMOD model was used to assess impacts in the nearby Class II areas, and a separate modeling effort, using the guideline model CALPUFF, with its associated pre- and post-processing algorithms, was used to assess impacts at the specific Class I areas. Those areas are:

- Eagle Cap Wilderness Area (WA)
- Goat Rocks WA
- Mount Adams WA
- Strawberry Mountain WA
- Columbia Gorge (designated area)
- Mount Hood WA

Modeling for Class I impacts used the guidance that has been provided by the Federal Land Manager's Air Quality Workgroup for assessing impacts on PSD increments in Class I areas.

Table 3.4-8 lists the relevant NAAQS and the modeled impacts for those pollutants, along with the relevant Class II PSD increment and their modeled impacts (at the maximum impact area).

Table 3.4-8
Modeled Maximum Impacts Compared to NAAQS and Class II PSD Increments

Pollutant	Averaging Period	NAAQS (Data in µg/m^3)				Class II PSD Increments (Data in µg/m^3)	
		Modeled[1]	Background[2]	Total	NAAQS	Modeled	PSD Increment
NO_2	Annual	7.24	13	20.24	100	7.24	25
PM_{10}	Annual	8.86	20	28.86	50	8.86	17
PM_{10}	24-hour	27.33	105	132.33	150	27.33	30

[1]The modeled concentration includes impacts from the proposed operation of the Wanapa Energy Center, existing industrial emission sources, and proposed industrial emission sources.
[2]The background concentration includes emissions from existing farming activities, mobile sources, and natural pollutant concentrations.

Table 3.4-9 provides a list of maximum PSD increment analyses for NO_2 and PM_{10} for Class I areas. The results show the greatest impact at any of the listed receptor areas. Impacts at other Class I areas, are less than these levels, and as can be easily deduced, all are below the PSD significance threshold. No additional air quality modeling of impacts at the Class I areas is required.

Table 3.4-9
Maximum Modeled Impacts at Class I Areas and PSD Increments

Pollutant	Averaging Period	Modeled Impact (µg/m^3)	Class II Significant Impact (µg/m^3)	Allowable PSD Increment (µg/m^3)	Location of Maximum Impact
NO_2	Annual	0.0005	0.1	2.5	Columbia Gorge
PM_{10}	Annual	0.0029	0.2	4	Columbia Gorge
PM_{10}	24-hour	0.085	0.3	8	Mount Adams

The Class I analysis also requires an evaluation of air quality related values, to include an assessment of impacts on visibility and on soils (acid deposition) at each area.

The deposition of both nitrogen-based acidic compounds and sulfur-based acidic compounds was analyzed for each site. The sulfur deposition is much less than the nitrogen deposition rates. The maximum nitrogen deposition was determined to be 0.00025 kg/hectare-year at the Columbia Gorge. The threshold for a significant impact is 0.005 kg/hectare-year for nitrogen based acidic compounds. Impacts are well below that threshold at any receptor in any of the Class I areas.

The impacts on visibility resources at Class I areas is calculated using the estimated maximum extinction percent over a 24-hour period. If the maximum extinction is below 5 percent of a "clean" background (natural) extinction level, for all of the modeled days, the impact is determined to be insignificant. Impacts at all Class I areas were below this threshold. There were no days in any of the Class I areas that had an average change in extinction of 5 percent or more. The maximum 24-hour extinction was 2.37 percent at Mount Adams.

Startup Emissions

Operational requirements, as well as demand for electric power, may lead to the startup or shut-down of any of the turbines or any of the duct burners. The operators have the flexibility to fire any or all units, and to operate the turbines at less than full load, in order to tailor production to current demand. Pollutant emissions during startup can exceed the normal operation emission rates, due largely to the fact that control equipment has not reached its optimum operating temperature. CO is the main constituent of concern regarding startup emissions, because the startup events are of short duration, CO emissions are known to be higher during startup, and there are short term (1-hour and 8-hour) standards that apply to CO. The permit application has demonstrated that the emissions of CO during startup lead to an impact that is less than the established significance levels for these standards. Therefore such emissions would not have a significant impact on ambient air quality.

Cooling Tower Water Vapor Plumes

Cooling towers release water vapor into the atmosphere along with a small amount of water droplets. A recent application has analyzed cooling tower water vapor plume formation, specifically addressing the development of icing and fogging conditions that can occur during very

cold weather. Results showed that cooling tower fogging or icing was not predicted to occur as a result of the operation of a similar cooling tower. It also should be noted that the proposed cooling towers will not be placed near any public roadways where fogging or icing could cause potentially hazardous conditions. Under the proposed design measures, cooling tower fogging and icing are not predicted for this project. No mitigation measures are planned to address this impact.

Cooling Tower Drift

Cooling towers also generate a small amount of "drift" as discussed above. The proposed drift eliminators, designed to reduce drift to 0.0005 percent of total circulating water, are comparable to the best performing drift eliminators that are in operation. The proposed dissolved and suspended solids concentration in the drift, at approximately 1,700 parts per million by weight, is low compared to the concentrations in other cooling tower operations. Given the low emission rates of PM_{10} resulting from these drift droplets, and the anticipated low level of impact, there are no mitigation measures proposed to further reduce drift and PM_{10} emissions from the cooling towers.

The project would generate large amounts of CO_2, resulting from the combustion of natural gas in the turbines and duct burners. CO_2 is a "greenhouse gas" that has the potential to contribute to global warming. There are no specific federal requirements to mitigate impacts of CO_2 emissions from the proposed facility. The use of natural gas to generate electricity from a combined cycle power plant is perhaps the most efficient method to generate electricity using fossil fuels. Recent studies, including the analysis provided for the Umatilla Generating Station, showed that the efficiency of electric generation with a similar combined cycle natural gas fired power plant was sufficient to meet the requirements of the State of Oregon's CO_2 emission standard for energy facilities. The proposed project would provide a similar level of efficiency. No mitigation measures are proposed for this project.

3.4.3 Impact Summary

Project construction would result in disturbance and handling of surface soils at the plant site and along the pipeline corridors, access road, and transmission line route. By implementing dust control measures, the impacts of construction-related fugitive dust would be minimized. The construction activities would include periodic watering of haul roads and storage piles during periods of observed fugitive dust transport off the site. Traffic speed limits would be established and may be specifically constrained during dry periods when fugitive dust is generated. Once

constructed, the soil storage piles will be stabilized, roadways graveled or hard-surfaced, and exposed areas would be reclaimed or revegetated with native species or with special plantings that are maintained.

The air emissions from of project operation include the discharge of air pollutants from the main stacks of the combustion turbines and duct firing units. The proposed project is classified as a major source and would be regulated under the PSD program and the Title V operating permit program. The facility must demonstrate continuous compliance with emissions of NO_x, CO, and SO_2 from these sources, and must perform periodic monitoring of other pollutants including PM_{10} and VOCs.

The facility will utilize "state of the art" pollution controls including selective catalytic reduction of NO_x emissions and the use of a CO oxidation catalyst. The permit application has demonstrated that the facility is installing BACT for NO_x, CO, SO_2, and PM_{10}. This level of BACT is equal to or better than all recently permitted power production facilities in the Pacific Northwest. The facility also will produce power in a very efficient and clean way with the use of steam turbines producing power from the hot exhaust gases of the combustion turbines that would otherwise be wasted. The facility also would install high performing drift eliminators on its cooling tower emissions.

The dispersion modeling for the air permit application shows that impacts of these emissions are below established significance levels for CO and SO_2. The dispersion modeling also demonstrates that predicted pollutant concentrations are well within allowable ambient air quality standards and PSD increments for NO_2 and PM_{10} including impacts from existing industrial and farming activities, recently permitted industrial activities, existing mobile sources of emissions, and natural sources of emissions. This therefore indicates that the operation of the Wanapa Energy Center will not affect any existing industrial or farming activities and also will allow for any future growth of possible farming or industrial activities. The modeling also addressed impact on nearby pristine (Class I) areas and demonstrated acceptable impacts on visibility, soils (acid deposition), and vegetation within those areas. The operation of the proposed facility would not cause or contribute to an exceedence of any established air quality standard and would not adversely impact air quality related values.

In summary, the Wanapa Energy Center is a very clean and good alternative to older methods of electric generation, such as coal-fired power plants. Also, the Wanapa Energy Center will meet or exceed emission controls that have been implemented at similar facilities in the Pacific Northwest.

And finally, the operation of the Wanapa Energy Center will not cause or contribute to any exceedences of any established air quality standards and will not hinder existing or future farming or industrial activities.

3.5 Traffic and Circulation

Construction of the Wanapa Energy Center would most likely affect traffic flow on McNary Beach Access Road, U.S. Highway 730, and U.S. Highway 395/State Route 32. Up to 600 workers would travel to the facility site during construction, 100 to the natural gas supply/wastewater discharge pipeline routes, and 120 to the transmission line route. During operation, 30 workers would work at the facility.

3.5.1 Affected Environment

Major highways accessing the project study area include U.S. Highway 730 (i.e., U.S. Highway 730; the Columbia River Highway), U.S. Highway 395/State Route (SR) 32 (i.e., SR 32; the Umatilla-Stanfield Highway), Interstate 82 (I-82), and State Route 207 (i.e., the Hermiston Highway). U.S. Highway 730 is a 2-lane west-east highway that generally runs along the south side of the Columbia River. U.S. Highway 395/SR 32 is a 2-lane northwest-southeast highway that runs from U.S. Highway 730 in the north; through Umatilla, Hermiston, and Stanfield; and then to I-84/U.S. 30 in the south. I-82 is a 4-lane highway running north-south from the Tri-Cities in Washington until it intersects with I-84/U.S. 30. SR 207 is a 2-lane highway that runs southwest-northeast, starting at I-82 in the west, through Hermiston, and then intersecting with U.S. Highway 730 in the east. **Table 3.5-1** summarizes the average daily traffic (ADT) and accident counts by milepost and location for these major roadways for 2001.

Direct access to the project site is via McNary Beach Access Road, about 0.5 mile north of its intersection with U.S. Highway 730. McNary Beach Access Road is a narrower 2-lane paved county road. McNary Beach Access Road has a load limit of 105,000 pounds. Loads greater than this limit would require obtaining a permit from the Umatilla County Public Works Department (Phillips 2003a).

McNary Beach Access Road had a traffic count of 904 vehicles for a 24-hour period, from noon of August 25, 2003, until noon of August 26. In comparison, the same site had a traffic count of 350 vehicles per day on May 26, 1998, prior to the construction and operation of the TRCI. Peak traffic periods during the 2003 count occurred 6:00-8:00a.m. and 3:00-4:00 p.m. Average speed on the road was 46 miles per hour. (Phillips 2003b).

Table 3.5-1
Average Daily Traffic and Accident Counts - 2001

Highway/ Milepost	Location Description	ADT	Accidents
U.S. Highway 730:			
182.60	Western Umatilla city limits to Umatilla Bridge spur	8,234	8
184.03	Umatilla Bridge spur to U.S. Highway 395/SR 32	10,100	5
184.80	U.S. Highway 395/SR 32 to eastern Umatilla city limits	6,339	7
186.85	Eastern Umatilla city limits to junction with SR 207	3,079	1
Subtotal			**21**
U.S. Highway 395/ SR 32:			
0.04	U.S. Highway 730 to northern Hermiston city limits	11,721	18
4.22	Northern Hermiston city limits to junction with SR 207	17,028	43
5.40	North of junction with SR 207 to south of junction with SR 207	20,200	4
5.46	South of junction with SR 207 to southern Hermiston city limits	10,430	15
8.45	Hermiston to Stanfield	8,377	4
9.25	Stanfield	7,491	7
12.44	Stanfield to junction with I-84/US 30	6,700	0
Subtotal			**91**
Interstate 82:			
0.00	Washington State line to northern Umatilla city limits	15,300	0
0.48	Northern Umatilla city limits to UPRR crossing	15,300	2
0.76	UPRR crossing to crossing of U.S. Highway 730	15,300	1
1.00	U.S. Highway 730 crossing to beginning structure SBD	9,300	1
1.65	Beginning to end of structure SBD	9,300	0
1.84	End of SBD structure to southern Umatilla city limits	9,300	2
2.07	Southern Umatilla city limits to crossing of Westland-Ordinance Road	8,978	5
9.78	Crossing of Westland-Ordinance Road to junction with I-84/US 30	8,700	3
Subtotal			**14**
SR 207:			
0.02	Junction of U.S. Highway 730 to eastern Hermiston city limits	4,267	13
6.15	Eastern Hermiston city limits to U.S. Highway 395/SR 32	6,909	5
7.30	U.S. Highway 395/SR 32 to Northwest Buttercreek Road	8,186	10
8.34	Northwest Buttercreek Road to southern Hermiston city limits	8,962	20
9.04	Southern Hermiston city limits to junction with I-84/ US 30	5,404	7
Subtotal			**55**

Source: Oregon Department of Transportation (DOT) 2002.

Note: Since 1998, a crash (referred to as an accident, above) has to be reported if it occurs on a public roadway and results in a fatality, bodily injury, or damage to one person's property in excess of $1,000.

Additional modes of transportation to the project study area include river barge access via the Port of Umatilla facilities on the Columbia River and railroad access via the UPRR, both located within or east of Umatilla and west of the project site. Air access to the study area is available via the Hermiston Municipal Airport. The airport does not have passenger or air freight service, but air charter services are available. The airport has a 4,500- by 75-foot runway (Oregon Economic & Community Development Department 2003).

3.5.2 Environmental Consequences and Mitigation

Construction of the project is estimated to take 24 to 26 months, starting in the fourth quarter of 2004, with a ramp-up of activities during the beginning of construction and ramping-down at the end. Most construction materials and equipment likely would be shipped to the project site by the statewide and regional highway transportation system. Regional transportation access would be via U.S Highway 730, located about 0.5 mile south of the project access road, and then McNary Beach Access Road. The new paved access road would be about 7,525 feet (1.4 miles) long and would extend from the McNary Beach Access Road to the power plant site. Large power plant equipment, such as the turbines and steam generators, might be shipped by rail and then offloaded in Hermiston or Umatilla for trucking to the project site on U.S. Highway 395/SR 32 or U.S. Highway 730. Alternatively, this equipment could be barged to the Port of Umatilla and then offloaded and transported by the McNary Beach Access Road to the project site. Major construction equipment accessing or being hauled to the various components of the project could include personal vehicles, light and heavy trucks, welding trucks, farm tractors, backhoes, bucket-wheel excavators, concrete trucks, bulldozers, graders, side booms, and cranes.

The large power plant and construction equipment may require transport of wide and/or long loads, requiring lead and/or follow-up vehicles and would be slower moving than typical lighter vehicles such as cars, and pickup trucks. Thus, these large tractor trailer and other vehicles could result in some traffic congestion and an increase in the potential for vehicular accidents. Assuming that the majority of workers and truck deliveries would turn north from U.S. Highway 730 onto Beach access road, it is likely that from 300 to 500 personal vehicles could turn left or right off U.S. Highway 730 onto Beach Access road at shift changes over a period of 1 to 2 hours. This traffic increase would be 10 to 20 percent of the current daily traffic on this segment of U.S. Highway 730; the estimated traffic increase for Beach Access Road would be 30 to 60 percent of the current daily traffic levels.

To reduce the potential for pipeline construction impacts on traffic, when constructing in or near a roadway, one traffic lane would always remain open. Some major roadways might be directionally bored to avoid damage to the travel surface and traffic disruptions. It is assumed that basalt mostly underlies U.S. Highway 730, so an open cut crossing is planned there and a traffic control plan would be implemented to avoid disruptions to traffic. Railroads and irrigation canals would be directionally drilled to avoid loss of service.

In addition, 100 to 600 workers would be traveling to the project site during the 24 to 26 months of construction, 100 would be working on the natural gas supply/wastewater discharge pipeline routes over 3 months, and 120 would be working on the transmission line route over 4 months. These workers may travel to the construction sites with private vehicles, by carpooling or vanpooling, or some could be bused to the site. These workers would likely originate from throughout Umatilla County, Morrow County, and the Tri-Cities area in Washington, and would represent a dispersed increase in traffic into the study area.

Beginning in the fourth quarter of 2006, the project would operate 24 hours each day, 365 days a year. During operation, 30 workers would be accessing the facility, likely over the course of three work shifts. Most of this vehicular access to the project site would be with private vehicles and trucks from Hermiston, Umatilla, or other parts of Umatilla County. Additional truck traffic would occasionally occur to the project site to deliver materials and supplies, and to conduct maintenance and repairs. The impacts of this traffic would be minimal and would require no mitigation.

Recommended Mitigation.

T-1. Implement partial plant site shift changes to reduce the number of personal vehicles that queue at the Beach Access Road/U.S. Highway 730 intersection.

T-2. Time major construction material deliveries to off-peak hours (early morning, late evening) to prevent local congestion on U.S. Highway 730.

T-3. A site-specific construction traffic flow plan would be submitted to the Oregon DOT that documents the present traffic volumes, expected volume of project construction traffic, and the intersections to be used. If warranted by this study, the width of the U.S. Highway 730 at the Beach road intersection (or other intersections) would be expanded to provide left-hand and right-hand turn lanes.

3.5.3 Impact Summary

Project construction and operation would result in increased traffic on U.S. Highway 730, U.S. Highway 395/SR 32, and local roads. Temporary traffic increases on access roads during a 24- to 36-month period for power plant construction. Temporary traffic increases on roads used for the pipelines and electric transmission line would occur during a 3- and 4-month period, respectively. Increased traffic levels also would result in an increased risk for accidents. Increased traffic for an estimated 30 workers would occur during plant operation. Impacts on traffic levels and flow and accident risks would be reduced by implementing a traffic flow plan, timing major construction traffic during off-peak hours, and use of partial site shift changes at the plant.

3.6 Visual Quality and Noise

3.6.1 Affected Environment

3.6.1.1 Visual Quality

The project site is located in a rural area on a relatively flat bluff about 150 feet above the Columbia River. The site is characterized by basalt outcrops, shrub-steppe habitat, and wetlands, with some scattered trees. The views to the north are of the wide Columbia River (Lake Wallula) and croplands, rangeland, shrub-steppe habitat, and scattered agricultural residences and buildings on the Washington State side of the river. The views to the east also are of the Columbia River and shrub-steppe habitat on the Oregon side of the river. To the south, high brush and smaller trees diversify the view of the surrounding landscape. To the west lies similar shrub-steppe habitat but the view is dominated by the TRCI, a large medium custody facility located about 1.5 miles west of the project site. The facility is an industrial-looking 650,000-square-foot concrete facility surrounded by tall fences with a guardhouse at the entrance. This facility is well-lit and visible at night.

The existing and proposed electrical transmission line and natural gas supply/wastewater discharge pipeline route is comprised of rural residences, irrigated croplands, non-irrigated croplands, grazing land, and low-growing shrub-steppe land.

3.6.1.2 Noise

The existing sound levels in the project area are characterized by rural, ambient/background noises. The closest potential noise source or receptor is the TRCI, located about 1.5 miles west of the project site. Although the background noise levels were not measured, it was estimated that they were in the 35- to 40-decibel range during a site visit.

The Oregon DEQ does not issue noise permits, but industrial facilities must meet the DEQ's noise standards (OAR Chapter 340). These standards require that:

> No person owning or controlling a new industrial or commercial noise source located on a previously unused industrial or commercial site shall cause or permit the operation of that noise source if the noise levels generated or indirectly caused

by that noise source increase the ambient statistical noise levels, L_{10} or L_{50}, by more than 10 decibels on the A-weighted scale (dBA) in any 1 hour, or exceed the levels specified in **Table 3.6-1**, as measured at an appropriate measurement point, as specified in subsection (3)(b) of this rule.

Table 3.6-1
New Industrial and Commercial Noise Standards (340-35-035),
Allowable Statistical Noise Levels in any 1-Hour

7:00 am – 10:00 pm	10:00 pm – 7:00 am
L_{50} – 55 dBA	L_{50} – 50 dBA
L_{10} – 60 dBA	L_{10} – 55 dBA
L_1 – 75 dBA	L_1 – 60 dBA

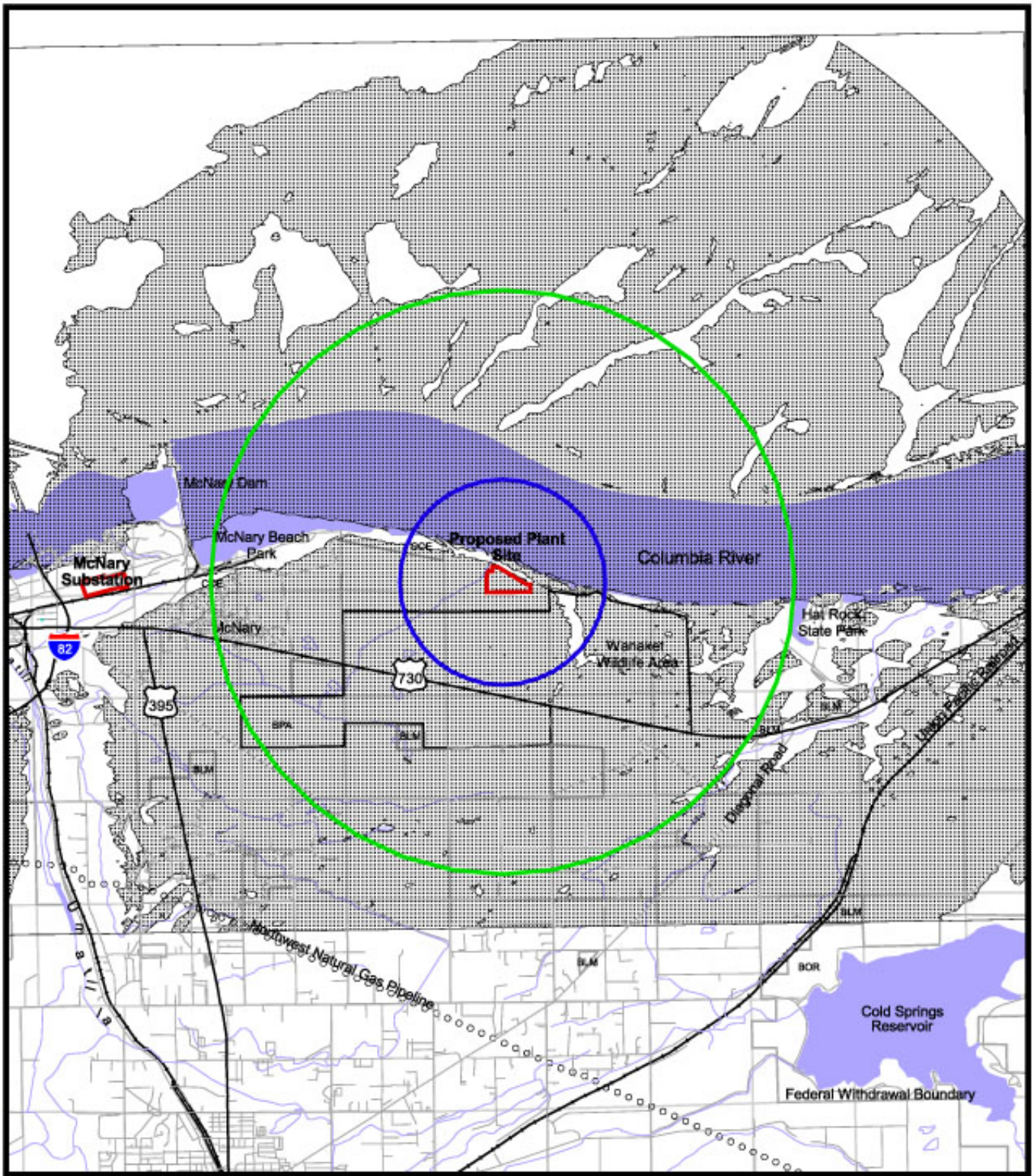
The proposed power plant would operate 24 hours per day, 365 days a year, so the nighttime (i.e., 10:00 p.m. – 7:00 a.m.) noise standards would apply.

