DOE/EIS

Draft Location Supplement To Final Environmental Impact Statement For Fiscal Year 1979 Proposed Program

(Supplement to DOE/EIS-0005)

BONNEVILLE POWER ADMINISTRATION

Franklin Area System Reinforcement

U.S. Department of Energy

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Responsible Official:

Assistant Secretary for Environment

U.S. Department of Energy
Washington, D.C. 20545

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FRANKLIN AREA SYSTEM REINFORCEMENT
STUDY AREA 79-1

Table of Contents

STATUS

FRANKLIN AREA SYSTEM REINFORCEMENT

The Draft Facility Planning Supplement (Study Area 79-1) was filed with the President's Council on Environmental Quality (CEQ) on September 1, 1977. Comments received during the public and agency review period which closed on November 18, 1977, were considered in the development of the Final Planning Supplement. A public meeting was held on October 25, 1977, at Pasco, Washington.

After evaluating the principal economic, technical, and environmental factors associated with this project, and review of public and agency comments received on the Draft Planning Supplement, Alternative Plan B was selected as the Proposed Plan of Service. A "Plan of Service Decision" section has been included in the Final Planning Supplement under the Description of the Proposal. This Final Planning Supplement identifies the need for the facility, the Proposed Plan, Alternative Plans considered, factors leading to the plan of service selection, and the predicted environmental impacts. A Facility Location Supplement has been prepared which evaluates the design and location needs associated with the Proposed Plan of Service.

The following tentative schedule dates for this project are:

Location Surveys	Fall 1978
Land Acquisition	Spring 1979-Spring 1980
Construction	Summer 1980-Spring 1981
Energization	May 1981

Franklin Area System Reinforcement
Study Area 79-1

D E S C R I P T I O N O F T H E P R O P O S A L

SYSTEM REQUIREMENTS

Overloads occur on the 230-kV and 115-kV lines in the vicinity of Franklin and McNary during outage conditions when Ice Harbor and McNary generators are peaking and local load is low. If one of the transmission lines serving the area is removed from service the area power requirements must be carried on the remaining lines. These remaining lines will open if overloaded and a large area would be without electric service.

When line loading limits are exceeded, Ice Harbor generation must be reduced to relieve the line overloads and avoid power outages. This means when streamflows are high, water will have to be spilled. The situation is particularly severe for an outage of the McNary-Franklin 230-kV line or one of the two Franklin-Benton 115-kV lines. If such an outage occurs during light load periods, especially during the seasons when irrigation pumps are off, sizable amounts of Ice Harbor generation must be cut back to control line loadings.

A different condition occurs during the late summer peakload period. The area loads are high due to irrigation and the Ice Harbor generation is low. The 115-kV lines from Benton to Franklin will overload for outages between Midway and White Bluffs. Some lines may be opened to relieve the line overloads.

With increased capacity on the Pacific Interties, energy in the Northwest which is now wasted can be exported. The increased probability of energy shortages resulting from delays in thermal plant construction and the need to maximize the use of hydrogeneration, both to make up energy shortages and conserve fuel oil, makes it desirable to provide additional Ice Harbor transmission support and eliminate the waste of hydroenergy. Several alternate plans for accomplishing this have been considered.

THE PROPOSED PLAN OF SERVICE

Alternative Plan B has been selected as the Proposed Plan of Service.

The BPA Lower Monumental-John Day 500-kV line would be connected to the Sacajawea Substation by an approximate 6-mile (10 km) 500-kV tap line. The Sacajawea Substation is near Ice Harbor Dam on the south side of the river. A 500/115-kV transformer and substation terminal facilities would be installed at Sacajawea. This would require an additional 6 acres (2.4 ha) at Sacajawea Substation. The tap point would require 3 acres (1.2 ha) of land (see Figures 1 and 2 on next pages).