3.6.2 Environmental Consequences and Mitigation

3.6.2.1 Visual Quality

The project would result in the introduction of a new industrial facility into the relatively natural area. The facility would include a turbine building, the administration building, the water treatment building, a natural gas metering building, a warehouse, switchyard, raw water storage tank, demineralization water storage tank, cooling towers, HRSGs, and four 213-foot-tall HRSG exhaust stacks. An analysis was conducted using a Digital Elevation Model to determine the locations where the stacks of the generating facility could be seen over a radius of approximately 4 miles from the site. The results of this analysis are illustrated on **Figure 3.6-1**. The visibility of the project and the distance, in miles, from various key viewing locations are described in **Table 3.6-2**.

The facility could be viewed from residential areas at McNary, residences on the Columbia River bluff near Hat Rock State Park, and by motorists traveling U.S. Highway 730 east of Umatilla.



Legend

- The stacks are visible
- The stacks are not visible
- 5,280 foot radius circle
- 15,000 foot radius circle

Source: ENSR, 2003.

0 4000 8000 Feet

Wanapa Energy Center EIS

Figure 3.6-1

Visibility to Generating Facility Stacks

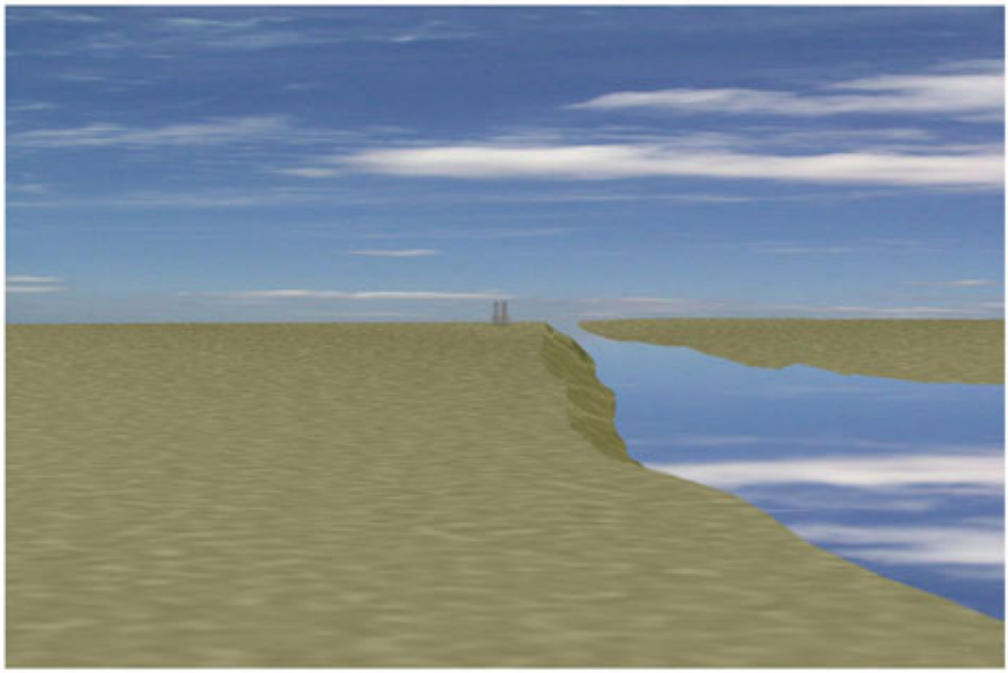
08/25/03

Table 3.6-2
Scenic Visibility Effects at Public Use Areas

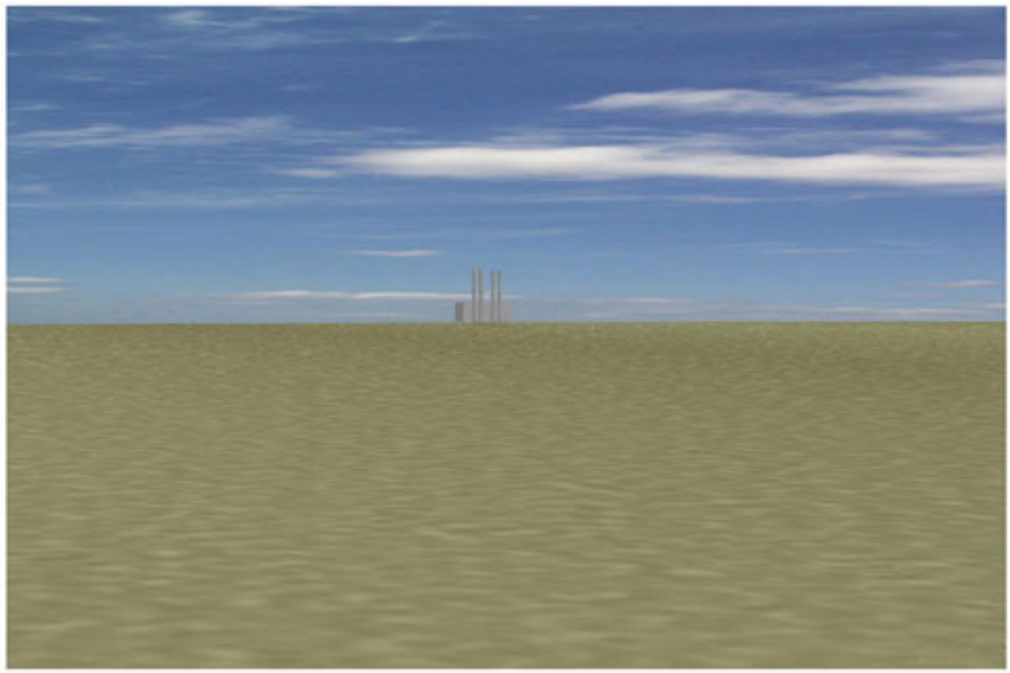
Feature	Visibility and Distance from Project (Miles)
Columbia River (Lake Wallula)	The project would be visible to recreational boaters, anglers, and windsurfers using the Columbia River, 0.2 mile north of the project site.
McNary Beach State Park and Recreation Area	Would not be visible, 1.7 air miles northwest of the site along the Columbia River (RM 295) and 150 feet below the bluff.
Hat Rock State Park	Would not be visible, 2.9 air miles east of the site and in a 150-foot ravine below the Columbia River bluff (RM 299).
Columbia River Gorge National Scenic Area	The power plant and exhaust stacks would be visible from the Columbia River, but would be about 80 air miles east of and not seen from the Gorge Scenic Area.
Cold Springs National Wildlife Refuge	Could be visible to wildlife observers, hikers, horseback riders, and bicyclers, about 4.6 air miles to the southeast of the project site.

Figure 3.6-2 provides simulations of the proposed plant and stacks at distances of approximately 1 mile and 2 miles to provide perspective on the scale of the facility. There is almost no natural screening provided by trees except along U.S. Highway 730 parallel to the Wanaket Wildlife area, where trees and shrubs adjacent to the highway screen the view to the north.

In addition to the above, Wanaket Wildlife Area is located east of the project site and the facility would be visible to hunters during hunting season. In addition, the TRCI is located about 1.5 miles west of the project site and the project would be visible from that location. Also, the McNary Dam is located about 3.0 miles west of the project site and could be visible from there. The tallest and most visible parts of the power plant would be the four 213-foot-tall HRSG exhaust stacks and the turbine building. In addition, at times the project would emit a visible steam plume from the cooling towers that would be visible over a wide area.



View of Generating Structures from 15,000 feet



View of Generating Structures from 5,280 feet

Wanapa Energy Center EIS

Figure 3.6-2

Simulated Views of Generating Facilities

8/25/03

At night, the facility would be illuminated with lights on utility poles. These lights would be shielded to reduce glare and overall visibility from public roads and residences. In addition, to meet FAA requirements, the exhaust stacks also would be lit with warning lights that would be visible for extended distances.

The 500-kV transmissions line exiting the power plant facility and connecting to BPA's McNary Substation would be visible to area residents and vehicular traffic on area highways and roads (i.e., McNary Beach Access Road, U.S. Highway 730, and U.S. Highway 395/SR32). The aesthetic impact of these lattice tower transmission lines would depend upon whether they are a new element to the landscape, and single- or double-circuit towers are being used. Single-circuit towers can be up to 145 feet tall and double-circuit towers can be up to 180 feet tall. Where the new ROW paralleled an existing ROW, the towers would be located parallel to existing towers (i.e., not staggered) to avoid the additional visual disruption that would otherwise be created. These towers would be located in a 150- to 200-foot-wide ROW and would contain 16- to 20-foot-wide access roads. Expanding the McNary Substation by another 160 by 750 feet, or about 2.75 acres, would result in a minor additional aesthetic impact to the existing substation in an industrial area.

Recommended Mitigation Measure. No mitigation measures would be required for visual resources.

3.6.2.2 Noise

During construction, noise would be generated by graders, bulldozers, cranes, other construction equipment, power hand tools, dump trucks and semi-trailer trucks, and by personal vehicles. Some rock drilling and blasting may be required to level the site and would generate additional noise. To minimize the amount of disturbance that could occur during the constructing phase, construction would only occur between the hours of 7 a.m. and 5 p.m. Because the nearest consistent noise receptors are the residents and workers at the TRCI, located about 1.5 miles west of the project site, noise impacts are expected to be minimal to these receptors during construction and operation. The occasional recreational users of the Columbia River, located 0.2 mile (at the closest point) to the north of the project site, and hunters on the nearby Wanaket Wildlife Area could be affected by the noise generated during construction and operation of the project.

During operation, noise would be generated by the combustion turbines and generators, HRSGs and steam turbines, transformers, the cooling towers, other operating equipment, and by vehicles. Noise level estimates have not yet been generated for this project, but the applicants commit to meeting the state industrial standards at the plant site fenceline.

Electrical transmission conductors can cause corona noise, which is a hissing, crackling sound that is most evident during wet weather (rain, fog). The BPA has established a design criterion for corona-generated audible noise from transmission lines of 50 dBA exceeded 50 percent of the time at the edge of the ROW (BPA 2002). This noise level is equivalent to moderate rainfall on foliage. No residential or commercial structures are located within 100 feet of the proposed transmission line centerline, which equates to the edge of the ROW for the purposes of establishing the noise criterion.

Recommended Mitigation Measure. No mitigation measures would be required for noise.

3.6.3 Impact Summary

3.6.3.1 Visual Resources

Construction of the power plant facility would result in visual impacts on residential areas at McNary and on the Columbia River bluff near Hat Rock State Park, motorists using U.S. Highway 730 east of Umatilla, and hunters in the Wanaket Wildlife Area. The most visible parts of the facility would be the HRSG exhaust stacks and the turbine building. In addition, a steam plume from the cooling towers would be visible in winter over a wide area. Facility lighting at night also would be seen from public roads and residences. Construction of the electric transmission line would be seen by area residents and motorists on area highways and roads. The visual effect would depend on whether the use of single or double circuit towers and whether the structures are new landscape features. The effects of the McNary Substation expansion would be considered minor, since the expansion area is industrial.

3.6.3.2 Noise

Increased noise levels would occur in the local area as a result of construction equipment, traffic, and facility operation. Construction traffic would be short term for the plant (24 to 36 months), pipelines (3 months), and transmission line (4 months) and long term for plant operation. By

scheduling construction between 7 a.m. and 5 p.m., the duration of noise during the day would be minimized. Noise impacts would be minor, since the residences and the TRCI are 1.5 miles from the plant. Recreational users of the Columbia River (0.2 mile from the plant) and hunters on the Wanaket Wildlife Area could be affected by construction and operation noise.

3.7 Cultural Resources

Federal historic preservation legislation provides a legal environment for documentation, evaluation, and protection of archaeological and historic sites that may be affected by federal undertakings, or by private undertakings operating under federal license, permit, or approval or on federally managed lands. The NEPA of 1969 states that federal undertakings shall take into consideration impacts to the natural environment with respect to an array of disciplines, and that alternatives must be considered. The courts have made clear that archaeological and historic sites (i.e., cultural resources) are regarded as part of the natural environment. The National Historic Preservation Act (NHPA) of 1966, as amended, established the Advisory Council on Historic Preservation and the National Register of Historic Places (NRHP) (in its modern form). The NHPA mandates that federal agencies consider projects' effects on cultural resources that are enrolled on or eligible for the NRHP and Section 106 of the NHPA establishes a four-step review process by which cultural resources are given consideration during the conduct of federal undertakings. The four steps of the Section 106 review process are: 1) initiation of the Section 106 review process (i.e., establish the undertaking, identify appropriate SHPO and/or Tribal Historic Preservation Office, plan to involve the public, identify other consulting parties); 2) identification of historic properties; 3) assessment of adverse effects; and 4) resolution of adverse effects. The Archaeological and Historic Preservation Act of 1974 further delineates the responsibilities of federal agencies in the execution of undertakings with respect to impacts on cultural resources. The Archaeological Resource Protection Act of 1979, as amended, provides for a system of permitting for investigations on federal land which may involve looking for and the removal of artifacts or other archaeological resources. The statute also requires that agencies develop compatible regulations for the management of cultural resources.

The effects of federal undertakings on properties of religious or cultural significance to contemporary Native Americans, including traditional cultural properties (TCPs), are given consideration under the provisions of the American Indian Religious Freedom Act of 1978, the Native American Graves Protection and Repatriation Act of 1990, and recent amendments to the NHPA. As amended, the NHPA now integrates Indian tribes into the Section 106 compliance process, and also strives to make the NHPA and NEPA procedurally compatible. In compliance with Section 106, federal agencies must consult with a representative designated by the tribe, the THPO. The THPO is the official representative of an Indian tribe for the purposes of Section 106.

The NHPA requires agencies to take into account the effects of their actions on properties listed or eligible for listing on the NRHP. The process begins with consultation with the SHPO to determine the undertaking's area of potential effect, an identification and evaluation of cultural resources for NRHP eligibility, followed by an assessment of effect on those eligible resources, and concluding after the consultation process between the SHPO and jurisdictional agency. In order for a cultural resource to be eligible for the NRHP it must meet one or more of the following criteria of significance: a) be associated with events that have made a significant contribution to the broad patterns of our history; b) be associated with the lives of persons significant in our past; c) embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic value, or represent a significant and distinguishable entity whose components may lack individual distinction; or, d) have yielded, or may be likely to yield, information important in prehistory or history. In addition, cultural resources must possess integrity of location, design, setting, materials, workmanship, feeling, and association (National Park Service [NPS] 1991).

3.7.1 Affected Environment

3.7.1.1 Plant Site

Cultural Resources

In September 2001, the Cultural Resources Protection Program (CRPP) conducted a literature search and records review through the Oregon SHPO as part of the cultural resources investigation for the proposed Wanapa Energy Center plant site. The CRPP reviewed all previously completed cultural resources surveys and all previously recorded archaeological sites and properties listed on the NRHP within 1 mile of the proposed plant site. Since the late 1940s, numerous cultural resources studies have been completed in the area of the plant site with the majority being inventory surveys. Excavation of individual sites also has occurred, beginning with those associated with the 1947 River Basin Surveys associated with the Columbia Basin Project.

As a result of the file search, 10 sites were identified within 1 mile of the plant site. Five sites were recorded during the McNary Reservoir surveys from the late 1940s through the 1950s; none of these sites are within the plant site boundary (Smithsonian Institution 1948, 1949; Osborne and Shiner 1950; Shiner 1955; and Osborne 1957). Since that time five additional sites have been recorded primarily under Section 106-driven projects. One site, an aqueduct currently in use, is

within the plant site boundary. The aqueduct is part of the Wanaket Pump System, which received its original ROW from the USACE on May 30, 1949 (Umatilla County, Deed Volume 189, Page 174, Charles Kik).

On October 9 and 10, 2001, the CRPP conducted a cultural resources field survey of the proposed Wanapa Energy Center plant site. During the survey, two isolated finds were recorded (Miller 2001). These isolated finds are not eligible for inclusion in the NRHP; therefore, there will be no effect per the NHPA (16 U. S. C. §§ 470-470x-6).

Additionally noted in the plant site was the currently utilized aqueduct and remnants of various types of irrigation piping and cement slabs. The field crew observed 22-inch-diameter ceramic pipes in 53-inch-long sections and segments of 24-inch-diameter iron pipe. Two piles of 25-gallon cans and two cement blocks also were noted. All of these features appear to be associated with the aqueduct and pumping stations. There is no evidence indicating that these features are over the 50 years old necessary to qualify them as an archaeological site; therefore, they were not recorded.

Ethnographic Resources

Ethnographic resources are those cultural and natural resources to which Native Americans or other groups ascribe cultural significance and that continue to play a role in their community's identity and way of life. Only members of the Native American group(s) to whom the resources hold cultural value can determine tribal ethnographic resources and potential impacts to them. An ethnographic resource is a site, structure, object, landscape, or natural resource feature assigned traditional, legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it. Some places of traditional cultural use may be eligible for inclusion in the NRHP as a TCP because of their association with cultural practices or beliefs of a living community that: a) are rooted in that community's history and b) are important in maintaining the continuing cultural identity of the community (Parker and King 1989). Since ethnographic resources identified by the tribes are important in each tribe's history, and since the resources are interconnected with places and resources located throughout customary tribal lands, any impacts to ethnographic resources would be regional in scope. In addition, because ethnographic resources are tied to communities' cultural identities, effects to the resources also have an effect on the communities to which they are tied in perpetuity. Therefore, the duration of impacts to ethnographic resources is forever.

The CRPP of the CTUIR was responsible for TCP assessment of the proposed Wanapa Energy Center plant site. A file and literature search was conducted using CRPP archives to identify known archaeological sites and obtain pertinent information about past and present customary and/or traditional use of the areas within and around the plant site. Past archaeological surveys and reports, ethnographic reports, reports on CTUIR ceded lands, and sensitive and confidential information were reviewed. An informational flyer regarding the Wanapa Energy Center project and site visit dates were mailed to 175 Tribal Elders requesting their assistance in this project. Two site visits to the proposed plant site were conducted during October 2001 with twenty Tribal Elders and four CRPP staff. Oral history interviews with Tribal Elders were conducted on October 10 and 16, 2001 (Farrow 2001). The outcome of the assessment was that the area of the Wanapa Energy Center is a TCP.

The proposed Wanapa Energy Center would be located on lands ceded by representatives of the CTUIR to the U.S. Government in the Treaty of 1855. The land is now held in trust by the United States for the CTUIR as beneficial owners and is still used for hunting and resource procurement.

3.7.1.2 Transmission, Water, and Gas Lines

In August 2003, Archaeological Investigations Northwest, Inc. conducted a literature and file search through the Oregon SHPO for the proposed transmission, water, and gas lines. The literature search study area extends 1 mile from the transmission, water, and gas alignments and encompasses 59 square miles, which also includes the proposed plant site. The literature and file search was directed primarily toward identifying previous cultural resource studies that had been conducted within the study area and previously identified cultural resources in the study area. Forty-three cultural resource surveys have been conducted in the study area since the mid-1970s and generally have been located between the cities of Umatilla and Hermiston, with the majority of the work focused near Umatilla. Previous surveys in the study area primarily cover the area around the proposed Wanapa Energy Center, 840 acres of the Wanaket Wildlife Area, the Department of Corrections prison site, the Williams Northwest Pipeline alignment south and west of Cold Springs Reservoir, and a north-south portion of the Level 3 fiber optic cable alignment.

Sixteen of the surveys conducted in the study area resulted in the discovery of no cultural resources. These negative surveys were conducted for highway improvement projects, wastewater facility projects, energy facility projects, improvements at Hat Rock State Park, and a water

diversion project, with most situated near the city of Umatilla. All of these projects were linear surveys with the exception of the work done at Hat Rock State Park.

Twenty-seven of the surveys in the study area recorded prehistoric or historic-period resources. These surveys include a variety of projects, with most being linear surveys for transmission lines and pipelines, new roads or road improvements, or improvements at McNary Dam.

There were 22 sites identified as a result of the literature and file search, including 12 prehistoric sites, 7 historic period sites and 3 multi-component sites (sites containing both prehistoric and historic period resources) (Baker and Ellis 2003). Three of the sites are considered significant; one is listed in the NRHP, one has been recommended as eligible, and one has been formerly determined eligible. In addition, two historic-period structures have been recorded as significant resources, the Cold Springs Dam and major associated elements of this irrigation system and McNary Dam.

Extending across the study area are both active and abandoned segments of irrigation systems developed between 1900 and 1930 by private interests and by the BOR as part of the Umatilla Basin Project. Five elements of the Cold Springs portion of the Umatilla Basin Project have been determined eligible for listing on the NRHP: the Cold Springs Dam, the Furnish Ditch, the Feed Canal, the Feed Canal Diversion Dam, and the A-Line Canal (Baker and Ellis 2003). In addition, the Three Mile Diversion Dam on the Umatilla River and the West Extension Irrigation Canal, which also were constructed by the BOR as part of the Umatilla Basin Project, have been determined eligible for the NRHP.

Cultural resources field surveys have not been conducted for the proposed transmission and water/gas lines. However, field surveys will be conducted by the CRPP prior to project-related construction. Results of the field surveys will be reviewed by the SHPO and THPO.

3.7.2 Environmental Consequences and Mitigation

3.7.2.1 Plant Site

Two isolated finds, 5N.29E.7/01 and 5N.29E.7/02, were located during the cultural resources field survey of the plant site. Isolated finds are not eligible for inclusion in the NRHP; therefore, there will be no effect to cultural resources in accordance with the NHPA, as amended. The aqueduct,

currently in use, and remnants of piping and cement slabs from earlier use of the aqueduct are located within the plant site. However, there is no evidence indicating that these features are over the 50 years old necessary to qualify them as an archaeological site.

Due to the possibility that burials and subsurface cultural material may be encountered during project construction, the CRPP recommends that an archaeological monitor be present during all ground disturbing activities associated with construction of the plant facility. If human remains or subsurface cultural material are inadvertently discovered, all work in the vicinity of the find would cease, the CTUIR would be notified, and in the case of ancestral remains, the CTUIR's Inadvertent Discovery Plan would be implemented.

3.7.2.2 Transmission, Water, and Gas Lines

Based on the file search data, the proposed water and gas lines would cross one previously recorded historic site, which was previously recommended as not eligible to the NRHP, and three NRHP-eligible elements of the Cold Springs irrigation system: the A-line Canal, the Feed Canal, and the Furnish Ditch. Upon concurrence from the SHPO, adverse effects to the three NRHP-eligible elements would be mitigated by horizontally boring under these features rather than trenching through them. The file search indicates that no significant cultural resources are located within or adjacent to the proposed transmission line.

3.7.2.3 Ethnographic Resources

The CRPP considers the Wanapa Energy Center plant site to be a TCP; therefore, the CRPP recommends a CRPP Tribal monitor be present during all ground disturbing activities. Additionally, the CRPP recommends that they be consulted throughout the entire construction process, including planning, until the project is completed.

3.7.3 Impact Summary

No NRHP-eligible sites were located during the cultural resources field survey of the plant site; however, due to the traditional and historical use of the plant site area by the Umatilla and the Walla Walla tribes, monitors would be present during all ground disturbing activities associated with construction of the plant facility. If subsurface cultural material or human remains were located during project-related construction, all work would cease, the CTUIR notified, and, in the

case of ancestral remains, the CTUIR's Inadvertent Discovery Plan would be implemented in consultation with the THPO. Therefore, any cultural resources excavated within the plant site would receive the appropriate level of treatment as defined by the THPO.

Based on the file search, the proposed water and gas lines would cross two NRHP-eligible historic canals and one NRHP-eligible ditch. Upon receiving concurrence from the SHPO, adverse effects to the canals and ditch would be avoided by boring under these historic features; therefore, no impacts to the canals and ditch are expected to occur. No cultural resources were identified as a result of the file search within or adjacent to the proposed transmission line; however, field surveys are required to determine the location and importance of cultural resources within the transmission line ROW. Adverse impacts and mitigation procedures would be determined in consultation with the SHPO/THPO. Monitors may need to be present during construction on portions of the transmission, water, and gas lines.

3.8 Land Use and Recreation

The primary land use and recreational issues include conversion of existing natural and agricultural land uses to industrial uses for project facilities, and potential impacts to nearby residents and visual impacts to recreational users.

3.8.1 Affected Environment

3.8.1.1 Land Use

Land Uses

The proposed plant would be constructed on approximately 47 acres out of 195 acres of Tribal Trust Land owned by the CTUIR, located approximately 4 miles east of Umatilla, in Umatilla County, Oregon (**Figure 1.1-1**). It would be located in the southern one-third of Section 7, Township 5 North (T5N), Range 29 East (R29E). The land would be leased from the CTUIR, which owns and manages land within and adjacent to the site on the east and south. The northern property boundary is a fence line located immediately south of an old railroad grade that parallels the southern bank of the Columbia River. The Port of Umatilla owns the land situated immediately south and southwest of the site. The TRCI is located on state land approximately 1.5 miles west of the site. The Wanaket Wildlife Area borders the site on the east and is just south of Port of Umatilla land on the south and southwest.

The project electrical transmission line, pipelines, and access road would cross Port of Umatilla land, BPA ROWs, grazing lands, irrigated croplands, an interstate highway and other paved and unpaved roads, and other private and public properties.

The Wanaket Wildlife Area encompasses 2,817 acres, lying adjacent to the south shore of the Columbia River, along Lake Wallula. The Wanaket Wildlife Area is bisected from west to east by U.S. Highway 730. The legal description for the Wanaket is T5N, R28E, and portions of Sections 13, 23, 24, and T5N, R29E, and portions of Sections 16, 17, 18, 19, 20, and 21. The area consists primarily of sagebrush-dominated shrub/steppe habitats and emergent wetlands. The Wanaket Wildlife Area was established to compensate for wildlife habitat losses resulting from the construction of the McNary Hydroelectric facility on the Columbia River and was approved as a Columbia River Basin Wildlife Mitigation Project by BPA and the Northwest Power Planning

Council in 1993. Although the Area is managed for wildlife, waterfowl, and upland bird habitat, limited public access is allowed. Access is typically obtained to conduct hunting, Tribal plant gathering, and Tribal cultural and religious activities. The HID also maintains a ROW through the southwest portion of the Wanaket Wildlife Area to conduct operation and maintenance of the "O" canal and the "OA" lateral. In addition, BPA transmission lines transect the southern half of the Area, through the southwest quarter of Section 13, the northeast quarter of Section 24, and the north half of Section 19 (CTUIR and BPA 2001b).

Land Use Policies

State and local authorizations that are required for various aspects of project construction and operation are listed in **Table 1.3-2**. Usually, before construction of an energy facility can occur in Oregon, the project must be approved by the EFSC by following standards to protect environmental resources under OAR Chapter 345, Division 22, Section 045. The proposed Wanapa Energy Center power plant is exempt from EFSC regulations due to location of the facility on tribal land (i.e., tribal sovereignty). However, certain ancillary facilities (e.g., the natural gas pipeline) may be subject to EFSC review. Construction of the natural gas supply/wastewater discharge pipelines would require county conditional use permits under the current zoning regulations.

3.8.1.2 Residential Areas

Using aerial photography interpretation and ground reconnaissance, structures (residences and outbuildings) were mapped onto a aerial photo base to determine the locations of structures within 0.5 mile of all project components. Structure locations are illustrated on **Figures 3.8-1** and **3.8-2**. The majority of the structures are located in a rural residential area located on both sides of Diagonal Road northeast of Hermiston; the housing development at McNary; residential and commercial developments on both sides of U.S. Highway 395 and Lind Road north of Hermiston, and scattered farmsteads adjacent to the existing Northwest interstate natural gas pipeline. In many locations, residences and farms are located adjacent to county roads where utilities (electrical lines, water lines) parallel the roadways.

Wanapa Energy Center EIS

Figure 3.8-1

Structures (Overall Study Area)

10/07/03

Wanapa Energy Center EIS

Figure 3.8-2

Structures (Plant Site to McNary Substation)

10/10/03

3.8.1.3 Recreation

The major parks and recreational areas in the study area include the Wanaket Wildlife Area, McNary Beach State Park and Recreation Area, Hat Rock State Park, Cold Springs National Wildlife Refuge, and the Columbia River. These recreational areas and their uses are described below.

The only public access allowed on the Wanaket Wildlife Area is non-motorized access to conduct regulated hunting for waterfowl and upland birds. Part of the Wanaket Wildlife Area is flood-irrigated in the late spring/early summer to supplement naturally occurring wetlands and provide waterfowl brood rearing habitat for 11 waterfowl species. Irrigation also occurs in late summer/early fall periods to provide feeding and resting habitat for mallards, Canada geese, and 18 other waterfowl species using the Area during their migrations. Other habitat is managed for upland bird species (e.g., downy woodpecker, California quail, ringed-neck pheasant, western meadowlark, yellow warbler, swallows, and harrier), seven shorebird species, and for mammals (e.g., mule deer and mink). Hunting is permitted only after a daily drawing (i.e., day-of-hunt) on Wednesdays and weekends, with waterfowl hunting limited to 15 hunting parties (i.e., up to two people) for a total of 30 hunters. Thirty additional hunters are permitted to enter the Wanaket Wildlife Area in the afternoon through a second, upland bird hunt drawing. Big game hunting and the use of rifles or pistols is not permitted on the Area. No fishing is allowed on the Area (CTUIR and BPA 2001b).

McNary Beach Park is a 118-acre day-use park that is located on Lake Wallula at RM 293 on the Columbia River, below a steep bluff. The park is about 1.7 air miles northwest of the site, on Port of Umatilla Road about 3 miles east of Umatilla and 1 mile north of U.S. Highway 730. The park is administered by the USACE, at the McNary Lock and Dam, and features a swimming area, hiking trails, fishing, picnic tables, barbecue grills, drinking water, cold showers, flush toilets, and a pay phone. The park is open from dawn to dusk from Memorial Day to Labor Day weekend (USACE 2003).

Hat Rock State Park is a 735-acre day-use and boating park located on Lake Wallula at RM 298 on the Columbia River, surrounded by river bluffs. The park is located about 2.9 air miles east of the project site, on Hat Rock Road about 8.2 miles east of Umatilla and 0.8 mile north of U.S. Highway 730. This park is administered by the Oregon State Parks Department. It features a two-lane boat launch and handling dock, swimming area, hiking trails, fishing, horseshoe pits, picnic

tables, fire pits/barbecue grills, ponds with domestic ducks and geese, drinking water, flush and vault toilets, and a pay phone. The park is open year-round during daylight hours. Hat Rock Campground is a private campground located next to the park. The campground has a store, café, full recreational vehicle (RV) hookup sites (including sewer), RV and tent campsites with water and electricity, hot showers, phones, and a dump station (USACE 2003).

The USFWS Cold Springs National Wildlife Refuge is a day-use park that comprises 3,112 acres and is located about 4.6 air miles to the southeast of the project site, 6 miles east/northeast of Hermiston, and 8 miles north/northeast of Stanfield. This refuge was established by President Theodore Roosevelt on February 25, 1909, as a "preserve and breeding ground for native birds." It includes the tree-lined Cold Springs Reservoir with mixed habitats that provide recreational opportunities for fishing, wildlife viewing, photography, hiking, horseback riding, bicycling, non-motorized boating, boats with electric motors, and hunting during the pheasant/quail and waterfowl (geese, ducks, coot, and snipe) seasons. The reservoir serves as the primary water source for irrigation of area croplands and its water levels are regulated by the BOR. As an irrigation reservoir, the water levels change significantly throughout the year, from 1,550 acres of open water in May when the reservoir is full down to 200 acres of open water after the irrigation season in late August. The northern portion of the Refuge (approximately two-thirds) is closed year-round to public access, the northern portion of the reservoir also is closed from October 1 through February 28/29, and the southern part of the Refuge and reservoir (approximately one-third) is open year-round. The Refuge has six designated parking areas and two car-top boat launch sites that are open from March 1 through September 30. The Refuge is only open for daytime recreational use, from 5:00 a.m. until 1.5 hours after sunset (USFWS nd).

Recreational boating, swimming, fishing, and windsurfing occur elsewhere along on the Columbia River (Lake Wallula), about 0.2 mile north of the project site at RM 295 and stretching westward and eastward. However, the project site would be about 80 air miles east of and not seen from the Columbia River Gorge National Scenic Area.

The Farm City Pro Rodeo is held annually for 5 days in August, in conjunction with the Umatilla County Fair. This is a nationally recognized professional rodeo, attracting participants and visitors from throughout the U.S.

3.8.2 Environmental Consequences and Mitigation

3.8.2.1 Land Use

The power plant site would convert 47 out of 195 acres from grassland-steppe habitat to an industrial facility for the life of the project. Because the power plant site is located on Tribal Trust Land, managed by the CTUIR, it is not zoned. However, the alternative electrical transmission line and pipeline routes cross various types of city and county zoning and comprehensive land use designations. Although the project may require some zoning changes or variances under the applicable city and county regulations, it would not require a zoning change under the state site certificate approval process.

Easements would be obtained from the landowners for the proposed water line, the natural gas pipeline and water discharge line, and the proposed transmission line ROW. The new 17,684-foot (3.35-mile) water pipeline corridor would parallel existing roads from the Port of Umatilla to the Wanapa Energy Center.

The proposed natural gas supply/wastewater discharge pipelines route would be about 52,362 feet (9.92 miles) long. The route would traverse south from the project site until it reached U.S. Highway 730, follow on the north side of U.S. Highway 730 traversing southeast for 0.3 mile, cross U.S. Highway 730 and traverse south until reaching West Progress Road, follow on the north side of West Progress Road and traverse east for 1.4 miles, traverse southward until reaching the Northwest Natural Gas Pipeline ROW, and then follow that ROW southeast until reaching the PGT pipeline.

The proposed transmission line ROW would be about 23,450 feet (4.44 miles) long. The route would traverse southwest from the project site, cross U.S. Highway 730, parallel an existing BPA ROW and go west/northwest, and then follow next to another existing BPA ROW north.

Table 3.8-1 generally summarizes the current types of land use that would be occupied or crossed by each of the project components of the Proposed Action, and thus the types of land use conversions that would occur.

Table 3.8-1
Types of Land Use Affected/Converted by the Proposed Action
(miles/acres)

Type of Land Use	Access Road	Water Supply Line	Natural Gas Supply/ WasteWater Discharge Line	Electrical Line
Rural residential			1.9 / 21.86	>0.0 / 0.22
Irrigated cropland			6.2 / 75.67	
Irrigated pasture				1.5 / 26.82
Grassland-steppe (natural)	0.9 / 5.86	1.7 / 10.22	1.8 / 21.73	2.2 / 40.90
Commercial & residential				
Industrial	0.5 / 2.83	1.7 / 10.08		0.5 / 9.75
Highway			>0.0 / 0.37	<0.1 / 0.89
Railroad			0.1 / 0.70	

3.8.2.2 Residential Areas

Those most likely to be affected by the project are the residents living near the proposed natural gas supply/wastewater discharge pipeline and the electrical transmission line ROWs. An analysis of these two ROWs showed that 16 residences are located within 200 feet of the pipeline ROW and 10 residences are located within 300 feet of the proposed electrical transmission line. These residents would be most affected by construction noise, disruptions to traffic flow and access, and temporary to long-term visual impacts. To reduce these impacts, facilities would be located a minimum of 200 feet from the nearest residents. Landowners also would be notified at least 5 days before the start of construction on or near their land, unless earlier notification was requested in the easement negotiations. They would be notified of the construction plans and schedules that are to occur on their land. Fences then would be cut before clearing and grading to provide access for equipment. Any fence that required cutting would be braced and secured to prevent the slacking of wires. Temporary gates would be installed across openings to control livestock and to limit public access. At the end of construction, the site would be graded and restored, fences would be replaced,

and pipeline markers would be installed. When constructing in or near a roadway, one traffic lane would always remain open and private drives would remain accessible.

3.8.2.3 Recreation

No recreational activities would be displaced by the project. Temporary disruptions in access for recreational users might occur during construction, to assure safety while there are open trenches, disturbed lands, staged materials and supplies, and heavy equipment is operating.

Hunters would continue to be allowed to hunt on the Wanaket Wildlife Area, but their recreational experience would be affected by the noise and visual impacts of the facilities during construction and operation of the power plant. As indicated earlier, recreationists on the Columbia River, and possibly the Cold Springs National Wildlife Refuge, would be able to see the four 213-foot-tall exhaust stacks, the turbine building, and possibly other parts of the facility. They would experience a significant change in the aesthetic quality of the area, from a natural grassland-steppe area, characteristic of the bluffs above and along the Columbia River, to an industrial facility. Recreational users of McNary Beach State Park and Recreation Area and Hat Rock State Park should not be affected by the project because of the 150-foot-high bluff that would screen them from the project.

3.8.3 Impact Summary

3.8.3.1 Land Use

Construction of the project components would occur on Tribal Trust Land and private land varying land uses. The power plant would convert 47 acres of grassland-steppe habitat to an industrial site. The other project components would occur on land used for rural residential, agriculture, grassland- and shrub-steppe, industrial, highway ROW, and railroad ROW. Construction noise and dust would be experienced for less than 1 month at over 16 residences located within 200 feet of the gas supply/water discharge pipeline ROW centerline and also at 10 residences within 300 feet of the electric transmission line ROW centerline.

3.8.3.2 Recreation

Project construction and operation would not displace recreational users in the Wanaket Wildlife Area, McNary Beach State Park and Recreation Area, Hat Rock State Park, Cold Springs National Wildlife Refuge, or Columbia River. However, increased traffic, visual, and noise could affect the recreational experience in the Wanaket Wildlife Area, but not in a manner that would change future use. Recreational users of the McNary Beach State Park and Recreation Area and Hat Rock State Park would not be affected because of visual screening by a bluff.

3.9 Socioeconomics

3.9.1 Affected Environment

The study area for the socioeconomic analysis includes Umatilla County, where the project would be located, and the nearby surrounding cities of Hermiston, Umatilla, and Stanfield where potential impacts are most likely to occur. Information specific to the CTUIR population is located in Section 3.9.1.5. Information also is provided for Morrow County, located west of Umatilla County, where additional work force members are likely to originate from and for the State of Oregon for comparative purposes.

3.9.1.1 Population and Environmental Justice

Umatilla County had a population of over 70,500 people in 2000 (see **Table 3.9-1**). This represented a moderate average annual increase of 1.9 percent from the 59,200 people living in the county in 1990, and that growth rate was similar to the state annual average increase of 2.0 percent. In contrast, the cities of Hermiston, Umatilla, and Stanfield experienced significant average annual growth since 1990. In 2000, Hermiston had 13,400 people with 3.4 percent annual growth, Umatilla had nearly 5,000 people with 7.2 percent annual growth, and Stanfield had nearly 2,000 people with 2.6 percent average annual growth (U.S. Bureau of the Census 2002, 1992).

Table 3.9-1
General Population Characteristics - 1990 and 2000

	Population		1990-2000 Change	
Jurisdiction	**1990**	**2000**	**Number**	**Ave Annual %**
Hermiston	10,040	13,417	3,377	3.4
Stanfield	1,567	1,971	404	2.6
Umatilla	2,870	4,946	2,076	7.2
Pendleton	15,127	16,262	1,135	0.8
Umatilla County	59,249	70,548	11,299	1.9
Morrow County	7,625	10,995	3,370	4.4
Oregon	2,842,321	3,421,399	579,078	2.0

Sources: U.S. Bureau of the Census 2002, 1992.

Environmental justice is the evaluation of potential disproportionate impacts to minority and low-income populations. Umatilla and Morrow counties had greater proportions of minority populations in 2000 (18 percent and 25 percent, respectively) than the State of Oregon (13.6 percent, see **Table 3.9-2**). Similarly, minority populations made up 20.9 percent of Hermiston, 30.6 percent of Umatilla, and 31.1 percent of Stanfield in 2000, all substantially greater then the proportion of minorities found in the State. The largest minority group in all jurisdictions was categorized as "other" by the Census, but the largest single minority groups were generally African-Americans and Native Americans. Hermiston also had a relatively large Asian population. Poverty levels can be used as a measure of low-income populations. In all jurisdictions, the percentage of the population living below the poverty level was somewhat to significantly greater than the 11.6 percent in the State overall. The greatest percentage occurred in Umatilla where 19.4 percent of the population had incomes below the poverty level (U.S. Bureau of the Census 2002).

3.9.1.2 Housing

Umatilla County had more than 27,600 housing units in 2000, of which nearly 2,500 or 9.0 percent were vacant (see **Table 3.9-3**). There were 760 units available for rent year-round and 790 units available on a seasonal basis. Morrow County had an additional 500 vacant units available for rent, with 126 available for rent year-round and 233 units available seasonally. Median gross rent was $481 per month in Umatilla County and $473 per month in Morrow County, substantially less than the $620 per month rent for Oregon, overall (U.S. Bureau of the Census 2002). In addition, there are a number of hotel and motel rooms available within Umatilla County and the surrounding cities. In 2000, the Oregon Lodging Association estimated that Umatilla County had a total of 1,726 rooms available for rent in hotels, motels, bed and breakfasts, and resorts in the area (BPA 2001). **Table 3.9-4** summarizes the four hotels/motels located in Hermiston and Umatilla.