ALTERNATIVE PLANS CONSIDERED

ALTERNATIVE PLAN A

The PP&L Vantage-Walla Walla 230-kV line would be connected to the Levey Substation by an approximate 5-mile (8 km) tap on the north side of the Snake River. The Levey Substation site is near Ice Harbor Dam on the north side of the river. A 230/115-kV transformer and substation terminal facilities would be installed at Levey. The substation would increase in size by about 2 acres (0.8 ha). (Figs. 1 and 2).

ALTERNATIVE PLAN C

A 6-mile (10 km) 115-kV double-circuit line would connect the Sacajawea Substation to a new substation at a tap point on the BPA Lower Monumental-John Day 500-kV line. Substation facilities would require an additional 2 acres (0.8 ha) at the Sacajawea Substation and 11 acres (4.5 ha) at the Lower Monumental-John Day tap point.

ALTERNATIVE PLAN D

A new 27-mile (43 km), 230-kV, single-circuit line would be constructed between McNary and Franklin Substations, adjacent to the existing McNary-Franklin 230-kV transmission line. Part of the existing McNary-Badger Canyon 115-kV transmission line could be removed to allow the construction of a portion of the new line on existing right-of-way. No substation land enlargement would be required.

ALTERNATIVE PLAN E

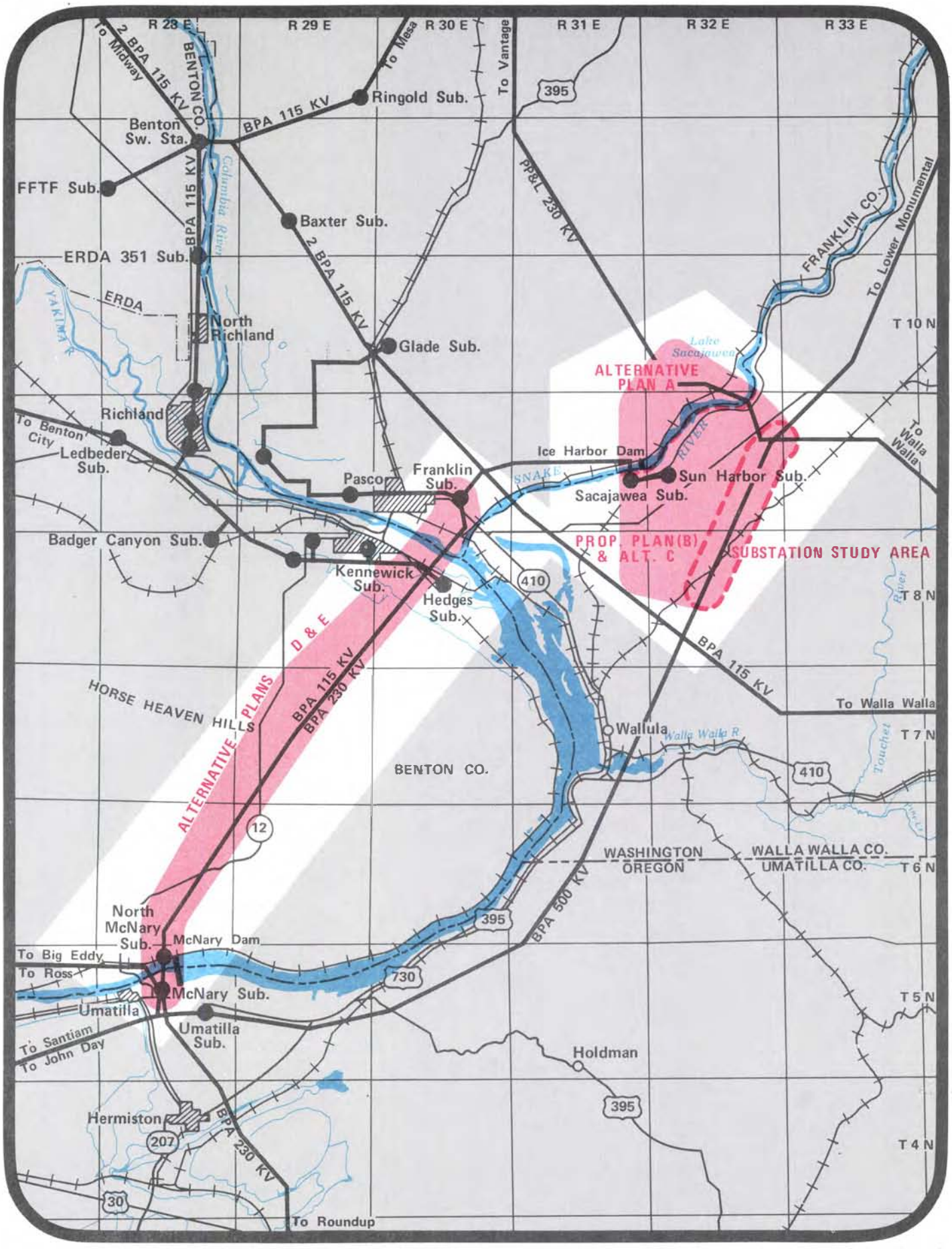
A new 20-mile (32 km), 230-kV, single-circuit line would be constructed between the McNary Substation and the Badger Canyon tap point. This line may replace part of the existing 115-kV line. No substation land enlargement would be required. However, 230/115-kV transformer additions will be required within existing BPA-owned land, at the Badger Canyon and Franklin Substations.