3.9.1.3 Employment, Economics, and Fiscal/Taxes

The principal industries in Umatilla County include agriculture, food processing, and forest/wood products. Additional major contributors to the economy include tourism, manufacturing, recreation, aggregate production, and power generation. Overall retail sales in the county were $567.2 million in 1997 (U.S. Bureau of the Census 2002). The three primary agricultural products in the county, as represented by the largest gross farm sales, are vegetable crops, field crops, and

Table 3.9-2
Environmental Justice Characteristics - 2000

Jurisdiction	Population	Race												Below Poverty	
		White Number	%	Black Number	%	Am Indian & Alaskan Number	%	Asian Number	%	Hawaiian & Pacific Isl. Number	%	Other Number	%	Number	%
Hermiston	13,417	10,618	79.1	122	0.9	122	0.9	259	1.9	24	0.2	2,039	15.2	1,655	12.4
Stanfield	1,971	1,359	68.9	6	0.3	15	0.8	14	0.7	0	0.0	503	25.5	279	14.2
Umatilla	4,946	3,432	69.4	206	4.2	35	0.7	13	0.3	0	0.0	1,188	24.0	817	19.4
Pendleton	16,262	14,393	88.5	322	2.0	422	2.6	66	0.4	11	0.1	657	4.0	1,910	13.3
Umatilla County	70,548	57,873	82.0	707	1.0	2,225	3.2	492	0.7	62	0.1	7,679	10.9	8,524	12.7
Morrow County	10,995	8,242	75.0	17	0.2	182	1.7	56	0.5	3	0.0	2,216	20.2	1,617	14.8
Oregon	3,421,399	2,957,510	86.4	53,032	1.6	43,434	1.3	99,136	2.9	7,583	0.2	146,837	4.3	388,740	11.6

Source: U.S. Bureau of the Census 2002.

Table 3.9-3
Housing Characteristics - 2000

Jurisdiction	Total Units	Occupied	Vacant				Median Gross Rent
			Total Number	Percent	For Rent Number	Seasonal Number	
Hermiston	5,421	5,047	374	6.9	226	21	$488
Stanfield	699	648	51	7.3	31	0	$504
Umatilla	1,515	1,378	137	9.0	89	12	$512
Pendleton	6,341	5,945	396	6.2	198	71	$448
Umatilla County	27,676	25,195	2,481	9.0	760	790	$481
Morrow County	4,276	3,776	500	11.7	126	233	$473
Oregon	1,452,709	1,333,723	118,986	8.2	38,901	39,629	$620

Source: U.S. Bureau of the Census 2002.

Table 3.9-4
Hotels and Motels in Hermiston and Umatilla

Hotel/Motel	Location	Rooms
Best Western Hermiston Inn	2255 U.S. Highway 395 South, Hermiston	54
Oak Tree Inn	1110 SE 4th Street, Hermiston	62
Oxford Inn	655 North 1 Street, Hermiston	87
Oxford Suites	1050 North 1 Street, Hermiston	127
Tillicum Motor Inn	1481 6th Street, Umatilla	40
Total		**370**

cattle and calves. There are a total of 97 manufacturing facilities in the county, of which 27 are located within Hermiston (Oregon Employment Department 1998; Oregon State University Extension Economic Information Office; and Hermiston City Administration, as cited by the Oregon Economic & Community Development Department 2003).

As shown in **Table 3.9-5**, in 1999 nearly 33,600 people comprised the civilian labor force (age 16 years and older) in Umatilla County with about 7.5 percent of that work force (2,530 people) unemployed that year. The primary employment sectors included services (35.9 percent), retail trade (13.9 percent), and manufacturing (12.8 percent). In comparison, Oregon State's primary employment sectors were services (41.3 percent), manufacturing (14.4 percent), and retail trade (12.5 percent) (U.S. Bureau of the Census 2002).

Table 3.9-5
Employment Characteristics, Persons 16 Years and Over - 1999

	Umatilla County		Hermiston		Oregon
Status/Industry	**Number**	**Percent**	**Number**	**Percent**	**Percent**
Status In Labor Force:					
Civilian	33,598		6,672		
Employed	31,068	92.5	6,155	92.3	93.5
Unemployed	2,530	7.5	517	7.7	6.5
Armed Forces	23	0.1	0	0.0	
Industry:					
Agriculture, Forestry, Fisheries, and Mining	2,358	7.6	368	6.0	3.2
Construction	2,109	6.8	350	5.7	6.9
Manufacturing	3,976	12.8	673	10.9	14.4
Transportation, Warehousing, and Other Util.	2,121	6.8	574	9.3	4.7
Information	462	1.5	78	1.3	2.4
Wholesale Trade	925	3.0	226	3.7	4.1
Retail Trade	4,328	13.9	1,066	17.3	12.5
Finance, Insurance, and Real Estate	1,073	3.5	273	4.4	6.1
Services	11,147	35.9	2,113	34.3	41.3
Public Administration	2,569	8.3	434	7.1	4.4
Total	31,068	100.0	6,155	100.0	100.0

Source: U.S. Bureau of the Census 2002.

In Hermiston, nearly 6,700 people comprised the civilian labor force (age 16 years and older) with about 7.7 percent of that work force (517 people) unemployed that year. Similar to Umatilla County overall, the primary employment sectors in Hermiston included services (34.3 percent), retail trade (17.3 percent), and manufacturing (10.9 percent) (U.S. Bureau of the Census 2002). The five largest employers in Hermiston are summarized in **Table 3.9-6**.

Table 3.9-6
Five Largest Employers in the City of Hermiston

Company	Product/Service	Number of Employees
Wal-Mart	Distribution facility	1,000
JR Simplot	Food products	850
Lamb-Weston, Inc.	French fries	500
Marlette Homes, Inc.	Manufactured homes	460
Hermiston Foods	Frozen foods	450

Source: Hermiston City Administration, as cited by the Oregon Economic & Community Development Department 2003.

As shown in **Table 3.9-7**, all of the jurisdictions in the study area had somewhat to significantly lower median household, median family, and per capita income levels in 1999 than for the State, overall. Umatilla County had a median household income of $39,249 compared to $40,916 for the State, a median family income of $41,850 compared to $48,680 for the State, and a per capita income of $16,410 compared to $20,940 for the State of Oregon (U.S. Bureau of the Census 2002).

There is no general sales tax levied in Oregon. Property taxes are assessed using permanent rates set for all taxing districts in fiscal year 1997-1998. The tax rates cannot exceed $15 per $1,000 of real market value. Construction occurring since July 1, 1995, is valued at the average rate of similar properties in the area, and is limited to a 3-percent annual growth rate. The total assessed value of property in Umatilla County was $3.760 billion in 2000 and $3.627 billion in 1999. Corporations conducting or authorized to conduct business in the state pay an Oregon excise tax, and corporations not conducting or authorized to conduct business in the state but having income from Oregon are required to pay an Oregon income tax. Employers in the state also are required to pay unemployment insurance. New employers as of 2002 are required to pay a fixed rate of 3 percent of the taxable wage base. Investor-owned utilities operating within the state also are required to pay an annual fee, based on 0.25 percent of gross operating revenues. Finally, other fees that represent sources of revenue for the state, county, or city include motor vehicle licensing, driver licensing, fuels, hunting and fishing licenses, hotel-motel, and emergency communications (911) taxes and fees (Oregon Economic & Community Development Department 2003).

Table 3.9-7
Income Characteristics - 1989 and 1999

Jurisdiction	Median Household			Median Family			Per Capita		
	1989	1999	Ave Annual %	1989	1999	Ave Annual %	1989	1999	Ave Annual %
Hermiston	$20,674	$35,354	7.1	$25,501	$42,881	6.8	$9,729	$17,075	7.6
Stanfield	$23,564	$35,286	5.0	$24,449	$38,145	5.6	$8,815	$12,842	4.6
Umatilla	$20,799	$33,844	6.3	$21,976	$32,969	5.0	$8,481	$11,469	3.5
Umatilla County	$22,791	$36,249	5.9	$27,459	$41,850	5.2	$11,178	$16,410	4.7
Morrow County	$23,969	$37,521	5.7	$26,825	$40,731	5.2	$10,412	$15,802	5.2
Oregon	$27,250	$40,916	5.0	$32,336	$48,680	5.1	$13,418	$20,940	5.6

Sources: U.S. Bureau of the Census 2002 and 1992.

Table 3.9-8 summarizes Umatilla County's budget for fiscal year 2004. The total budget was almost $48.5 million. Sources of revenue included almost $21.3 million in various revenues (e.g., unrestricted funds, beginning balances, and transfers into the account), almost $7.4 million from local funds, over $18.8 million in state funds, and $972,000 in federal funds. (Umatilla County 2003).

Table 3.9-8
Umatilla County Fiscal Year 2004 Budget

Fund/ Department	Local Revenue	State Revenue	Federal Revenue	Other Revenue	Expenditure
General	$1,953,985	$2,122,123	$41,900	$12,925,079	$17,043,087
Special Revenue	3,238,895	4,899,859	278,606	3,080,009	11,497,369
Road	180,500	3,347,000	651,000	1,909,777	6,088,277
Children & Families	8,800	749,122	0	397,222	1,155,144
Mental Health	877,600	7,742,580	0	1,623,357	10,243,537
Capital Projects	1,000	0	0	539,902	540,902
Other Requirements	1,126,884	0	0	790,000	1,916,884
Total	$7,387,664	$18,860,684	$971,506	$21,265,346	$48,485,200

Source: Umatilla County 2003.

Tables 3.9-9 and **3.9-10** summarize the City Hermiston's budget for 2001-2002. Total revenues were over $31.0 million and total expenditures were over $29.0 million. The greatest sources of revenue were non-revenue receipts, cash forward, and energy services. Major capital costs now or in the near future include completion of the system capital acquisition costs for Hermiston Energy Services (a new municipal energy utility), construction of a new community pool at Butte Park (an estimated total of up to $3.64 million), and improvements to the wastewater treatment plant (an estimated total of up to $8.7 million over several years). In the 1996-1997 budget, the City of Hermiston had $370,267,000 in assessed property value. Total taxes of $25.28 per $1,000 in property value were assessed that year, including $6.52/$1,000 for the city, $15.68/$1,000 for the school district, and $3.08/$1,000 value for other taxing districts.

3.9.1.4 Public Services and Utilities

The Hermiston Fire and Emergency Services District provides fire prevention, fire suppression, emergency medical services, and hazardous materials response to the City of Hermiston and to

Table 3.9-9
City of Hermiston 2001-02 Budget Revenues and Expenditures

Fund	Revenues	Expenditures
Bonded Debt	$1,539,408	$1,430,700
Bancroft Bond	0	0
General Fund	5,852,800	4,847,174
State Tax Street	574,843	574,843
Transient Room	116,439	46,223
Utility	3,123,670	2,662,108
Regional Water	1,051,470	680,052
Revolving Loan	251,949	
Energy Services	15,242,763	14,708,121
Pool Construction	0	0
Reserve	3,273,409	4,110,627
Total	$31,026,751	$29,059,848

Source: City of Hermiston 2003b.

Table 3.9-10
City of Hermiston 2001-02 Sources of Revenues

Revenue Source	Revenues
Property Taxes	$2,351,395
Local Assessments	75,140
License & Franchise	561,400
Fines & Penalties	90,000
Use of City Money	347,600
From other Agencies	1,520,170
Service Charges	520,720
Non-Revenue Receipt	11,115,000
Miscellaneous Revenues	230,000
Sewer Service	1,070,000
Water Service	1,826,500
Energy Service	5,374,000
Transfer from Other Funds	1,619,395
Cash Forward	5,775,870
Total	$32,477,190

Source: City of Hermiston 2003b.

northwestern Umatilla County. The District provides fire services to a 135-square-mile area and ambulance services to a 500-square-mile area. In addition, the District has mutual-aid agreements with five neighboring fire departments. The District has 21 paid and 30 volunteer personnel staffing its three fire stations and equipment:

Stations

- Station 1 – the headquarters and primary station at the Public Safety Center at 330 S. First Street
- Station 2 – at Diagonal Boulevard and Craig Road
- Station 3 – at Westland Road

Equipment

- 3 light fire attack engines
- 4 full-size fire attack engines
- 1, 75-foot Quint Aerial Ladder
- 1 rescue engine
- 3 water tenders
- 4 ambulances
- 5 hazardous materials response assets
- 3 staff vehicles
- 1 parade engine

The district had an Insurance Services Organization rating of 4. **Table 3.9-11** provides a summary of the District's fire responses in 2001 (City of Hermiston 2003).

Medical services are provided by the Good Shepherd Medical Center in Hermiston. This is a 48-bed facility that provides complete medical/surgical, ob/gyn, critical care, surgery services, and ambulance services. The Center has a Trauma Level 3 Emergency Room that is open 24 hours a day. It has over 30 physicians and 400 employees. The Center, as part of the Good Shepherd Health Care System, is affiliated with TLC Home Health, Vange John Memorial Hospice, Good Shepherd Clinic Pharmacy, Good Shepherd Medical Group, and the Cascade East Health Plans (Good Shepherd Health Care System 2003).

Table 3.9-11
Hermiston Fire and Emergency Services District Fire Responses - 2001

Type of Response	Number of Responses
Structure fires	189
Vehicle fires	23
Natural cover fires	122
False alarms	96
Hazardous materials responses	5
Rescue	11
Mutual-aid	3
Other types of responses	170
Total	**619**

Source: City of Hermiston 2003.

Law enforcement services are provided by the Hermiston Police Department, the Umatilla County Sheriff's Department, the Oregon State Patrol, and by other local municipal police departments. The Hermiston Police Department is housed in the Public Safety Center at 330 South First Street in Hermiston. The department has a total of 42 staff, including 8 dispatchers, 1 dispatch supervisor, 17 police officers, 9 reserve officers, 4 sergeants, 1 lieutenant, 1 chief, 0.5 nuisance abatement staff, and 0.5 administrative assistant (City of Hermiston 2003).

The Umatilla County Sheriff Department's Criminal/Patrol Division has 12 sworn deputies. Nine of those deputies are assigned to criminal investigations and patrol duties, two are assigned to the domestic violence investigation unit, and one is assigned to the drug task force. The department's Corrections Division/Jail includes the Umatilla County Correctional Facility, a 250-bed jail in Pendleton. The department's Communication Division includes the Umatilla County Dispatch Center, which provides emergency 911 and non-emergency services to a number of cities (including Stanfield) and unincorporated areas in the county. The center receives over 7,500 calls annually (Umatilla County Sheriff's Department 2003).

In addition to the law enforcement services in the project study area and within Umatilla County, TRCI is located outside of the Umatilla city limits, on Beach Access Road about 1.5 miles west of the project site. The facility is designed to hold about 1,550 medium custody male inmates. As of November 2002, the facility housed 1,452 inmates. Although it is a medium custody facility, more

violent offenders have been housed there. The facility is staffed by about 250 correctional officers, corporals, and sergeants and about 100 non-custody support staff (American Federation of State, County, and Municipal Employees 2003; Oregon Department of Corrections 2002).

The project site does not currently have electrical, natural gas, water, wastewater, or telecommunications services. Electrical service to the surrounding area is provided by the Umatilla Electric Cooperative and natural gas is provided by Cascade Natural Gas. Water is supplied to the region by the Port of Umatilla from a pumping station at RM 293 on the Columbia River. The City of Hermiston obtains water from deep and shallow wells, a surface water intake on the Columbia River and a regional water treatment facility (part of the Port of Umatilla regional water supply system), pump and booster pump stations, storage tanks, and reservoirs. Wastewater collection and treatment is conducted by the City of Hermiston, with a 2.94-mgd capacity system being used at less than half its capacity at 1.2 mgd. Telecommunication services in Hermiston are provided by U.S. West and E.O. Telecom, and cable television service is provided by Charter Cable (City of Hermiston 2003).

3.9.1.5 CTUIR Demographics and Socioeconomic Issues

The total CTUIR Reservation population grew 72 percent between 1960 and 2000 while the Tribal population grew by 131 percent in the same time period. Both populations have seen significant increases in the last decade after several decades of general decline. Based on the demographic statistics below (**Table 3.9-12**), 36 percent of the Tribal population on the Reservation was 20 years old or younger.

Between 1990 and 2000, the unemployment rate for the Tribal population on the Reservation declined from 32 percent to 11 percent. Much of this decline can be attributed to the growth in Tribal government and enterprises such as the Wildhorse Resort and Casino. The per capita income of Indians on the Reservation has more than doubled since 1990 and has grown to 73 percent of the county per capita income.

The poverty rate among Tribal members on the Reservation dropped from 35 percent to 23 percent during the 1990-2000 time period. The 2000 poverty rate is twice the statewide poverty rate and 10 percent higher than the county wide rate.

Table 3.9-12
Demographic Statistics

Age Class	Number in Age Class	Percentage of Total
0-10	441	18
11-20	440	18
21-30	363	15
31-40	340	14
41-50	370	15
51-60	200	8
61-70	127	5
71-80	89	4
81-90	32	1
91 or older	1	Less than 1
Total	**2,404**	

Data provided by CTUIR. Department of Economic and Community Development.

The number of homes occupied by Indians on the Reservation has increased by 49 percent in the last decade, outpacing the total Indian population growth of 42 percent. Indian ownership on the Reservation has increased by 62 percent through an increase of 93 homes. Housing patterns on the Reservation are generally scattered site development on parcels ranging from 0.25 acre to hundreds of acres. Most of the population is concentrated in the Mission area where there is subsidized public housing. The number of homeowners on the Reservation that are paying more than 30 percent of their income for mortgage costs has increased from 11 percent to 16 percent in the last decade while the number of renters paying more than 30 percent has increased from 13 percent to 25 percent. This is indicative of a tight housing market and a community increasingly at risk of losing their homes.

3.9.2 Environmental Consequences and Mitigation

3.9.2.1 Population and Environmental Justice

No residents would be displaced as a result of construction of the project facilities. Construction activity on the project would vary throughout the 24- to 26-month construction period that would begin in September 2004. It is estimated that the work force could include:

- Power plant – 100 to 600 workers through construction;
- Natural gas pipeline – 80 workers over 3 months;
- Water discharge pipeline – 20 workers over 3 months; and
- Electrical transmission line – 120 workers over 4 months.

Management and specially skilled workers, possibly comprising 10 percent of the work force (i.e., maximum of 60 workers), would likely originate from throughout Washington, Oregon, or possibly remainder of the United States. These workers would most likely rent a hotel/motel room, apartment, or house relatively close to the project site (i.e., Hermiston, Umatilla, or Pendleton). As much as 30 percent of the construction work force (i.e., a maximum of 180 workers) could be hired locally from within Umatilla and Morrow counties. The 2,530 unemployed people in Umatilla County in 1999 indicates that an adequate local work force exists to fill these local jobs. The local workers would likely to remain at their existing residences and commute to the project construction sites on a daily basis. The remaining 60 percent (i.e., maximum of 360 workers) of the peak power plant work force would likely originate from outside of the study area, such as from the Tri-Cities area in Washington. These workers may elect to commute daily to the project site, or may rent a room during the work week and travel home for the weekends.

Assuming that each direct construction job generates an additional 0.3 indirect/secondary jobs (Weber and Howell 1982), an estimated 180 indirect jobs would be generated by the project during the peak construction period. These jobs would likely to be generated in the hotels/motels, restaurants, gas stations, and retail stores that would be providing additional services to the direct construction work force.

Although Umatilla County and its cities have a greater proportion of minorities and low-income people than the state, they would not be disproportionately negatively affected by the facilities because no residents would be displaced. However, because of their greater presence in the study area, they may benefit from the higher-paying maximum 180 direct construction jobs that would likely be generated by the project and up to 180 secondary jobs that could be generated.

3.9.2.2 Housing

As indicated earlier, there were an estimated 760 vacant units available for rent in Umatilla County, 126 units available in Morrow County, and an additional 1,726 hotel/motel rooms

available to rent in Umatilla County (370 in Hermiston alone) in 2000. Thus, adequate housing would likely be available for the 60 to 420 maximum power plant workers that would be seeking temporary to long-term residences near the power plant site during construction.

The 30 operational employees would likely be partially hired from within the study area and the rest would move to Umatilla County with their families, if applicable. If all workers were hired from outside of the study area and there were an average of 2.6 people per household, a maximum of 78 people would in-migrate as a result of operation of the power plant. Because there is an adequate number of houses for sale, or the workers may decide to buy property and construct their own homes, no long-term impacts are likely to occur to local population levels or housing as a result of the operational work force.

3.9.2.3 Employment, Economics, and Fiscal/Taxes

One potential direct impact would be the temporary loss of crop production along the natural gas supply/wastewater discharge pipeline and electrical transmission line construction ROWs. The affected land would be taken out of production while these facilities are constructed. Although the disruption might last as little as one to several weeks, it might result in loss of an entire growing season. These landowners would be compensated for the lost income as part of the negotiated fees for the easements to cross their properties. Potential longer-term reductions in crop production also could occur as a result of compacted or disturbed topsoils. Best management construction practices would be used to separate and set aside topsoil during construction, replace it appropriately, and to till the soil to ensure that compaction is eliminated.

During construction, the project would have a positive impact by generating increased sales to local merchants and wholesalers from the purchase of local construction materials such as gravel, concrete, lumber, equipment, and other goods. Similarly, the construction work force expenditures within the study area also would have a positive impact, leading to increased business for local hotels and motels, restaurants, gas stations, and retail stores.

Since the power plant would be sited on land held in trust by the United States for the CTUIR, the beneficial owners, state and county taxation would not be applicable. However, the power plant would pay a tribal tax to the CTUIR, equivalent to the aggregate of State taxation. CTUIR would spend these tax revenues on goods and services mainly in Umatilla County, thereby directly introducing these revenues into the local economy. All project "tax advantages" are realized in the

federal taxation scheme through a federal provision for accelerated depreciation for projects built on tribal land. Therefore, the power plant would introduce the same amount of revenues through taxation into the local and Oregon economies but the manner of introduction would be different. Any "tax breaks" would be at the federal level. Further, the power plant has committed to spend environmental mitigation funds in the local area. The power plant would pay for all local services used by the facility at rates negotiated with the local authorities. Because BPA buys easements from landowners for the placement of electrical transmission lines on private land, rather than being bought in fee, the land would remain in private ownership and would not be converted to tax exempt property. Thus, there would be no change in county or city tax revenues as a result of construction of the electrical transmission line. However, the natural gas supply/wastewater discharge pipeline would be subjected to property taxes and would generate additional tax revenues for Umatilla County and the various jurisdictions to which property tax revenues are dispersed.

The 10-mile natural gas supply/wastewater discharge pipeline for the project would be subjected to several annual taxes:

- County property tax - 1.5%, or $15 per $1,000 value
- Tax to the Oregon Department of Energy - less than 0.2%
- Gross operating revenue tax to the Oregon Public Utility Commission - 0.25%
- City franchise tax (if applicable) - about 3.0%

It is estimated that it would cost about $10 million to construct the natural gas supply/wastewater discharge pipeline. Based on this figure, an estimated $150,000 in county property taxes and $20,000 in Oregon Department of Energy taxes would be generated by the project on an annual basis. Gross operating revenues have not yet been estimated for the project.

As indicated above, during operation the plant also would provide 30 full-time jobs and an in-migrating population of up to 78 people. As with the construction work force, these workers would have a positive impact by generating additional revenues for local business from purchasing goods and services. The plant also would have a positive impact on the local economy by purchasing and consuming about 10.2 million cubic feet of natural gas per hour. Other power plant purchases that are likely to occur include miscellaneous parts and supplies, aqueous ammonia for the air pollution control system, various treatment and laboratory chemicals, and diesel fuel.

3.9.2.4 Public Services and Utilities

A fire protection system meeting the Uniform Fire Code would be installed within the buildings and yard areas of the power plant site. The system would include a fire water system, dry chemical extinguishing system, a CO_2 extinguishing system, and portable fire extinguishers. Construction and operational work forces would be trained in the use of the equipment and fire suppression, and in first aid. When needed, the plant managers would call upon local and/or regional firefighting and emergency medical services to provide services.

The generating plant would use about 10 to 13 million gallons per day of water from the Port of Umatilla intake and pump facility and its existing water right. This would represent about 12 to 13 percent of the Port's 100.2 mgd water right. The Port would benefit from the additional revenue stream that would be created from selling this water to the project owners. The power plant minimizes water use by using a recirculating cooling system with mechanical draft evaporative cooling towers.

Blowdown/discharge wastewater would meet local permitting requirements and would be discharged into the end of the canal discharging into the Cold Springs Reservoir. This water would have a positive impact by supplementing the water flowing into the reservoir and later being used to irrigate farmlands. Sewerage and other wastewater generated at the power plant would be treated onsite, and thus would not affect local wastewater treatment systems or facilities. Surface water would be collected and diverted to a retention pond with sufficient volume to hold the design storm event.

The generating plant would generate an estimated 1,200 cubic yards of waste annually. Recyclable materials would be separated from the wastes and taken to a recycler, and the remaining waste would be taken by a private contractor to a licensed disposal facility. Chemicals, lubricating oils and grease, and other similar wastes also would be taken by a private contractor to an approved hazardous materials disposal facility.

3.9.3 Impact Summary

Overall, the proposed project would result in beneficial impacts to socioeconomics. When combining all project components, construction activities would create a total of 320 to 820 temporary jobs during a 3- to 36-month period. An estimated 180 indirect/secondary jobs also

would be generated during construction. project operation would result in 30 permanent workers. Adequate housing would be available for the estimated work force numbers. Beneficial impacts also would occur from increased sales in the local area, additional tax revenues from the gas supply/water discharge pipeline ROW property taxes, and the purchase/use of additional natural gas. Since the power plant would be sited on land held in trust by the United States for the CTUIR, the beneficial owners, state and county taxation would not be applicable. However, the power plant would pay a tribal tax to the CTUIR, equivalent to the aggregate of State taxation. CTUIR would spend these tax revenues on goods and services mainly in Umatilla County, thereby directly introducing these revenues into the local economy. All project "tax advantages" are realized in the federal taxation scheme through a federal provision for accelerated depreciation for projects built on tribal land. Therefore, the power plant would introduce the same amount of revenues through taxation into the local and Oregon economies but the manner of introduction would be different. Any "tax breaks" would be at the federal level. Further, the power plant has committed to spend environmental mitigation funds in the local area. The power plant would pay for all local services used by the facility at rates negotiated with the local authorities. Potential adverse impacts would occur due to a temporary loss of crop production along the gas supply/water discharge pipelines and electric transmission line ROWs. Public utilities and services are available and would be used during plant operation. A fire protection system would be installed at the power plant site for fire control and protection. Local services would be available to handle solid wastes produced by the plant.

3.10 Public Health and Safety

3.10.1 Affected Environment

3.10.1.1 Natural Gas Pipeline Safety

The transportation of natural gas involves inherent risk from the potential failure of the pipeline due to corrosion, installation problems, physical deformation, substrate movement or material wear. Pipeline operations are relatively safe and accidental releases are rare. There is a minor potential risk for explosion, fire or significant release of natural gas into the atmosphere.

Natural gas consumption in the U.S. has increased 21 percent since 1988 yet the number of injuries associated with pipeline accidents has declined 39 percent in the same period. This result has been attributed to better construction techniques, stricter safety precautions and stronger training programs. **Table 3.10-1** represents the risk probabilities for natural gas pipelines:

Table 3.10-1
Risk Probabilities for Natural Gas Pipelines
Average Probabilities Per Year (USDOT data – 1986 to 2002)

Event probability per mile year	0.00027 accidents per mile-year	0.000045 injuries per mile-year	0.000012 fatalities per mile-year
Equivalent probability	2.7 accidents: 10,000 miles-year	4.5 injuries: 100,000 miles-year	1.2 fatalities: 100,000 miles-year

The term “per mile-year” is equivalent to “each mile, each year." For example, there would be an estimated 0.00027 accidents along any particular mile of pipe within a given year.

The majority of accidents involving natural gas pipelines are caused by damage from outside forces, primarily third-party damage and earth movement. Third-party damage is responsible for almost 50 percent of all reportable accidents on natural gas pipelines. Earth movements such as subsidence, frost heave, and landslides account for almost 3 percent of accidents.

3.10.1.2 Transmission Line Safety

Currently, there are several transmission lines in the vicinity of the proposed project that are associated with the McNary substation. The Lower Monumental-McNary No. 1 Line runs east and west and then turns north for approximately 1 mile before entering the substation. This north-south corridor also includes several other transmission lines including an existing DC line (see **Figure 2.3-7**). There are seven residences and buildings within four hundred feet of the existing transmission lines. The BPA McNary-John Day Transmission Project (BPA 2002) identified a number of environmental impacts and mitigation measures for the upgrade of the substation and associated transmission facilities. Part of the transmission route for the proposed project would utilize double-circuit structures that would be constructed with single-circuit lines; this would allow for future transmission capacity.

Transmission lines produce electric and magnetic fields whose strengths depend on line design and distance from the line. Field strengths diminish rapidly with distance from the line. There are no national guidelines or standards for electric fields from transmission lines except for the 5-milliampere criterion for maximum permissible shock current from vehicles. Oregon also has a 9-kV/m limit on the maximum field under transmission lines. BPA designs new transmission lines to meet the 9-kV/m maximum on the transmission ROW and 5-kV/m maximum at the edge of the ROW. Transmission lines can be a major source of magnetic field exposure for residences located close by. There are no national guidelines or standards for magnetic field exposure.

3.10.2 Environmental Consequences and Mitigation

3.10.2.1 Natural Gas Pipeline

The gas pipeline would be constructed along a 10-mile corridor from the Northwest Stanfield Compressor Station to the proposed facility. The land use in the construction corridor consists of mixed use and includes agricultural, residential and vacant land.

During construction and operation of the pipeline, there are several potential impacts to public health and safety.

Gas Pipeline Construction Safety Risks

During construction and installation of the pipeline, there is potential for fire and injury due to use of heavy equipment, working in trenches and working with large material components. Directional drilling also would be utilized in certain locations to minimize surface disturbance. There also are potential safety issues associated with increased traffic on access roads and the movement of heavy equipment to the construction corridor.

Contractors that conduct construction activities would be required to develop and implement health and safety plans that address all on-site activities. These plans would include specific procedures for safely conducting any activity with significant safety risks. All contractor employees would receive initial health and safety training before starting work and periodic training updates throughout the project. Emergency response and first aid procedures also would be established and all employees would be trained on their implementation. At the end of every workday, the contractors would secure all construction areas to protect equipment, materials and the public. Fueling of highway authorized vehicles would be conducted off-site. Fueling of construction vehicles would be conducted according to established procedures that minimize fire risks. Only trained personnel would be permitted to conduct high-risk operations such as directional drilling and all other personnel would be required to maintain a safe distance from such operations.

All construction sites would maintain firefighting equipment such as extinguishers and spill response equipment. Vegetation would be cleared from construction sites to prevent contact with fire ignition sources such as vehicles and construction equipment. All construction activities would be conducted according to applicable USDOT, Occupational Safety and Health Administration, and state regulations.

Recommended Mitigation Measures. No measures beyond those included in the proposed project are recommended.

Gas Pipeline Operational Public Health and Safety Risks

As far as potential risk to environmentally sensitive areas, natural gas releases are expected to have limited adverse effects on the environment due to the physical properties of natural gas. Methane, the primary component of natural gas, is colorless, odorless and tasteless. Methane is a naturally occurring product of anaerobic fermentation and is commonly found as an emission from wetlands.

Once released, methane rapidly volatilizes (evaporates) into the atmosphere. While methane is not toxic, it is classified as a simple asphyxiant which means that if breathed in high concentrations, it can cause oxygen deficiency. Because natural gas does not bioaccumulate, is non-toxic and disperses rapidly into the atmosphere, toxicological effects to environmentally sensitive areas would not be expected.

However, natural gas does pose a physical hazard. The greatest hazard to public safety from a major pipeline rupture would be a fire or explosion. Methane has an ignition temperature of 1,000°F and is flammable at concentrations between 5 and 15 percent in air. A flammable concentration within an enclosed space in the presence of an ignition source could explode. However, unconfined mixtures of methane in air are not explosive.

To evaluate the potential hazard to the public, it was determined that there are 16 residences within 200 feet of the pipeline route. Using the risk probabilities for natural gas pipelines, the following risk values to these residences can be calculated for the life of the proposed facility:

Table 3.10-2 demonstrates that the probability of an incident involving the natural gas pipeline would be extremely low, based on historical statistics.

Table 3.10-2
Estimated Incident Rates for the Project's Natural Gas Pipeline Service Life

Service Life	Accidents (#)	Injuries (#)	Fatalities (#)
30 Years Service	0.08	0.01	0.004
50 Years Service	0.14	0.02	0.006

The gas pipeline for the proposed project would be constructed according to federal standards including the Pipeline Safety Act of 1992 and the Pipeline Safety Improvement Act of 2000. Safety specifications include minimum depth cover, pipe wall thickness, design pressures, material selection and protection from internal, external and atmospheric corrosion. There also would be requirements for inspection and testing of welds and frequency of pipeline patrols and leak surveys. Before operation, the pipeline would be tested for leaks using hydrostatic test methods. The pipeline route would be marked with aboveground signs at road crossings to deter third-party damage.

Because the 10-mile route of the gas pipeline is readily accessible, emergency response would be rapid and unhindered by terrain or weather. Subsequent repairs also would be completed quickly.

The potential hazard to public safety and the environment from pipeline failures would be extremely low.

Recommended Mitigation Measures. No measures beyond those included in the proposed project are recommended.

3.10.2.2 Transmission Line

Transmission Line Construction Safety Risks

During construction and installation of towers and conductor/ground wires, there is potential for fire and injury due to use of heavy equipment, working at heights and working with high voltage equipment. Connection of conductors may be done using implosion bolts, which can cause potential injury to construction workers. There also are potential safety issues associated with increased traffic on access roads and the movement of heavy equipment to the construction corridor.

Contractors that conduct construction activities would be required to develop and implement health and safety plans that address all on-site activities. These plans would include specific procedures for safely conducting any activity with significant safety risks. All contractor employees would receive initial health and safety training before starting work and periodic updates throughout the project. Emergency response and first aid procedures also would be established and all employees would be trained on their implementation. At the end of every work day, the contractors would secure all construction areas to protect equipment, materials and the public. Fueling of highway authorized vehicles and helicopters would be conducted off-site. Fueling of construction vehicles would be conducted according to established procedures that minimize fire risks. Helicopter pilots would adhere to established flight safety procedures for protecting construction workers and the general public. Notice would be provided to the public for all high-risk operations such as blasting. Only trained personnel would be permitted to conduct such high-risk operations and all other personnel would be required to maintain a safe distance from such operations.

All construction sites would maintain firefighting equipment such as extinguishers. Vegetation would be cleared from construction sites to prevent contact with transmission lines and fire ignition sources such as vehicles. Towers and lines would be constructed according to the National Electrical Safety Code and BPA procedures. BPA specifications also would be followed for grounding fences and other objects on or near the proposed ROW.

Recommended Mitigation Measures. No measures beyond those included in the proposed project are recommended.

Transmission Line Operational Public Health and Safety Effects

There would be slight additional risks for fire and injuries to maintenance workers that travel in the corridor to perform maintenance on the transmission lines. Transmission lines also represent potential for electric shocks; however, the lines are constructed and operated according to the National Electrical Safety Code and BPA procedures and are designed to minimize the risk for shock. BPA offers a free booklet that describes safety precautions for individuals who live or work near transmission lines ("Living and Working Safely Around High Voltage Power Lines" – a copy can be found in the BPA McNary- John Day Transmission Project EIS (BPA 2002) or obtained directly from BPA).

All maintenance workers would receive specific training on the appropriate procedures for equipment inspection and repairs. They also would receive first aid and emergency response training with periodic refresher sessions. Maintenance vehicles would carry fire suppression equipment and communications equipment to facilitate contacting back-up emergency response personnel.

There are four operational aspects, attributed to the electrical environment of a high voltage transmission line, which are commonly addressed in new construction: 1) radio and television interference – also known as RI and TVI; 2) audible noise; 3) electric fields; and 4) magnetic fields. Often electric and magnetic fields are generically grouped and called Electromagnetic fields (EMFs). Each of these aspects is considered below.

RI and TVI. A spark-like phenomenon called corona on the surface of high voltage conductors can create signals that may interfere with radio and television reception. Modern line designs have reduced corona to a minimum and such a design would be employed. However, occasionally, more

sensitive radios and television sets pick up the "corona" noise. BPA policy is to address problems on a case-by-case basis. Some RI and TVI situations been corrected by locating and fixing a hardware problem on the transmission line, a problem typically caused during construction.

The TRCI has expressed concern about the proximity of a new high voltage transmission line to the facility because some of the frequencies used for facility communications and security could be affected. The Institution also expressed concern about interference with the reception for AM band radio stations, to which prisoners often listen. Prediction of potential transmission line corona effects on these sources would require detailed studies. As an alternative, the BPA has estimated that a distance of 1,000 feet would be sufficient to prevent interaction between the transmission line and Institution security systems and radio reception. The proposed transmission line alignment would much farther than 1,000 feet from the Institution fence line.

Audible Noise. Corona, especially during rain, is a source of low–frequency hum (120 Hz) and crackling. Modern line designs have reduced this noise to regulatory levels. The unit of measurement for audible noise is the dBA. Oregon State regulations require 50 dBA at the edge of ROW. BPA calculations show that existing levels to be approximately 52 dBA; however, the calculation methodology does have a 2 dBA uncertainty and actual measured levels are usually less.

The audible noise calculation methodology can predict the relative effect of a new line on the existing environment. Specific calculated levels at the existing edges of ROW are 52.2, 52.3, 51.0, and 50.6 dBA. For the new transmission line, the calculated results are 52.5, 52.2, 51.4, and 50.8 dBA. These differences are undetectable to the human ear. Also note that one level slightly decreased; this is because the location of the edge of that ROW changed due to the position of the new line.

Electric fields. These fields are a function of line voltage, line design, and distance between the conductors and ground. The chief effects can be nuisance shocks to humans on the ROW. Oregon State limits the level to a maximum of 9 kV/m on the ROW. Under conditions of maximum conductor sag (minimum clearance) the levels on the new ROW would not exceed that limit.

Magnetic Fields. These fields are generated by line currents that can be quite variable depending on electrical loads through the system. Thus, magnetic fields depend on the time of day and the season. There is no simple methodology to predict levels at any particular future instance in time.

However, experience has shown that peak levels are the most predictable. These peaks will occur when all involved lines have maximum currents flowing. If the new line were not built the calculated peak magnetic fields at the edges of ROW would be 18.4, 6.3, 61.1, and 61.4 milligauss (mG) - (estimated predictions for 2004). Effect of a new line would be 21.2, 74.3, 45.5, and 45.2 mG at those same locations.

The only residential areas located in the vicinity of the proposed new transmission line is the north-south 1 mile segment parallel to Highway 395 where the new transmission line would be constructed. The existing Lower Monumental–McNary circuits would be re-located on the new structures; the Wanapa–McNary transmission line would be attached to the existing Lower Monumental–McNary structures (see **Figure 2.3-8**). It was estimated from aerial photo interpretation and ground reconnaissance that 10 occupied residential structures are located adjacent to Lind Road between the existing Lower Monumental–McNary transmission line and the proposed transmission line segment (see **Figure 3.8-2**). The non-ROW area between the new transmission line and the existing Lower Monumental–McNary 500 kV transmission line varies from about 250 feet wide to 550 feet (a somewhat triangular shape). Variation of magnetic field in this area is best described in chart form. The following figures (**Figures 3.10-1** and **3.10-2**) show plots of predicted magnetic fields in the non-ROW area as well as on the ROW.

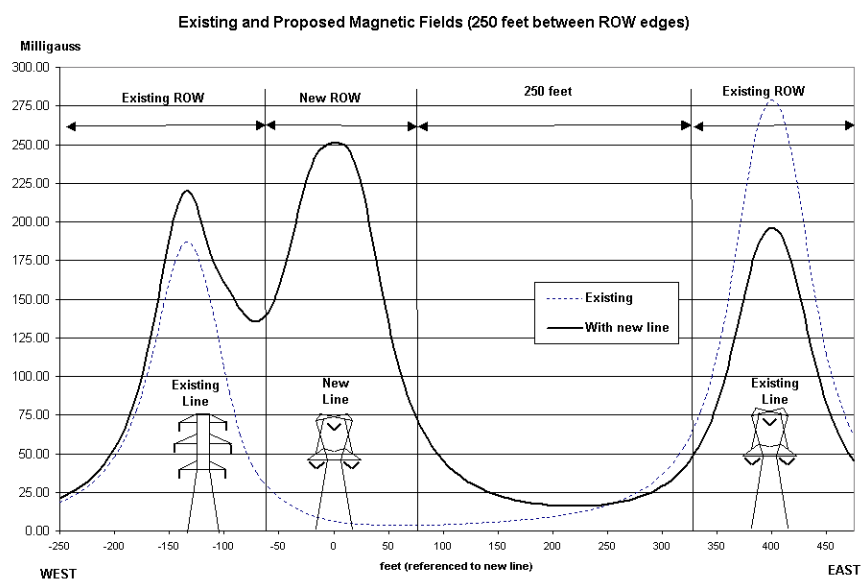


Figure 3.10-1 Existing and Proposed Magnetic Fields (250 feet between ROWs)

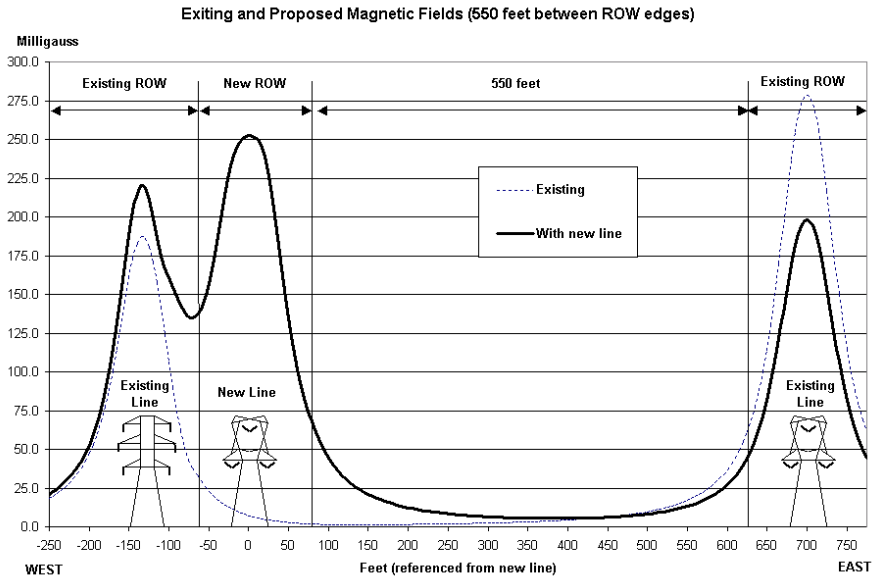


Figure 3.10-2 Existing and Proposed Magnetic Fields (500 feet between ROWs)

The net result is a reduction of the magnetic fields on the eastern one-third portion of the area between the ROW edges, as well as under the existing Lower Monumental–McNary 500 kV line. Magnetic fields would be increased in the vicinity of the new line and in the western two-thirds of the triangular area.

Residences in the area of increasing magnetic fields may have problems with TV pictures and computer monitors – the degree of disturbance depends on exact location. Liquid crystal display monitors are not affected.

Over the past two decades, much research has been completed regarding the health effects of magnetic fields. Some studies have reported increased risks for cancer; other studies were negative. The general opinion is that there is a lack of evidence supporting the health effects, and, if there are effects, they are difficult to establish. BPA has adopted the stance taken by the National Institute of Environmental Health Science (NIEHS) and advises those interested in the subject to locate the

NIEHS website and the related site called EMFRAPID. The available information is extensive. BPA suggests reviewing the summaries which essentially state the NIEHS position.

All structures, conductors and lines would be constructed according to the National Electrical Safety Code and BPA procedures – electric and magnetic fields that would be produced would not exceed standard levels of exposure for this type of transmission line and distances to receptors.

Recommended Mitigation Measures. No measures beyond those included in the proposed project are recommended.

3.10.3 Impact Summary

The potential impacts to public safety and health would be minor. During construction of the transmission lines and gas pipeline, good engineering practices and standard safety procedures would be implemented to protect construction workers and the general public. The new transmission line would be located adjacent to existing transmission lines and those residences and buildings already in close proximity to existing lines could experience a slight increase in exposure to electric and magnetic fields. Residences, buildings and people in the vicinity of the gas pipeline would be exposed to a minor risk for pipeline incidents such as leaks, fires or explosions. However, over the 30 to 50 years of expected service life of the pipeline, the projected incident rate for accidents, injuries or fatalities is 0.014 or less. The pipeline would be regularly inspected and tested according to industry standards to minimize the potential for incidents.