P L A N O F S E R V I C E D E C I S I O N

Alternative Plan B, 6-mile (10 km) 500-kV tap line with 6 acre (2.4 ha) Sacajawea Substation expansion, has been selected as the proposed Plan of Service. The following is a summary of the principal factors used in the selection of the Proposed Plan.

Economic and Engineering Factors

The alternatives were modeled on the BPA digital computer to simulate the actual operating conditions. Various conditions of possible loadings and outages were investigated to study the adequacy of service to the loads in the area. Plan A, tap of the PP&L Vantage-Walla Walla 230-kV line to



NORTH

0 5 10

Scale in Miles

FIGURE 1
PLANNING STUDY AREA
FRANKLIN AREA SYSTEM REINFOR.
79–1

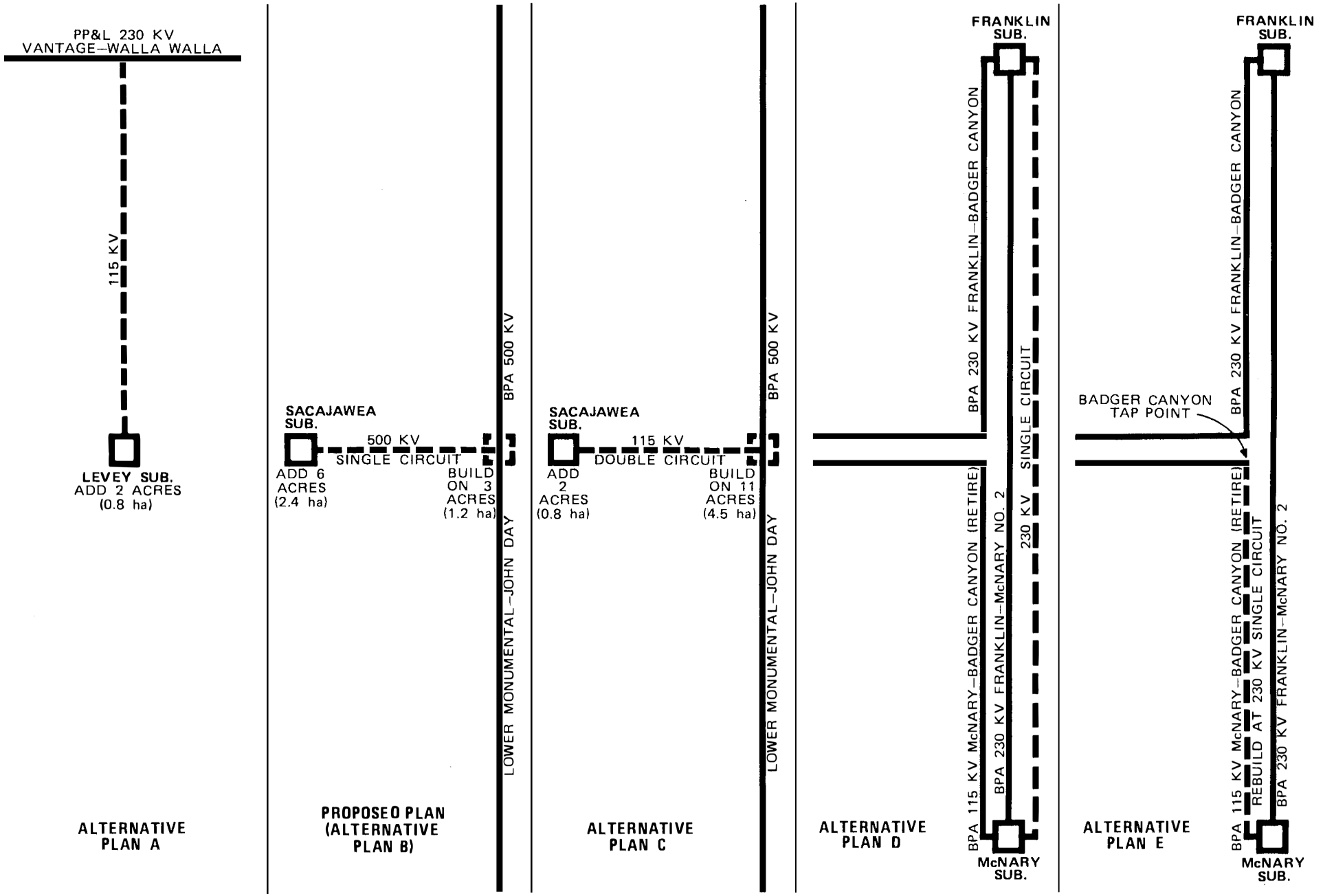


FIGURE 2
PLANS CONSIDERED
FRANKLIN AREA SYSTEM REINFORCEMENT
79–1

Levey would not provide sufficient support to the area. However, the Proposed Plan and Alternatives C, D, and E with connections to the BPA 500-kV grid at Sacajawea or McNary would provide adequate support to the area. Plans D and E with 20 miles (32 km) or 27 miles (43 km) of 230-kV line construction are one and one-half to two times more costly than Plans B or C with 6 miles (10 km) of 500-kV or 115-kV construction. Also, since it is more efficient to transmit power at higher voltages than lower voltages, Plan B has approximately 5,000 kilowatts lower losses. Losses are currently valued in excess of $100 per kilowatt-year for a total loss of $500,000 per year. The Proposed Plan is preferred over Plan C as the 6 mile (10 km) 500-kV tap line can carry several times as much power as the double-circuit 115-kV line, and will eliminate the need for some future line construction as the load increases in the area. The Proposed Plan also avoids the development of a new substation at the tap point and associated development and equipment costs. The 3 acres (1.2 ha) of land required at the tap point is for less costly transmission structures. It is less costly to expand the existing Sacajawea Substation than to develop a new substation.

Environmental Factors

A public meeting was held at the Franklin Co. PUD Auditorium, Pasco, Washington, on October 25, 1977, to present the 5 Alternative Plans to the public. Responses to comments from two federal agencies, one county planning department, and two attendees of the public meeting were used in the plan of service selection.