3.11 Summary of Mitigation Measures

Table 3.11-1 summarizes the mitigation measures discussed in this section.

Table 3.11-1
Summary of Mitigation Measures

Resource	Mitigation Measure
Soils	
	S-1: Restrict construction traffic to the defined ROW.
	S-2: Restrict the pipeline construction ROW width to 75 feet in the Wanser loamy fine sand and Winchester sand units where the natural gas supply/wastewater discharge pipeline route crosses native vegetation communities.
	S-3: Use measures such as topsoil matting, planting of cover crops, or soil binder in the Wanser loamy fine sand and Winchester sand units along the southern portion of the natural gas supply/wastewater discharge pipeline routes to reduce wind erosion.
	S-4: Segregate the stripped topsoil separately from the trench spoil;
	S-5: Remove all excess large-size rock from the upper 12 inches of the soil to the extent practical in agricultural and residential areas.
	S-6: Excess pipeline trench rock would be placed in a landowner-approved location.
Vegetation/Land Cover	
	VLC-1: The revegetation mixture applied to disturbed soils on the Wanaket Wildlife Area would conform to the future management objectives for the site as described by the Wildlife Area Management Plan (CTUIR and BPA 2001b).
	VLC-2: A pre-construction weed inventory would be completed along the approved pipeline route to determine the location of weed populations within and adjacent to the construction ROW. Excavation equipment would be cleaned (air pressure hoses, or wash stations) after crossing weed infestation areas and entering weed-free areas. All soil excavated from weed-infested areas would be replaced in the same location.
	VLC-3: Any hay used as mulch would be certified as weed-free prior to application.
Wildlife	
	W-1: Prior to construction activities during the raptor breeding season (March 1 - June 30), breeding raptor surveys would be conducted by a qualified biologist through areas of suitable nesting habitat to identify any potentially active nest sites within 0.5 mile from the project area. If applicable, appropriate protection measures, including seasonal constraints and establishment of buffer areas would be implemented at active nest sites until the young have fledged and have dispersed from the nest area. These measures will be implemented on a site-specific and species-specific basis, in coordination with CTUIR and Wanaket Wildlife Area biologists.
	W-2: Standard, safe designs as outlined in Mitigating Bird Collision with Power Lines (APLIC 1994) would be incorporated in the design of the electrical distribution lines to prevent collision to foraging and migrating bird species with the project area, in coordination with CTUIR and Wanaket Wildlife Area biologists. Design features would include the configuration of the route to avoid partitioning

Resource	Mitigation Measure
	foraging and resting habitat, alignment of overhead groundwire to the same height as the conductors, and the use of markers to increase the visibility of the lines to birds.
	W-3: Prior to construction activities during the avian breeding season (March 1 - June 30), avian breeding surveys for long-billed curlew, grasshopper sparrow, loggerhead shrike, and western burrowing owl would be conducted by a qualified biologist through areas of suitable nesting habitat to identify any potentially active nest sites within 0.25 mile from the project area. If applicable, appropriate protection measures, including seasonal constraints and establishment of buffer areas would be implemented at active nest sites until the young have fledged and have dispersed from the nest area. These measures would be implemented on a site-specific and species-specific basis, in coordination with CTUIR Wanaket Wildlife Area biologists.
	W-4: Prior to construction activities through suitable breeding habitat for special status reptile and amphibian species, occurrence surveys for western painted turtle, western toad, Woodhouse's toad, and northern leopard frog would be conducted by a qualified biologist to determine presence. If present, appropriate protection measures could include rerouting the pipeline ROW to avoid breeding habitat, in coordination with CTUIR and Wanaket Wildlife Area biologists.
Transportation	
	T-1: Implement partial plant site shift changes to reduce the number of personal vehicles that queue at the Beach Access Road/U.S. Highway 730 intersection.
	T-2: Time major construction material deliveries to off-peak hours (early morning, late evening) to prevent local congestion on U.S. Highway 730.
	T-3: A site-specific construction traffic flow plan would be submitted to the Oregon DOT that documents the present traffic volumes, expected volume of project construction traffic, and the intersections to be used. If warranted by this study, the width of the U.S. Highway 730 at the Beach road intersection (or other intersections) would be expanded to provide left-hand and right-hand turn lanes.

4.0 PROPOSED ACTION COMPONENT ALTERNATIVES

Project alternatives were evaluated for two project components, gas supply/water discharge pipeline routes and electrical transmission line routes. Detailed descriptions of these project component alternatives are provided in Sections 2.4.1 and 2.4.2, respectively. No alternatives were proposed for the other project components (power plant site, access road, and water supply pipeline). The impact evaluation focused on environmental resources and impact topics that indicated a difference for one or more alternatives in relation to the Proposed Action. Results of the impact evaluations for the gas supply/water discharge pipeline and electrical transmission line alternatives are discussed in the following sections.

4.1 Natural Gas/Water Discharge Pipelines Alternatives

In addition to the Proposed Action route, four alternative routes were evaluated. Route locations are shown in **Figures 2.4-1** through **2.4-4**. The alternative routes would be approximately the same length as the Proposed Action route, but would follow a more eastern (Alternatives 1, 3, and 4) or more western approach (Alternative 2) in connecting the power plant and Stanfield Compressor Station. Impact evaluations for the gas supply/water discharge pipeline alternatives focused on impact topics for soils, vegetation, wildlife, threatened and endangered species, and land use disturbance (**Table 4.1-1**). Impacts to cultural resources could not be compared because complete survey data are not available.

4.2 Electrical Transmission Line Alternatives

Alternatives that were evaluated for electric transmission connection between the power plant and the McNary Substation include the Proposed Action route and three alternative transmission routes (**Table 4.1-2**). The length of the routes would be 5.3 miles for the Proposed Action and range from 3.7 to 4.0 miles for the other alternatives. Impact evaluations for the electric transmission line routes focused on impact topics for soils, vegetation, wildlife, and threatened and endangered species, residential land, and project economics. No notable differences between alternatives were identified for other environmental resource topics.

Table 4.1-1
Natural Gas Supply/Water Discharge Pipeline Alternatives Comparison

Resource/Impact Issue	Proposed Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Land Use					
Temporary Disturbance	Approximately 120 acres would be disturbed during construction.	Approximately 3 additional acres would be disturbed during construction.	Approximately 4 additional acres would be disturbed during construction.	Approximately 1 additional acre acres would be disturbed during construction.	Approximately 6 fewer acres would be disturbed during construction.
Long-term land commitment to utility uses	Approximately 60 acres would be used as the ROW easement.	Approximately 2 additional acres would be used as the ROW easement.	Approximately 2 additional acres would be used as the ROW easement.	Approximately 1 additional acre would be used as the ROW easement.	Approximately 2 fewer acres would be used as the ROW easement.
Public safety	Sixteen residences are located within 200 feet of the ROW centerline.	Four fewer residences are located within 200 feet of the ROW centerline.	Forty-three additional residences are located within 200 feet of the ROW centerline.	Four fewer residences are located within 200 feet of the ROW centerline.	Two fewer residences are located within 200 feet of the ROW centerline.
Soils					
Presence of large rock in trenched area	Approximately 23 acres contain outcrop or large rock in the upper 40 inches of soil.	Approximately 7 additional acres contain outcrop or large rock in the upper 40 inches of soil.	Approximately 2 additional acres contain outcrop or large rock in the upper 40 inches of soil.	Approximately 5 additional acres contain outcrop or large rock in the upper 40 inches of soil.	Approximately 1 additional acre contain outcrop or large rock in the upper 40 inches of soil.
Prime farmland	Approximately 32 acres temporarily affected within the ROW.	Same as the Proposed Action.	Approximately 4 additional acres temporarily affected within the ROW.	Same as the Proposed Action.	Same as the Proposed Action.
Moderate water erosion	Approximately 24 acres in the construction ROW have moderate water erosion potential.	Approximately 3 additional acres in the construction ROW have moderate water erosion potential.	Approximately 6 additional acres in the construction ROW have moderate water erosion potential.	Approximately 10 fewer acres in the construction ROW have moderate water erosion potential.	Approximately 10 fewer acres in the construction ROW have moderate water erosion potential.
High water erosion	None of the construction ROW has soils with high water erosion potential.	None of the construction ROW has soils with high water erosion potential.	None of the construction ROW has soils with high water erosion potential.	Approximately 11 additional acres in the construction ROW have high water erosion potential.	Approximately 11 additional acres in the construction ROW have high water erosion potential.

Table 4.1-1 (Continued)

Resource/Impact Issue	Proposed Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4
High wind erosion	Approximately 23 acres in the construction ROW have high wind erosion potential.	Approximately 3 additional acres in the construction ROW have high wind erosion potential.	Approximately 11 fewer acres in the construction ROW have high wind erosion potential.	Approximately 16 additional acres in the construction ROW have high wind erosion potential.	Approximately 9 additional acres in the construction ROW have high wind erosion potential.
Very high wind erosion	Approximately 30 acres in the construction ROW have very high wind erosion potential.	Approximately 6 fewer acres in the construction ROW have very high wind erosion potential.	Approximately 3 additional acres in the construction ROW have very high wind erosion potential.	Approximately 8 fewer acres in the construction ROW have very high wind erosion potential.	Approximately 7 fewer acres in the construction ROW have very high wind erosion potential.
Vegetation					
Shrub and grassland-steppe disturbance	Approximately 22 acres of this vegetation community would temporarily be disturbed during construction.	Approximately 17 additional acres of this vegetation community would temporarily be disturbed during construction.	Approximately 1 less acre of this vegetation community would temporarily be disturbed during construction.	Approximately 15 additional acres of this vegetation community would temporarily be disturbed during construction.	Approximately 6 additional acres of this vegetation community would temporarily be disturbed during construction.
Number of wetlands crossed	No developed wetlands within the Wanaket Wildlife Area would be crossed by the ROW.	No wetlands would be crossed by the ROW.	Seven additional wetlands would be crossed by the ROW.	No wetlands would be crossed by the ROW.	No wetlands would be crossed by the ROW.
Wetland area crossed	No developed wetlands within the Wanaket Wildlife Area would be crossed by the ROW.	No wetlands would be crossed by the ROW.	Approximately 1 acre would be crossed by the ROW.	No wetlands would be crossed by the ROW.	No wetlands would be crossed by the ROW.
Wildlife					
Wildlife habitat	Disturbance of approximately 22 acres of potentially suitable grassland/shrub-steppe habitat, and approximately 76 acres of irrigated cropland habitat.	No impacts to wetland habitat, disturbance of approximately 17 more acres of grassland/shrub-steppe habitat, and 4 fewer acres of irrigated cropland habitat.	Disturbance of approximately 1.2 acres of wetland habitat and approximately 1 more acre of grassland/shrub-steppe foraging habitat, and 7 fewer acres of irrigated cropland habitat.	No impacts to wetland habitat, disturbance of 15 more acres of grassland/shrub-steppe foraging habitat, and 4 fewer acres of irrigated cropland habitat.	No impacts to wetland habitat, disturbance of 6 more acres of grassland/shrub-steppe habitat, and 13 fewer acres of irrigated cropland habitat.
Wanaket Wildlife Area	Approximately 8,429 feet of land would be crossed by the ROW.	Approximately 6,211 additional feet of land would be crossed by the ROW.	Approximately 384 additional feet of land would be crossed by the ROW.	Approximately 3,207 additional feet of land would be crossed by the ROW.	Approximately 873 additional feet of land would be crossed by the ROW.

Table 4.1-1 (Continued)

Resource/Impact Issue	Proposed Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Special Status Species					
Bald eagle	Disturbance of approximately 22 acres of potentially suitable grassland/shrub-steppe foraging habitat for bald eagles. However, the project area consists of marginal foraging habitat, as compared to habitats within the project region.	No impacts to wetland foraging habitat, disturbance of approximately 17 more acres of grassland/shrub-steppe foraging habitat.	Disturbance of approximately 1.2 acres of wetland habitat and approximately 1 acre more of grassland/shrub-steppe foraging habitat.	No impacts to wetland habitat and disturbance of approximately 15 more acres of grassland/shrub-steppe foraging habitat.	No impacts to wetland habitat and disturbance of approximately 6 more acres of grassland/shrub-steppe foraging habitat.
Long-billed curlew, grasshopper sparrow, loggerhead shrike, western burrowing owl	Disturbance of approximately 22 acres of potentially suitable nesting and foraging grassland/shrub-steppe habitat for long-billed curlew, grasshopper sparrow, loggerhead shrike, western burrowing owl. The PA would come within several hundred feet of two known burrowing nest sites that have been active for several years.	Disturbance of approximately 17 more acres of grassland/shrub-steppe nesting and foraging habitat.	Disturbance of approximately 1 less acre of grassland/shrub-steppe nesting and foraging habitat.	Disturbance of approximately 15 more acres of grassland/shrub-steppe nesting and foraging habitat.	Disturbance of approximately 6 more acres of grassland/shrub-steppe nesting and foraging habitat.
Ferruginous hawk, Swainson's hawk, and American peregrine falcon	Disturbance of approximately 22 acres of potentially suitable grassland/shrub-steppe habitat for ferruginous hawk, Swainson's hawk, and American peregrine falcon.	No impacts to wetland habitat and a disturbance of approximately 17 more acres of grassland/shrub-steppe habitat.	Disturbance of approximately 1.2 acres of wetland habitat and approximately 1 more acre of grassland/shrub-steppe habitat.	No impacts to wetland habitat and disturbance of approximately 15 more acres of grassland/shrub-steppe habitat.	No impacts to wetland habitat and disturbance of approximately 6 more acres of grassland/shrub-steppe habitat.
American white pelican	No impacts to wetland habitat.	No impacts to wetland habitat.	Disturbance of approximately 1.2 acres of wetland habitat.	No impacts to wetland habitat.	No impacts to wetland habitat.
Western painted turtle, western toad, Woodhouse's toad, and northern leopard frog	No impacts to wetland breeding habitat.	No impacts to wetland breeding habitat.	Disturbance of approximately 1.2 acres of wetland breeding habitat.	No impacts to wetland breeding habitat.	No impacts to wetland breeding habitat.

Table 4.1-2
Electric Transmission Line Alternatives Comparison

Resource/Impact Issue	Proposed Action	Alternative 1	Alternative 2	Alternative 3
Land Use				
Temporary Disturbance	Approximately 101 acres would be disturbed during construction.	Approximately 15 additional acres would be disturbed during construction.	Approximately 9 fewer acres would be disturbed during construction.	Approximately 9 fewer acres would be disturbed during construction.
Public safety	Eight residences are located within 300 feet of the ROW centerline.	Same as the Proposed Action.	No residences are within 300 feet of the ROW centerline.	No residences are within 300 feet of the ROW centerline.
Soils				
Prime farmland	Approximately 15 acres in the ROW.	Same as the Proposed Action.	Approximately 11 fewer acres in the ROW.	Approximately 11 fewer acres in the ROW.
Vegetation				
Shrub and grassland-steppe disturbance	Approximately 41 acres of disturbance to this vegetation community during construction.	Approximately 17 additional acres of disturbance to this vegetation community during construction.	Approximately 25 fewer acres of disturbance to this vegetation community during construction.	Approximately 13 fewer acres of disturbance to this vegetation community during construction.
Wetland area potential disturbance	Approximately 2.5 acres of potential disturbance to wetlands.	Approximately 1.5 acre fewer potential disturbance to wetlands.	No potential disturbance to wetlands.	No potential disturbance to wetlands.
Wildlife				
Wildlife habitat	This action would result in the incremental increase in habitat fragmentation by crossing approximately 3.9 miles of potentially suitable wildlife habitat (wetland, grassland/shrub-steppe and irrigated cropland).	This alternative would result in greater habitat fragmentation of approximately 1 mile than the PA.	This alternative would result in less habitat fragmentation by approximately 3 miles than the PA.	This alternative would result in less habitat fragmentation by approximately 2 miles than the PA.
Wanaket Wildlife Area	Approximately 6,069 feet would be crossed by the ROW.	Approximately 5,846 additional feet would be crossed by the ROW.	Wanaket Wildlife Area would not be crossed by the ROW.	Wanaket Wildlife Area would not be crossed by the ROW.
Collision potential for waterfowl	This alignment crosses a portion of the 1.5 square mile wetland complex. Approximately 15% of the total wetland complex (waterfowl resting habitat) would be partitioned from agricultural fields to the south and east (waterfowl foraging habitat). Waterfowl using the isolated portion of the wetland would need to negotiate the transmission power line as they flew from one habitat type to the other.	This alignment would separate about 70% of the total wetland complex from the agricultural area.	This alignment would not separate the wetland complex from the agricultural areas.	This alignment would not separate the wetland complex from the agricultural areas.

Table 4.1-2 (Continued)

Resource/Impact Issue	Proposed Action	Alternative 1	Alternative 2	Alternative 3
	The alignment does not parallel the river and is offset from the river. As a result, waterfowl could use the river as a flight corridor and, for those birds crossing the river, the setback would allow waterfowl ample opportunity to adjust their flight paths and avoid the power lines.	Like the Proposed Action, the alignment would not parallel the river and is offset from the river. As a result, waterfowl could use the river as a flight corridor and, for those birds crossing the river, the setback would allow waterfowl ample opportunity to adjust their flight paths and avoid the power lines.	This alignment would parallel the river, though approximately 50% of the alignment would be about 0.5 mile from the river. This alignment would pose a potential collision hazard to waterfowl utilizing the river as a flight corridor as well as those birds crossing the river.	This alignment would parallel the river. The majority of the alignment would be within 0.2 mile from the river. This alignment would pose a potential collision hazard to waterfowl utilizing the river as a flight corridor as well as those birds crossing the river.
Special Status Species				
Bald eagle	Temporary disturbance of approximately 2.5 acres of potentially suitable wetland habitat and approximately 41 acres of potentially suitable grassland/shrub-steppe habitat for foraging bald eagles. However, the project area consists of marginal foraging habitat, as compared to habitats within the project region.	Temporary disturbance of approximately 1.5 fewer acres of wetland foraging habitat and approximately 17 more acres of grassland/shrub-steppe foraging habitat.	No impacts to wetland habitat and disturbance of approximately 25 fewer acres of grassland/shrub-steppe foraging habitat.	No impacts to wetland habitat and disturbance of approximately 13 fewer acres of grassland/shrub-steppe foraging habitat.
Long-billed curlew, grasshopper sparrow, loggerhead shrike, western burrowing owl	Disturbance of approximately 41 acres of potentially suitable nesting and foraging habitat for long-billed curlew, grasshopper sparrow, loggerhead shrike, and western burrowing owl.	Disturbance of approximately 17 more acres of grassland/ shrub-steppe nesting and foraging habitat.	Disturbance of approximately 25 fewer acres of grassland/shrub-steppe nesting and foraging habitat.	Disturbance of approximately 13 fewer acres of grassland/shrub-steppe nesting and foraging habitat.
Ferruginous hawk, Swainson's hawk, and American peregrine falcon	Temporary disturbance of approximately 2.5 acres of potentially suitable wetland habitat and approximately 41 acres of potentially suitable grassland/shrub-steppe habitat for ferruginous hawk, Swainson's hawk, and American peregrine falcon.	Temporary disturbance of approximately 1.5 fewer acres of wetland habitat and approximately 17 more acres of grassland/shrub-steppe nesting and foraging habitat.	No impacts to wetland habitat and disturbance of approximately 25 fewer acres of grassland/shrub-steppe habitat.	No impacts to wetland habitat and disturbance of approximately 13 fewer acres of grassland/shrub-steppe habitat.
American white pelican	Temporary disturbance of approximately 2.5 acres of potentially suitable wetland habitat for the American white pelican.	Temporary disturbance of approximately 1.5 fewer acres of wetland habitat.	No impacts to wetland habitat.	No impacts to wetland habitat.

Table 4.1-2 (Continued)

Resource/Impact Issue	Proposed Action	Alternative 1	Alternative 2	Alternative 3
Western painted turtle, western toad, Woodhouse's toad, and northern leopard frog	Temporary disturbance of approximately 2.5 acres of potentially suitable wetland breeding habitat for the Western painted turtle, western toad, Woodhouse's toad, and northern leopard frog.	Temporary disturbance of approximately 1.5 fewer acres of wetland breeding habitat.	No impacts to wetland breeding habitat.	No impacts to wetland breeding habitat.
Visual Resources				
Visual effects on public use areas	The transmission line segment located in a new ROW between the plant site and the existing BPA transmission corridor would represent a new industrial element to viewers along Highway 730, and visitors to the Wanaket Wildlife Area.	The transmission line segment located in a new ROW between the plant site and the existing BPA transmission corridor would represent a new industrial element to viewers along Highway 730, and visitors to the Wanaket Wildlife Area.	The transmission line would represent a new industrial element that traverses the Columbia River bluff between the TRCI and the McNary Substation (about 2 miles). The transmission line would intercept the view of approximately 17 McNary residences that overlook the Columbia River and McNary Dam. The transmission line would represent a new industrial element for visitors to the McNary State Park and the COE park facilities at McNary Dam and visitor center.	The transmission line would represent a new industrial element that traverses the Columbia River bluff from Wanapa Plant Site to the McNary Substation (about 3 miles). The transmission line would intercept the view of approximately 17 McNary residences that overlook the Columbia River and McNary Dam. The transmission line would represent a new industrial element for visitors to the McNary State Park and the COE park facilities at McNary Dam and visitor center.

5.0 NO ACTION ALTERNATIVE

If the proposed project is not approved, none of the project facilities would be constructed. As a consequence, the additions of a new energy supply to the western U.S. power network would not occur; neither investment costs nor benefits would accrue to the project proponents, and no commitment of natural and human resources (land, water, air) would occur. If this project were not approved, another electrical generating project would likely be proposed, or an existing approved generation project would be completed within the Oregon-Washington region. However, if the proposed project is not approved, the region would not receive the socioeconomic benefits or the federal taxation advantages of the proposed site.