A new transmission line corridor will be required for the Proposed Plan, 6 miles (10 km) total length, Alternative A, 5 miles (8 km) and Alternative C, 6 miles (10 km). Alternative Plans D and E may parallel existing transmission lines for 27 miles (43 km) and 20 miles (32 km) respectively (see Figures 1 and 2). Existing land uses in the Planning Study Areas of the Proposed Plan and Alternatives A and C are related to the use of sprinkler irrigation systems in the production of grapes, potatoes, sugar beets, alfalfa hay and cereal grains. The above plans do impact sprinkler systems, but do not impact recreational areas. Alternative Plans D and E generally do not impact sprinkler systems, but do moderately impact recreational areas (see Figure 3). Refer to Figure 4 for the degree and likelihood of a plan-by-plan comparison of the environmental impacts in detail. The Proposed Plan and Alternatives A and C do not cross the Columbia River. Alternative Plan D has two crossings and Alternative E one (see Figure 1). BPA has carefully considered the relevant shoreline designations, policies, and regulations of Benton and Franklin Counties Final Shoreline Master Programs in selecting a Proposed Plan. Substation and terminal facilities construction or expansion will require 9 acres (3.6 ha) for the Proposed Plan. Alternatives A, C, D, and E will require 2 acres (0.8 ha), 13 acres (5.3 ha), 0, and 0, acres respectively.

Energy conservation is accomplished in two ways: First without additional Ice Harbor transmission support, water will have to be spilled and