6.0 CUMULATIVE IMPACTS

Cumulative impacts are defined in the Council on Environmental Quality regulations 40 CFR 1508.7 as "... the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions regardless of what agency... or person undertakes such other actions." The primary study for cumulative impacts is the area outlined in **Figure 1.1-1**, which includes the communities of Umatilla, Hermiston, and rural developments east of Hermiston to Cold Springs Reservoir in Umatilla County, Oregon. Certain resources (air, water, and socioeconomics) are considered in a larger geographic context. The time frame for the cumulative assessment is 20 years, although it is not possible to speculate about future development beyond projects that are currently proposed.

6.1 Past and Present Actions

The primary land use within the cumulative study area is irrigated agriculture for which the primary water sources are the Columbia and Umatilla Rivers. Reservoirs (Cold Springs Reservoir) and irrigation canals have been constructed to store and deliver irrigation water. Native plant communities remain on the basalt outcrops near the Columbia River. Rural residential communities have developed along major county roads and highways. Major industrial and transportation infrastructure includes the following:

- State and Federal Highways (I-82, I-84, U.S. Highway 395, U.S Highway 730) that form a major east-west and north-south interconnection near Hermiston.

- A dam and locks on the Columbia River at McNary where barge traffic moves up and down the river, and where hydroelectric power is generated.

- The Port of Umatilla, which includes grain storage facilities, an oil products storage terminal, and several smaller industries. Within the general port industrial area is the TRCI, a medium-security prison.

- McNary Substation, a major hub within the BPA System that is connected with the hydropower generators at the dam and the interstate transmission system that serves the Northwest region.

- The Hermiston power plant and transmission lines located south of Hermiston.

- Two large interstate natural gas pipelines (Northwest, PGT) that transfer natural gas from the Rocky Mountains, and Canada, respectively.

6.2 Foreseeable Actions

The three primary foreseeable actions that could interact directly with the Wanapa project are the McNary to John Day transmission line (BPA 2002a), a new transmission line that would expand BPA electrical transmission capacity from McNary westward, the Wallula power plant and transmission line (BPA and Washington EFSC 2002), and the Plymouth Cogeneration Facility (BPA and EFSC 2003). The transmission capacity needed to move power from the Wanapa Energy Center, as well as other projects, would be provided by construction of the McNary-John Day transmission line. The Wallula transmission line could be located in the same transmission line corridor and approach to McNary substation as the Wanapa project. Other potential projects that could potentially be interconnected with the McNary and John Day substations are described in the McNary to John Day Draft EIS (BPA 2002b). These include the Starbuck-Lower Monumental Dam Transmission Line Project and Starbuck Power Project, Umatilla Generating Project, Mercer Ranch, Cliffs Energy Project, and several wind generation projects in southeastern Washington and northeastern Oregon.

The State of Oregon has an option to expand its prison facilities onto a block of land east of the existing TRCI and west of the proposed Wanapa Electric Generating Facility.

6.3 Cumulative Effects of the Proposed Action

6.3.1 Geologic Hazards and Soils

The proposed action would not cause, or be affected by any existing geologic hazards, based on facility design to accommodate regional seismicity. Surface disturbance caused by the project would cause a very small incremental increase in soil and wind erosion relative to existing erosion from thousands of acres of dryland wheat fields within Umatilla County.

6.3.2 Water Resources

The proposed action would consume a small fraction of the flow of the Columbia River, and would represent a very small fraction of the ongoing agricultural and industrial consumptive uses upstream and downstream of the proposed water withdrawal point at the Port of Umatilla. Some plant site water would be returned to the regional agricultural system where it could be used to water crops. The Wanapa project withdrawal would be 23 cfs out of 65,000 cfs available during low flow periods in the Columbia River. The Umatilla Power plant would withdraw about 5 cfs; the current municipal withdrawal rate is about 25 cfs. Based on these existing and future demands, water demand at the Port of Umatilla could increase to 53 cfs, which is under the 61 cfs capacity of the existing intake structure (with improvements). A cumulative withdrawal rate of 53 cfs represents 34 percent of the Port of Umatilla/Hermiston water right of 155 cfs.

6.3.3 Biological Resources

The project would remove about 60 acres of native vegetation habitat out of about 3,000 acres on basalt outcrops that extend eastward along the south bank of the Columbia River. Based on the boundaries of the Port of Umatilla industrial area and the Wanaket Wildife Area, it is unlikely that future industrial development would consume additional shrub steppe habitat in this area, or would expand adjacent to the Wanaket Wildife Area except at the western boundary. The electrical transmission corridor south of U.S. Highway 730 could be expanded to provide new transmission line interconnections with McNary Substation (Wallula Project). The Port of Umatilla previously consulted with the USFWS and NMFS on their water intake structure for the current intake capacity, and therefore, potential cumulative withdrawal effects as well as entrainment effects have already been considered.

6.3.4 Air Resources

The proposed facility is in an area where several other proposed power plants are undergoing the permitting process. To date, the proposed facilities are all gas-fired combined cycle or simple cycle turbine power plants.

The air quality modeling that was conducted as part of the PSD application indicated that emissions from the proposed facility would not cause or contribute to an exceedence of any ambient air quality standard. Facility impacts are well below significant impact levels for all

criteria air pollutants except NO_x and PM_{10}. Emissions of those pollutants are mitigated by the use of SCR control technology and the use of natural gas firing. Significant impacts are confined to an area immediately around the power plant site.

A recent study by the BPA (2002a) attempted to anticipate the impact of up to 24,000 MW of additional power generation in the region, with several of these plants located in the Umatilla Area. Results from a Phase I study indicated that there were no expected exceedences of ambient air quality standards resulting from the combined projects and that impacts on sensitive areas were acceptable.

The main concern dealt with the impacts on visibility in the Class I areas in the region. A subsequent Phase II report was issued (BPA 2002b). When all proposed units are operated at full capacity on natural gas only, there were no predicted exceedences of the cumulative 10 percent threshold at any of the Class I areas that were studied. There were only two exceedences of the cumulative 10 percent threshold at any of the Class I areas that were studied. There were only two exceedences of the 5 percent single source threshold that were predicted by the model. Since this proposed project does not create a significant impact on visibility in the Class I area, and since its emission levels of NO_x and SO_2 are mitigated as shown above, the effects of the proposed facility would not contribute significantly to any visibility impact in a Class I area.

Despite the expected increase in power generation in the area, some of which will likely not take place, the use of natural gas firing for the proposed sources, including the Wanapa Energy Center project, will not lead to significant impairment of air quality or of air quality-related values within the region.

6.3.5 Traffic and Circulation

It is anticipated that there will be short term increases in Wanapa plant site construction traffic that may require special management; however, the long-term work force will be small (30 workers), and would not cause incremental cumulative effects to local traffic turning from U.S. Highway 730 onto Beach Access Road. It is likely that traffic turning onto Beach Access Road will continue to increase to serve the existing and potential new correctional facilities.

6.3.6 Visual Quality and Noise

The Wanapa Energy Center would incrementally expand an existing landscape occupied by industrial buildings and infrastructure eastward on the south bank of the Columbia River. Based on current land ownership by the CTUIR to the east and south, the power generation site would represent the eastern-most extension of this development. The new transmission line would expand an existing transmission line corridor, which may be further expanded in the future as new projects are brought on line. The noise generated by the plant would meet state standards at the fence line. No new residential or commercial developments are expected adjacent to the fence line because of the existing ownership and existing designated industrial uses.

6.3.7 Cultural Resources

Construction of industrial facilities within the Port of Umatilla industrial area would incrementally remove cultural evidence from the landscape, and modify the landscape where traditional cultural uses still occur. As indicated above, the generating plant and new prison would be extensions of existing industrial land uses, but further development along the Columbia River bluff to the east would be limited by the boundaries of the CTUIR Wanaket Wildlife Management Area.

6.3.8 Land Use and Recreation

The industrial facilities within the Port of Umatilla industrial area would not affect the use of, or access to existing recreation sites. The foreseeable projects would convert about 60 acres of existing wildlife habitat to industrial uses for the long term (see Biological Resources above). No changes in human land uses, primarily agricultural uses would occur.

6.3.9 Socioeconomics

The existing and foreseeable projects contribute additional employment and taxes to the local and regional economy. No known major industrial projects in the vicinity of Hermiston are expected to overlap with the peak Wanapa Energy Center construction period. Because the electric generating facility would be located within an approved industrial zone, no special infrastructure demands (roads, water, sewer, electrical power) would be required that would generate additional capital projects.

7.0 SHORT-TERM USE OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The surface disturbance caused by construction activities would represent a short-term use of the environment, that would largely be restored by continuation of existing land use practices (agriculture), or revegetation of wildlife habitats. Long-term productivity would be enhanced by the production and transmission of electricity from the constructed facilities.

8.0 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES

The irreversible commitment of resources is the use of non-renewable resources such as fossil fuels, manufactured structural materials, cultural resources, and land converted to long-term industrial uses. The generating plant site and facilities (about 47 acres) and the energy required to build and operate the plant, and industrial water that is evaporated in cooling towers represent irreversible commitments of resources.

Irretrievable commitments of resources cause the lost production or use of renewable resources such as timber, rangeland, or wildlife habitat. For this project, irretrievable commitments of resources include crop losses because of facility construction, and surface disturbance that may require several to many years to recover to former wildlife habitat values. Because of the problems associated with weed invasion, some disturbed sites may represent irreversible commitments of resources because they will never recover to their former vegetation cover and composition.

9.0 CONSULTATION AND COORDINATION

9.1 List of Agency Contacts

While preparing the EIS for the proposed Wanapa project, the BIA and BPA communicated with and received input from various federal, state, and local agencies and private organizations. The following sections list these contacts.

Federal Agencies

Bureau of Land Management
Bureau of Reclamation
National Marine Fisheries Service
National Resources Conservation Service
U.S. Army Corps of Engineers
U.S. Department of Agriculture
U.S. Department of Energy
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
U.S. Geological Survey
U.S. National Park Service

State Agencies, Oregon

Department of Agriculture
Department of Corrections
Department of Environmental Quality
Department of Fish and Wildlife
Department of Land Conservation and Development
Department of Transportation
Division of State Lands
Division of Wildlife
Natural Heritage Program
Water Resources Department

Local Agencies

Eugene Water and Electric Board
Hermiston Irrigation District
Port of Umatilla
Umatilla County Soil and Water Conservation District

Tribal Organizations

Confederated Tribes of the Umatilla Indian Reservation

Private Organizations and Companies

Cascade Natural Gas
Diamond Generating Corporation
Trinity Consultants

9.2 List of Agencies, Organizations, and Persons to Whom Copies of this Statement are Sent

Federal Agencies

Bonneville Power Administration
Bureau of Indian Affairs
Bureau of Land Management
Bureau of Reclamation
National Marine Fisheries Service
National Park Service
Northwest Power Planning Council
U.S. Army Community Outreach
U.S. Army Corps of Engineers
U.S. Department of Agriculture
U.S. Department of Transportation, FAA
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
U.S. House of Representatives
U.S. Senate

State Agencies, Oregon

Department of Agriculture
Department of Environmental Quality
Department of Fish and Wildlife
Department of Land Conservation and Development
Department of Transportation
Division of State Lands
House of Representatives
Office of Energy
State Senate
Water Resources Department

Municipalities and County and Local Agencies

City of Boardman
City of Echo
City of Hermiston
City of Umatilla
County of Morrow Board of Commissioners
County of Umatilla Board of Commissioners
County of Umatilla Department of Public Works
County of Umatilla Department of Resource Services
Eugene Water and Electric Board
Hermiston Irrigation District
Port of Umatilla
Umatilla Chamber of Commerce
Umatilla County Soil and Water Conservation District

Tribal Organizations

Burns Paiute Tribe
Confederated Tribes of the Umatilla Indian Reservation
Confederated Tribes of Warm Springs
Nez Perce Tribe
Shoshone Bannock Tribes of Fort Hall
Yakama Indian Nation

Newspapers and Libraries

City of Hermiston Public Library
City of Pendleton Public Library
East Oregonian
Hermiston Herald
Oregon Trail Public Library

Other Organizations

National Wildlife Federation
Nature Conservancy of Oregon
Northwest Environmental Advocates
Oregon Environmental Council
Oregon Hay Producers
Oregon Trout
Oregon Wheat Growers League
Pacific Northwest Electric Power and Conservation Planning Council
Pendleton Grain Growers, Inc.
Salmon for All
Sierra Club

Industry/Business

Cascade Natural Gas
Diamond Generating Corporation
Potlatch Corporation
S.K. Industries LLC
Trinity Consultants
Umatilla Electric Co-op

Individuals

Able, Tom
Achuff, Walt
Balito, Marie
Brown, George
Doherty, Dennis and Anne
Hankensiden, Frank

Hardin, Rod
Jones, Linda
Knop, Randy
Luiz, Johnny
Maier, Patricia
McKenzie, Lydia
Mulfinger, Jeff
Myers, Jackie
Paige, John
Quick, Gary
Shoeships, Susan
Springer, Harmon
Steinmetz, Shawn
Thompson, Ken
Torres, Jason
Watson, Dick
White, Duwayne
Williams, John L.
Ziari, Farahmand

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Wildlife 1-10, 1-14; 2-3, 2-33, 2-37,3.2-1, 3.2-4, 3.2-16, 3.3-1,
..... 3.3-2, 3.3-6, 3.3-8, 3.3-9, 3.3-10, 3.3-11, 3.3-12, 3.3-15,
..... 3.3-16, 3.3-17, 3.3-18, 3.3-20, 3.3-23, 3.3-24,
..... 3.3-25, 3.3-26, 3.3-27, 3.6-4, 3.6-6, 3.6-7, 3.6-8,
..... 3.7-5, 3.8-1, 3.8-5, 3.8-6, 3.8-9, 3.8-10, 3.11-1, 3.11-2; 6-5

APPENDIX A

BALD EAGLE IMPACT EVALUATION
AMPHIBIAN AND REPTILE SURVEY RESULTS

IMPACT ASSESSMENT FOR THE BALD EAGLE

Habitat Association and Potential Presence in the Project Area

The bald eagle (*Haliaeetus leucocephalus*) was downlisted to Federally threatened on July 12, 1995. This species was proposed to be delisted in 1999 (64 FR 47755); this listing decision is currently pending. The bald eagle also is protected under the Bald Eagle Protection Act and the Migratory Bird Treaty Act. No designated critical habitat has been identified for the study area.

Bald eagle nests are typically found in mature, heterogeneous stands of multi-storied trees that have sturdy branches at sufficient height for nest support and protection (Grubb 1976; Anderson and Bruce 1980). Optimum nest sites are typically found in proximity to open water, which provides an adequate food source (Marshall et al. 1996); however, they also may use uplands and arid valleys (Edwards 1969). In Oregon, breeding habitat is associated with large water bodies that support adequate fish populations and suitable trees for nesting. Nest trees typically consist of large ponderosa pine (*Pinus ponderosa*), mixed Douglas-fir (*Pseudotsuga menziesii*), and sitka spruce (*Picea sitchensis*)/western hemlock (*Tsuga heterophylla*) forest types (Marshall et al. 1996). The closest known bald eagle nest site to the project area is a false nest structure in a cottonwood tree that occurs along the Umatilla River near Stanfield, Umatilla County. This structure was built and tended by immature nonbreeding eagles over the last 5 years: no mature eagles have attempted to use this site for nesting. Relative to the project area, this nest structure occurs greater than 7 miles from the proposed power plant site and occurs greater than 4 miles from the proposed water and gas pipeline ROW.

Winter habitats generally include areas of open water, adequate food sources, and sufficient diurnal perches and night roosts (Grubb and Kennedy 1982). Wintering bald eagles often congregate in large numbers at communal roosts; however, roosts located in less populated areas may be used by individuals or small groups (Grubb and Kennedy 1982). Eagles are attracted to large bodies of water, but they also may occur in arid valleys (Edwards 1969). In Oregon, wintering habitat occur wherever there is an adequate food supply, mainly in the form of carrion, or trapped, crippled, or dying fish, birds, or mammals. Roosting sites, which can be 20 or more miles from feeding sites, are often in stands of mature conifers, but can also occur in large deciduous trees on basin floors (Marshall et al. 1996). Relative to the project area, more than 30 wintering bald eagles are observed on the Wanaket Wildlife Area annually. The primary attraction to the wildlife area is the relatively high concentrations of waterfowl that utilize the areas' wetland ponds. Bald eagles are

also known to winter at Hat Rock State Park and Cold Springs National Wildlife Refuge (Allen 2003; Quaempts 2003). Hat Rock State Park occurs more than 2 miles east of the proposed power plant site and greater than 2 mile from the proposed water and gas pipeline ROW. The Cold Springs National Wildlife Refuge occurs approximately 4 miles southeast of the proposed power plant site. However, the proposed water and gas pipeline ROW would come within approximately 0.5 mile of the refuge boundary. From 1991 to 2003, mid-winter surveys at Cold Springs National Wildlife Refuge recorded approximately 3 eagles per year on average (Allen 2003).

Impact Evaluation

As stated above only one bald eagle nest site has been documented within the project region. This nest is a false nest structure that occurs along the Umatilla River near Stanfield, Umatilla County, and is located approximately 7 miles from the proposed power plant site and powerline structures, and approximately 4 miles from the proposed water and gas pipeline ROW. Based on the distance of the nest structure from the proposed surface disturbance activities (i.e., power plant, water and gas pipeline, and powerline) and the lack of nesting attempts by adult eagles at this site, no impacts to breeding eagles would occur as a result of project construction and operation.

Occurrence by bald eagles within the project area would be limited to migrating and wintering eagles. Primary winter use within the project area would include the Wanaket Wildlife Area, Hat Rock State Park, and Cold Springs National Wildlife Refuge. Although wintering eagles has been recorded within the project region on an annual basis, no established roost sites or communal roosts have been identified within two miles of the project study area. Consequently, no impacts to established roost sites or communal roosts would be anticipated from the construction and operation of the proposed action. Potential impacts to individual eagles that may occur within the project area would be limited to indirect effects from increased noise levels and human presence.

Potential impacts to foraging bald eagles would result in the incremental long-term loss of approximately 2.6 acres of wetland habitat and 71 acres of grassland/shrub-steppe habitat from the construction of the water and gas pipeline, electrical powerlines, and ancillary facilities (i.e., access roads and water intake pipeline). Impacts also would result in the incremental long-term loss of approximately 47 acres of grassland/shrub-steppe habitat from construction and operation of the power plant facility. However, based on the amount of potentially suitable foraging habitat in the project region, impacts to foraging bald eagles would be low.

As part of the proposed project, a new 4.4-mile, 500-kV electrical powerline segment would incrementally increase the collision potential for foraging bald eagles, particularly on the Wanaket Wildlife Area where most foraging activity within the project area has been documented. In order to minimize the collision potential for foraging eagles on the Wanaket Wildlife Area, standard designs, as outlined in *Mitigating Bird Collision With Power Lines* (APLIC 1994), will be incorporated into the design of the electrical powerlines, in coordination with the CTUIR. Relative to potential electrocution hazard, powerline configurations less than 1kV or greater than 69 kV typically do not present an electrocution hazard, based on conductor placement and orientation (APLIC 1996). Consequently, no electrocution impacts would be anticipated for bald eagles from the operation of the proposed 500-kV power line.

Determination

Effect on Critical Habitat. No effect

Effect on the Continued Existence of the Species. No effect to nesting bald eagles, based on the lack of known nest sites within the project area. No effect to established winter roosts or communal roost sites within 2 miles of the project area. May effect, not likely to adversely affect individual roosting and foraging bald eagles within the project area as a result of increased noise and human presence during the construction and operation phases of the project, and from the incremental long-term loss of potentially suitable foraging habitat for this species.

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Table A-1
Special Status Species Identified for the Wanapa Power Plant

Common Name	Scientific Name	Status[1]	Range and Habitat Association	Potential for Occurrence Within the Project Area	Eliminated From Detailed Analysis	References
MAMMALS						
Washington ground squirrel	Spermophilus washingtoni	FC; OR-E	This species occurs in isolated grassland remnants in northern Gilliam, northern Morrow, and northwest Umatilla counties. It primarily inhabits grassland and low sagebrush; however, it also has been documented using wheat fields and rocky hillsides. Occupied areas tend to have deep, sandy soils and a heavy cover of perennial and annual grasses and forbs.	Extremely low. The Oregon population of this species is confined mainly to natural grasslands on the U.S. Naval Boardman Bombing Range in Morrow County, approximately 15 miles west of the project area. This species also occurs in isolated remnant grasslands in northern Gilliam, northern Morrow, and northwest Umatilla counties, approximately 10 miles south of the project area.	Yes. It is highly unlikely that this species would occur within the project area, based on its known range south and west of the project area.	Marshall et al. 1996.
White-tailed jackrabbit	Lepus townsendii	OR-U	In Oregon, this species primarily occurs east of the Cascade Range. Habitat for this species consists of sagebrush and grassland communities, but occurs most often in areas with an abundance of native grasses. It is unlikely to occur in habitats consisting of dense sagebrush in valleys or in sagebrush/ rabbitbrush/ greasewood flats and shadscale communities that are occupied by black-tailed jackrabbits.	Extremely low. Relative to the project area, this species has been documented in the Pendleton area in Umatilla County, approximately 20 miles southeast of the project area.	Yes. It is highly unlikely that this species would occur within the project area, based on its known range southeast of the project area.	Marshall et al. 1996.