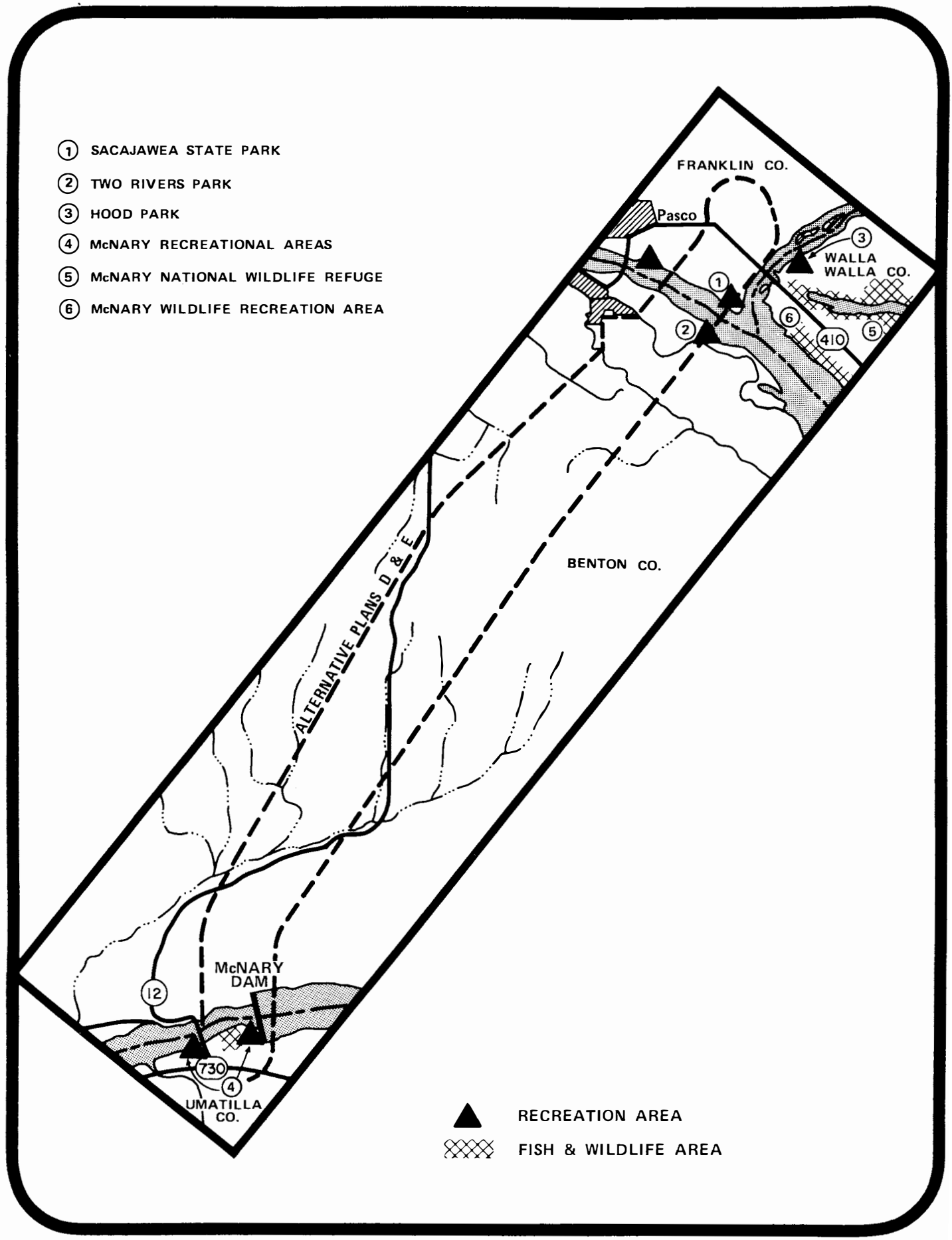


FIGURE 3
IMPORTANT RESOURCES
FRANKLIN AREA SYSTEM REINFORCEMENT
79–1

	Alternative Plan A Impact Adverse					Proposed Plan (Alternative Plan B) Impact Adverse				
	High	Mod	Sli	None	Unknown	High	Mod	Sli	None	Unknown
Agriculture:										
Grape Vineyards	●					●				
Soils			●					●		
Sprinkler Irrigation Systems	●					●				
Hydrology			◒					◒		
Recreation:										
Sacajawea State Park				○					○	
Two Rivers Park				○					○	
Hood Park				○					○	
McNary Recreational Areas				○					○	
McNary National Wildlife Refuge				○					○	
McNary Wildlife Recreation Area				○					○	
Urbanized Land Uses				○					○	
Wildlife:										
Anadromous fishery				○					○	
Waterfowl			◒					○		
Upland birds			○					○		
Endangered Peregrine falcon				○					○	

Likelihood of Impact Occurrence:

○ = Low

◒ = Medium

● = High

Figure 4. - Potential Adverse Impacts on Important Resources and Uses Within the Planning Study Area (the nature of the impacts is described in the narrative).

	Alternative Plan C Impact Adverse					Alternative Plan D Impact Adverse				
	High	Mod	Sli	None	Unknown	High	Mod	Sli	None	Unknown
Agriculture:										
Grape Vineyards	●								○	
Soils			●					●		
Sprinkler Irrigation Systems	●							○		
Hydrology			◒					◒		
Recreation:										
Sacajawea State Park				○			●			
Two Rivers Park				○			●			
Hood Park				○				○		
McNary Recreational Areas				○			◒			
McNary National Wildlife Refuge				○					○	
McNary Wildlife Recreation Areas				○					○	
Urbanized Land Uses				○			◒			