Table A-1 (Continued)

Common Name	Scientific Name	Status[1]	Range and Habitat Association	Potential for Occurrence Within the Project Area	Eliminated From Detailed Analysis	References
BIRDS						
American white pelican	*Pelecanus erythrorhynchos*	OR-V	In Oregon, three breeding colonies occur in southern Oregon at Pelican Lake (Lake County), Upper Klamath Lake (Klamath County), and at Malheur Lake (Harney County). Post-breeding gatherings occur on Malheur Lake, in other lake basins, and on reservoirs east of the Cascade Range, including those on the Columbia River. Habitat for this species consists of shallow-water areas and marshes, reservoirs and lakes, and along major rivers.	Low to moderate. Occurrence by this species within the project area would be limited to migrating and foraging individuals. This species has been observed on the Wanaket Wildlife Area and adjacent Columbia River annually during wildlife surveys.	No.	Marshall et al. 1996.
Ferruginous hawk	*Buteo regalis*	OR-C; FWS	This species occurs in lowlands and prairies east of the Cascade Range, mainly in Baker, Harney, Malheur, Morrow, Umatilla, and Wallowa counties. Nests occur in juniper trees, on rocky outcrops, ledges, and low cliffs in sagebrush valleys and rolling grasslands. Manmade structures such as transmission towers as well as artificial nest structures also are sometimes used for nesting. Primary habitat for this species includes grassland, sagebrush, and juniper communities.	Low. No nesting records by this species have been documented within the project area. However, nest sites have been recorded in Umatilla County.	No.	Johnsgard 1990; Marshall et al. 1996.

Table A-1 (Continued)

Common Name	Scientific Name	Status[1]	Range and Habitat Association	Potential for Occurrence Within the Project Area	Eliminated From Detailed Analysis	References
Swainson's hawk	*Buteo swainsoni*	OR-V	This species breeds mainly in grassland valleys and agricultural areas of Baker, Malheur, Umatilla, Union, Wallowa, and Wasco counties. Nesting records also have been documented in Gilliam and Morrow counties. Nests occur in willow, juniper, or other small trees, and on manmade structures such as utility poles as well as artificial nest platforms. Primary habitat for this species includes low rolling bunchgrass prairies and agricultural areas with scattered trees.	Low. No nesting records by this species have been documented within the project area. However, potentially suitable habitat could occur within the project area.	No.	Johnsgard 1990; Marshall et al. 1996.
Bald eagle	*Haliaeetus leucocephalus*	FT	Over 95 percent of Oregon's nest sites for bald eagles occur within five areas including Columbia River below Portland, Oregon coast and coast range, the high Cascades, Klamath Basin, and upper Williamette River Basin. The remaining 5 percent of nests occur in the Blue/Wallowa Mountains area. Nest sites occur primarily in ponderosa pine, mixed conifer, and sitka spruce forests within close proximity (<1 mile) of large bodies of water. Wintering eagles occur in	Low to moderate. The closest known bald eagle nest site is a false nest structure located greater than 7 miles from the Wanaket Wildlife Area, near Stanfield in Umatilla County. Wintering eagles occur primarily along the Columbia River and at Hat Rock State Park. Multiple observations of foraging and roosting individuals have been documented annually on the Wanaket Wildlife Area.	No.	Kirsch 2002; Marshall et al. 1996.

Table A-1 (Continued)

Common Name	Scientific Name	Status[1]	Range and Habitat Association	Potential for Occurrence Within the Project Area	Eliminated From Detailed Analysis	References
			every county in Oregon, but most eagle concentration areas occur in the Klamath and Harney Basins and along the Snake and Columbia rivers. Winter roost sites are often in stands of mature conifers, but also will roost in large deciduous trees on basin floors.			
American peregrine falcon	*Falco peregrinus anatum*	OR-E	This species occurs statewide in Oregon. Nesting by this species has been documented along the Columbia River as far east as Dalles in Wasco County. Nesting is restricted to natural shelves, ledges, and potholes on high cliffs. Preference for nest sites include cliff-sites near waters and cliff heights ranging from about 115 to 800 feet (mean = 165 feet).	Low. No suitable nesting habitat occurs along the Columbia River within the project study area. However, it is possible that this species could occasionally forage on the Wanaket Wildlife Area and other potentially suitable habitat within the study area.	No.	Kirsch 2002; Marshall et al. 1996.
Long-billed curlew	*Numenius americanus*	OR-V	This species occurs in portions of Gilliam, Morrow, and Umatilla in Northern Oregon, and in Baker, Malheur, Harney, Lake and Klamath counties in eastern and southern Oregon. Habitat for this species includes level to gently sloping or rolling terrain with short vegetation. In northcentral Oregon, areas of	High. This species is known to breed on Wanaket Wildlife Area within the project area.	No.	Dechant et al. 2001; Quaempts 2003.

Table A-1 (Continued)

Common Name	Scientific Name	Status[1]	Range and Habitat Association	Potential for Occurrence Within the Project Area	Eliminated From Detailed Analysis	References
			shrubs or downy brome intermixed with patches of Sandberg's bluegrass is preferred over areas of dense forbs, antelope bitterbrush and bunchgrass.			
Yellow-billed cuckoo	*Coccyzus americanus*	FC; OR-C	This species is currently a rare, irregular visitor to Oregon with no known breeding population in the state. Single birds, presumed to be floaters or migrants, are periodically observed in willow-black cottonwood riparian areas east of the Cascades in the southern portion of Oregon. This species occurs in large riparian forests, especially those with cottonwood overstories and dense willow understories.	Extremely low. No known nest sites or observations have been documented within the project area. Habitat within the project area is marginal.	Yes. The potential occurrence by this species within the project area would be highly unlikely and would be limited to individual migrants.	Marshall et al. 1996, 2003.
Western burrowing owl	*Athene cunicularia hypugea*	OR-C; FWS	This species breeds in non-mountainous areas in all counties east of the Cascades and in Jackson County. Nesting occurs primarily in mammal burrows, but also may use manmade structures such as culverts. Habitat consists of sagebrush-steppe, grassland, and pastureland on relatively level terrain. Nest sites typically occur where soil and/or vegetation has been	High. This species is known to breed on the Wanaket Wildlife Area within the project area.	No.	Marshall et al. 1996.

Table A-1 (Continued)

Common Name	Scientific Name	Status[1]	Range and Habitat Association	Potential for Occurrence Within the Project Area	Eliminated From Detailed Analysis	References
			disturbed through overgrazing, fire, construction, or farming.			
Grasshopper sparrow	*Ammodramus savannarum*	OR-V	This species occurs at disjunct breeding sites in Harney, Jackson, Lane, Baker, Wallowa, Morrow, and Umatilla counties with the most consistent reports from grassland remnants in Morrow and western Umatilla counties. Relative to the project area, nest sites have been documented near Boardman, Heppner, Pilot Rock, Lexington, and Nye. Habitat for this species includes grasslands, particularly bunchgrass and shortgrass communities, which may have some shrub cover.	Low. No known occurrence by this species has been documented within the project area. The closest known occurrence is from Boardman located approximately 20 miles west of the project area. However, potentially suitable habitat may be present within the project area.	No.	Marshall et al. 1996.
Loggerhead shrike	*Lanius ludovicianus*	OR-V	This species occurs in lowland steppe habitats east of the Cascade Range. In eastern Oregon, this species in found mostly in sagebrush and juniper-steppe. This species is not found in chaparral, grasslands, or in areas under intensive cultivation. In southeastern Washington, highest densities of shrikes were found in flat terrain, deep soils, and relatively high horizontal and vertical	Low. No known occurrence by this species has been documented within the project area. However, potentially suitable habitat may be present within the project area.	No.	Marshall et al. 1996.

Table A-1 (Continued)

Common Name	Scientific Name	Status[1]	Range and Habitat Association	Potential for Occurrence Within the Project Area	Eliminated From Detailed Analysis	References
			structural diversity. Nest sites occur in the interior of shrubs and small trees.			
Black-throated sparrow	*Amphispiza bilineata*	OR-PR	This species breeds primarily in southeast Oregon in Harney and Malheur counties; however, birds have been observed carrying nesting material in Klamath and Wheeler counties and elsewhere east of the Cascades. This species typically occurs in a narrow zone between valleys or playa floors and steep rocky areas. Alluvial fans having rocks or coarse gravel are typical nest sites for this species. Depending on location vegetation can include juniper, sagebrush, and saltbush.	Extremely low. No known nest sites or observations have been documented within the project area. The project area occurs outside of the known breeding range for this species.	Yes. The potential occurrence by this species within the project area would be highly unlikely and would be limited to individual migrants.	Marshall et al. 1996.
REPTILES						
Western painted turtle	*Chrysemys picta*	OR-C	This species occurs in the Williamette Valley and as far south as Corvallis and east along the Columbia River drainage. It has been documented on Irrigation Wildlife Area and Umatilla National Wildlife Refuge in Morrow County, and on the Wanaket Wildlife Area in Umatilla County. Habitat consists of slow-moving or still, shallow	High. This species has been documented within the project area on the Wanaket Wildlife Area in Umatilla County.	No.	Marshall et al. 1996; Quaempts 2003.

Table A-1 (Continued)

Common Name	Scientific Name	Status[1]	Range and Habitat Association	Potential for Occurrence Within the Project Area	Eliminated From Detailed Analysis	References
			waters with soft bottoms, basking sites, and an abundance of aquatic vegetation.			
AMPHIBIANS						
Blotched tiger salamander	*Ambystoma tigrinum melanostictum*	OR-U	This sub-species is known only from Mosier, Hood River County; southern Klamath County south of Klamath Falls; Harney Basin in Harney County; and near Leslie Gulch, Malheur County. This sub-species breeds in a variety of seasonal and permanent water bodies, including reservoirs and stock watering ponds. Terrestrial adults spend most of their life in burrows.	Extremely low. No known individuals or populations of blotched tiger salamanders are known to occur within the project region.	Yes. It is highly unlikely that this species would occur within the project area, based on its known range of this species.	Marshall et al. 1996.
Western toad	*Bufo boreas*	OR-V	This species is widely distributed in Oregon, but is absent in Williamette Valley and valleys of the Great Basin. Habitat for this species includes forested and brushy areas from sea level to high mountains. Breeding occurs in springs, ponds, shallows of lakes, and slow moving streams. During dry weather, it occurs under damp woody debris or in burrows.	Moderate. This species is widely distributed throughout much of Oregon including Umatilla County. However, potentially suitable habitat may be present within the project area.	No.	Marshall et al. 1996.

Table A-1 (Continued)

Common Name	Scientific Name	Status[1]	Range and Habitat Association	Potential for Occurrence Within the Project Area	Eliminated From Detailed Analysis	References
Woodhouse's toad	*Bufo woodhousii*	OR-PR	This species has a spotty distribution in Oregon in Malheur County and from records along the Columbia River in Gilliam, Morrow, and Umatilla counties. Specifically, this species was found in Umatilla National Wildlife Refuge in 1994 and 1995. Habitat for this species is variable occurring near human habitations, riparian areas, sagebrush flats, and fields.Breeding occurs in permanent waters, including streams, lakes, ponds, and reservoirs; however, it also has been observing in shallow temporary ponds in Morrow County. Daytime activities are spent beneath debris, in rodent burrows, or self-dug burrows.	Low. No known occurrence by this species has been documented within the project area. However, potentially suitable habitat may be present within the project area.	No.	Marshall et al. 1996.
Northern leopard frog	*Rana pipiens*	OR-C	Historical records indicate that this species once occurred in wetlands along the Columbia River from Wasco County to Umatilla County and in the Snake River drainage in Malheur and southern Baker counties. However, intensive surveys conducted in the early 1970's along the Columbia River did not	Low. No known occurrence by this species has been documented within the project area. However, potentially suitable habitat may be present within the project area.	No.	Marshall et al. 1996.

Table A-1 (Continued)

Common Name	Scientific Name	Status[1]	Range and Habitat Association	Potential for Occurrence Within the Project Area	Eliminated From Detailed Analysis	References
			turn up this frog. Habitat from this species includes marshes and meadows and surrounding hay fields and grassy woodlands.			
Columbia spotted frog	*Rana luteiventris*	FC; OR-U	This species occurs in eastern and central portions of Oregon at elevations ranging from 1,706 feet to 6,400 feet. This species inhabits marshy ponds or lake edges, or algae-covered overflow pools and streams.	Extremely low. No known individuals or populations of this species are known to occur within the project region. The project area occurs below the elevational range of this species.	Yes. This project does not occur within the known distribution or elevational range of this species.	Marshall et al. 1996; USGS 2002.

[1]Status:
FT = Federally listed as threatened.
FC = Federal candidate.
FWS = USFWS species of special concern.
OR-E = State-listed as endangered in Oregon.
OR-C = Sensitive species categorized as critical in Oregon.
OR-V = Sensitive species categorized as vulnerable in Oregon.
OR-PR = Sensitive species categorized as peripheral or naturally rare in Oregon.
OR-U = Sensitive species categorized as undetermined status in Oregon.

Table A-2
Amphibian and Reptile Species Observed in Wanaket Wildlife Area Wetlands
April 29 – May 1, 2002

Wetland No.	Great Basin Spadefoot	Pacific Tree Frog	Bull Frog	Western Painted Turtle	General Wetland Characteristics
1					Relatively deep wetland with limited vegetation
2	X	X			Relatively shallow wetland with abundant nearshore vegetation
3					Relatively shallow wetland with abundant nearshore vegetation
4				X	Relatively shallow wetland with abundant nearshore vegetation
5				X	Relatively shallow wetland with abundant nearshore vegetation
6		X			Relatively deep wetland with abundant nearshore vegetation
7					Relatively shallow wetland with abundant nearshore vegetation
8					Dry
9a				X	Relatively deep wetland with rocky shoreline and limited vegetation; carp present
9b					Dry
10					Relatively shallow wetland with abundant nearshore vegetation
11				X	Relatively deep wetland with rocky shoreline and limited nearshore vegetation; carp present
12					Relatively deep wetland with rocky shoreline and limited nearshore vegetation; carp present
13a				X	Relatively deep wetland with rocky shoreline and limited nearshore vegetation; carp present
13b					Dry
14a					Dry
14b				X	Relatively deep wetland with rocky shoreline and limited nearshore vegetation
14c				X	Relatively deep wetland with rocky shoreline with limited nearshore vegetation
14d					Dry
15			X		Relatively deep wetland with rocky shoreline and limited vegetation
16					Relatively deep wetland with rocky shoreline and limited vegetation
17a					Relatively shallow wetland with abundant nearshore vegetation
17b					Relatively deep wetland with rocky shoreline and limited nearshore vegetation; carp present
18				X	Relatively deep wetland with rocky shoreline and limited vegetation; carp present
19			X	X	Relatively shallow wetland with abundant nearshore vegetation
20			X		Relatively shallow wetland with abundant nearshore vegetation

Table A-2 (Continued)

Wetland No.	Great Basin Spadefoot	Pacific Tree Frog	Bull Frog	Western Painted Turtle	General Wetland Characteristics
21			X		Relatively deep wetland with rocky shoreline and one shallow vegetated bay
22a					Relatively shallow wetland with abundant nearshore vegetation
22b					Relatively deep wetland with one shallow vegetated area
23a				X	Relatively deep wetland with limited nearshore vegetation
23b				X	Relatively deep wetland with rocky shoreline and limited nearshore vegetation
23c					Dry
23d			X	X	Relatively deep wetland with limited nearshore vegetation except in several shallow areas
24a					Dry
24b					Dry
24c				X	Relatively shallow wetland with abundant nearshore vegetation
24d				X	Relatively deep wetland with rocky shoreline and limited nearshore vegetation
25a			X	X	Relatively deep wetland with limited nearshore vegetation
25b					Dry
26a					Relatively shallow wetland with abundant nearshore vegetation
26b					Relatively shallow wetland with abundant nearshore vegetation
26c				X	Relatively deep wetland with rocky shoreline and limited nearshore vegetation
32					Dry
34					Relatively shallow wetland with abundant nearshore vegetation
35			X	X	Relatively deep wetland with rocky shoreline and limited nearshore vegetation
36			X	X	Relatively deep wetland with rocky shoreline and limited nearshore vegetation
37			X		Relatively deep wetland with rocky shoreline and limited nearshore vegetation
38			X	X	Relatively deep wetland with limited nearshore vegetation except in several shallow areas
39			X	X	Relatively deep wetland with limited nearshore vegetation except in several scattered shallow areas
40				X	Relatively deep wetland with rocky shoreline and limited vegetation; carp present
41a					Relatively shallow wetland with abundant nearshore vegetation
41b					Relatively shallow wetland with abundant nearshore vegetation
42					Dry
43a					Relatively deep wetland with rocky shoreline and limited nearshore vegetation
43b					Relatively shallow wetland with abundant nearshore vegetation

Table A-2 (Continued)

Wetland No.	Great Basin Spadefoot	Pacific Tree Frog	Bull Frog	Western Painted Turtle	General Wetland Characteristics
44					Relatively deep wetland at one end and shallow vegetated area at other end
45					Dry
46					Relatively shallow wetland with abundant nearshore vegetation
47				X	Relatively shallow wetland with abundant nearshore vegetation
48				X	Relatively deep wetland with limited nearshore vegetation except in several shallow areas
49					Relatively shallow wetland with abundant nearshore vegetation
50			X		Relatively shallow wetland with abundant nearshore vegetation
51			X		Relatively shallow wetland with abundant nearshore vegetation
52a					Relatively deep wetland with limited nearshore vegetation
52b					Dry
53					Dry
54					Dry
55					Dry
56	X				Relatively shallow wetland with abundant nearshore vegetation

Total Wetlands Examined = 69.
Total Wetlands Surveyed = 53.
Dry Wetlands = 16.
Total Wetlands with Frog Species = 16.
Total Wetlands with Western Painted Turtle = 23.

Table A-3
Amphibian and Reptile Species Observed in Wanaket Wildlife Area Wetlands
May 22 – May 23, 2002

Wetland No.	Surveyed	Examined Not Surveyed	Great Basin Spadefoot	Pacific Tree Frog	Bull Frog	Western Painted Turtle	General Wetland Characteristics
1		X					Relatively deep wetland with limited vegetation
2	X		X	X		X	Relatively shallow wetland with abundant nearshore vegetation
3		X					Dry
4	X						Relatively shallow wetland with abundant nearshore vegetation
5	X						Dry
6		X		X			Relatively deep wetland with abundant nearshore vegetation
7		X					Dry
8		X					Dry
9a		X					Dry
9b		X					Bedrock shoreline w/steep edges.
10		X					Dry
11		X					Relatively deep wetland with rocky shoreline and limited nearshore vegetation; carp present
12		X					Relatively deep wetland with rocky shoreline and limited nearshore vegetation; carp present
13a		X				X	Bedrock shores, steep sidebanks, limited vegetaton
13b		X					Dry
14a		X					Dry
14b		X					Relatively deep wetland with rocky shoreline and limited nearshore vegetation
14c		X					Relatively deep wetland with rocky shoreline with limited nearshore vegetation

Table A-3 (Continued)

Wetland No.	Surveyed	Examined Not Surveyed	Great Basin Spadefoot	Pacific Tree Frog	Bull Frog	Western Painted Turtle	General Wetland Characteristics
14d	X			X			Dry
15	X						Relatively deep wetland with rocky shoreline and limited vegetation
16		X					Relatively deep wetland with rocky shoreline and limited vegetation
17a		X					Relatively shallow wetland with abundant nearshore vegetation
17b		X					Relatively deep wetland with rocky shoreline and limited nearshore vegetation; carp present
18		X					Relatively deep wetland with rocky shoreline and limited vegetation; carp present
19		X					Relatively shallow wetland with abundant nearshore vegetation
20	X						Relatively shallow wetland with abundant nearshore vegetation
21		X					Relatively deep wetland with rocky shoreline and one shallow vegetated bay
22a		X					Dry
22b		X					Relatively deep wetland with one shallow vegetated area
23a		X					Relatively deep wetland with limited nearshore vegetation
23b		X					Relatively deep wetland with rocky shoreline and limited nearshore vegetation
23c		X					Dry
23d		X					Relatively deep wetland with limited nearshore vegetation except in several shallow areas
24a		X					Dry
24b		X					Dry

Table A-3 (Continued)

Wetland No.	Surveyed	Examined Not Surveyed	Great Basin Spadefoot	Pacific Tree Frog	Bull Frog	Western Painted Turtle	General Wetland Characteristics
24c		X					Relatively shallow wetland with abundant nearshore vegetation
24d		X					Relatively deep wetland with rocky shoreline and limited nearshore vegetation
25a		X					Relatively deep wetland with limited nearshore vegetation
25b		X					Dry
26a		X					Relatively shallow wetland with abundant nearshore vegetation
26b		X					Relatively shallow wetland with abundant nearshore vegetation
26c		X					Relatively deep wetland with rocky shoreline and limited nearshore vegetation
32		X					Dry
33		X					Dry
34		X					Relatively shallow wetland with abundant nearshore vegetation
35		X					Relatively deep wetland with rocky shoreline and limited nearshore vegetation
36	X						Relatively deep wetland with rocky shoreline and limited nearshore vegetation
37	X			X			Relatively deep wetland with rocky shoreline and limited nearshore vegetation
38	X			X	X		Relatively deep wetland with limited nearshore vegetation except in several shallow areas
39		X					Relatively deep wetland with limited nearshore vegetation except in several scattered shallow areas

Table A-3 (Continued)

Wetland No.	Surveyed	Examined Not Surveyed	Great Basin Spadefoot	Pacific Tree Frog	Bull Frog	Western Painted Turtle	General Wetland Characteristics
40		X					Relatively deep wetland with rocky shoreline and limited vegetation; carp present
41a		X					Dry
41b		X					Dry
42		X					Dry
43a	X						Relatively deep wetland with rocky shoreline and limited nearshore vegetation
43b		X					Relatively shallow wetland with abundant nearshore vegetation
44		X					Dry
45		X					Dry
46		X					Dry
47		X					Dry
48	X						Relatively deep wetland with limited nearshore vegetation except in several shallow areas
49		X					Dry
50		X					Relatively shallow wetland with abundant nearshore vegetation
51	X						Relatively shallow wetland with abundant nearshore vegetation
52a	X						Relatively deep wetland with limited nearshore vegetation
52b		X					Dry
53		X					Dry
54		X					Dry
55		X					Dry
56	X						Relatively shallow wetland with abundant nearshore vegetation
n.a.	X			X		X	Vegetated shallow resulting from ditch leak.
TOTALS	**15**	**56**	**1**	**6**	**1**	**3**	**28 Dry**