Wildlife:										
Anadromous fishery			○						○	
Waterfowl			○				◒			
Upland birds			◒					◒		
Endangered Peregrine falcon				○					○	

Likelihood of Impact Occurrence:

○ = Low

◒ = Medium

● = High

Figure 4. - Potential Adverse Impacts on Important Resources and Uses Within the Planning Study Area (the nature of the impacts is described in the narrative).

Alternative Plan E

Impact
Adverse

	High	Mod	Sli	None	Unknown
Agriculture:					
Grape Vineyards				○	
Soils			●		
Sprinkler Irrigation Systems			○		
Hydrology			◒		
Recreation:					
Sacajawea State Park				○	
Twc Rivers Park				○	
Hood Park				○	
McNary Recreational Areas		◒			
McNary National Wildlife Refuge				○	
McNary Wildlife Recreation Area				○	
Urbanized Land Uses		○			
Wildlife:					
Anadromous fishery			○		
Waterfowl		○			
Upland birds			◒		
Endangered Peregrine falcon				○	

Likelihood of Impact Occurrence:

○ = Low

◒ = Medium

● = High

Figure 4. - Potential Adverse Impacts on Important Resources and Uses Within the Planning Study Area (the nature of the impacts is described in the narrative).

hydro-energy wasted during periods of high Columbia River stream flow (see System Requirements p. 1 and Nonconstruction p. 21). Second it is more efficient (cost of construction vs return on investment and eventual savings to the consuming public) to transmit power at higher voltages than at lower voltages. The Proposed Plan at 500-kV is the most efficient. Alternatives A, C, D, and E are 115-kV double-circuit, 230-kV, and 230-kV respectively (see Figure 2).

D E S C R I P T I O N O F T H E E N V I R O N M E N T

PLANNING STUDY AREA

GEOGRAPHY

The Planning Study Area occupies approximately 350 square miles (906 sq. km) in southcentral Washington near the confluence of the Snake and Columbia Rivers (Fig. 1). Portions of Benton, Franklin, and Walla Walla Counties in Washington State and a very small section of Umatilla County in the State of Oregon are located in the Planning Study Area. The Pasco-Kennewick urban complex is adjacent to the study area boundary, however, only portions of the cities are included within the study area. The planning study area extends for approximately 40 miles (64 km) in the northeast/southwest direction with the southwestern corner encompassing McNary Dam on the Columbia River while the northeastern portion takes in Ice Harbor Dam on the Snake. The Horse Heaven Hills are the principal topographic unit located within the planning study area (Fig. 1).

CLIMATE

The Planning Study Area has a semi-arid climate which is characterized by low annual precipitation, large daily temperature variations, and substantial interseasonal temperature fluctuations. A summary of principal meteorological observations at Umatilla, Kennewick, and Ice Harbor Dam is provided in Table 1, page 5.

Summers are generally hot and dry. The cold winters are moderated by relatively warm air masses. However, extremely cold temperatures are occasionally produced by intrusions of arctic air. Recorded temperature extremes for Kennewick are a maximum of 115°F (45°C) and a minimum of -23°F (-31°C). The frost-free period in the study area varies from around 140 to 160 days per year.

Annual precipitation is less than 10 inches (254 mm) near the Snake and Columbia Rivers and increases to around 15 inches (381 mm) in the higher elevations of the Planning Study Area. Two-thirds of the annual precipitation normally falls from October through March. On the average, the study area receives about 10 inches (254 mm) of snow annually. This represents roughly 10 to 15 percent of the mean annual precipitation total. The prevailing direction of the wind is influenced by topography and varies with the change of seasons. In general, the direction varies

from south to west, with the higher velocities from the southwest or west. During spring and fall, rapidly moving weather systems result in dust storms.

Table 1. - Representative Climatological Data

Characteristic (Mean)	Station Umatilla (1931-60)	Kennewick (1931-60)	Ice Harbor Dam (1957-65)
Annual Temp. (°F)	53.4	53.6	54.4
(°C)	(11.9)	(12.0)	(12.4)
Max/Min Jan. Temp. °F	39.8/24/1	38.3/25.0	40.8/25.9
(°C)	(4.3/-4.4)	(3.5/-3.9)	(4.9/-3.4)
Max/Min July Temp. °F	91.1/58.7	91.5/58.9	92.3/60.6
(°C)	(32.8/14.8)	(33.1/14.9)	(33.5/15.9)
Annual Precip. (inches)	8.13	7.49	9.76
(mm)	(207)	(190)	(248)
Jan. Precip. (inches)	1.08	1.05	1.08
(mm)	(27)	(27)	(27)
July Precip. (inches)	0.18	0.17	0.16
(mm)	(5)	(4)	(4)
Annual Snowfall (inches)	8.4	10.7	--
(mm)	(213)	(272)	

Source: PNRBC 1969, Climatological Handbook, Vols. I and II

NATURAL RESOURCES

The natural resources of the planning study area are characterized in this section. Their geographic location and distribution within the study area are shown and described. Man's use of the natural resources will be discussed in the section, "Resource Use and Socioeconomic Resources."

ATMOSPHERE

Air quality throughout the planning study area is generally quite good. Pollutants associated with agricultural, urban, and industrial development are normally localized. The Kennewick/Pasco urban complex, with the many air pollution-producing activities that are related to it, is a major year-round source of air contamination adjacent to the study area. Agricultural activities contribute significantly to the deterioration of air quality during spring and fall.

The study area is subject to frequent, often strong winds which tend to parallel the Columbia River. Although this wind is beneficial for dispersing much of the urban and industrial types of pollution, it results in dust clouds in recently cultivated areas, disturbed areas, and along

unsurfaced roads. Microscopic evaluation of samples obtained at the Umatilla background sampling station[1/] indicates that about 80 percent by weight of the particulate samples are the result of windblown dust (DEQ 1975). Pollen is another primary source of particulate matter in the atmosphere.

An additional atmospheric factor influencing the quality of the ambient air in the study area is the amount of mixing that takes place. Low mixing or inversion heights tend to result in higher ambient concentrations, as do low wind speeds. These parameters usually undergo daytime variations, tending to be highest in midafternoon and lower in early morning. From a seasonal standpoint, average mixing heights are lowest in winter.

GEOLOGY, SOILS, AND MINERALS

The planning study area is located in the Columbia Basin Physiographic Province (Highsmith 1973). This province is characterized by extensive basalt flows of middle to late Tertiary age. These make up the vast Columbia River Basalt formation which underlies the entire region to great depths. The boundary between the Central Plains and the Yakima Folds subdivisions of the Columbia Basin Physiographic Province cuts across the planning study area in a northwestern to southwestern direction which roughly parallels the Columbia River below Kennewick. The northeastern portion of the study area falls in the Central Plains Subdivision which is a region of vast outwash plains and terraces which have moderate to very deep soils of high fertility. The southwestern portion of the planning study area crosses the planning study area crosses the east-west anticline known as the Horse Heaven Hills. These hills are part of the Yakima Folds subdivision and rise to elevations of over 2,000 feet (600 m) in the study area.

Earthquake epicenters with Richter magnitudes of 6.3 or less have been recorded within a 50-mile (80 km) radius. Seismic intensities anticipated from earthquakes of the magnitudes experienced near the planning study area do not exceed IX on the Modified Mercalli Scale (Shannon and Wilson 1972).

In general, all the soils were formed under a grassland or shrub-grassland vegetative complex from Plio-Pleistocene glacio-fluvial, lacustrine and/or wind-deposited materials (Franklin and Dyrness 1973). This has resulted in soils of fine sandy loam to silt loam texture of variable depth (CNP Staff 1971). The soils have developed under scant rainfall and are relatively fertile due to the high mineral content. Generally, they are suitable for agricultural production with dryland farming techniques or irrigation, if water is available. The loose, crumbly nature of the soil

1/ The Oregon Department of Environmental Quality operates a suspended particulate ambient air monitoring station at Umatilla.

in combination with its tendency for droughtiness makes for erosion problems, especially from wind, in areas where the soil is exposed through cultivation or other disturbance.

HYDROLOGY

The Columbia and Snake Rivers dominate the surface hydrology of the Planning Study Area (Fig. 1). The southwestern corner of the study area encompasses McNary Dam on the Columbia and a portion of its reservoir, Lake Wallula. The Snake River passes through the northeastern section of the study area on the way to its confluence with the Columbia. A portion of Lake Sacajawea, which is a result of the backwater from Ice Harbor Dam on the Snake River, is also included.

Other hydrological features include Dalton Lake which is adjacent to Lake Sacajawea, Columbia Canals, No. 1, 2, and 3 situated southeast of Kennewick, and Smith Canyon Waterway. The Burbank Slough, a significant wetland area partially located in the study area, is administered as part of the McNary National Wildlife Refuge. See the "Wildlife" and "Recreation" sections for further discussions of this resource. In addition, a few intermittent streams and wet areas are located throughout the other portions of the planning study area.

VEGETATION

Major vegetation types are rangeland and riparian. Principal rangeland plant species include sagebrush, rabbitbrush, bluebunch wheatgrass, fescue, and cheatgrass. Cheatgrass, an annual that dominates overgrazed rangelands, has good initial holding ability against wind erosion but has little forage value for livestock.

Potholes, irrigation ditches, and the banks of the Columbia River support patches of riparian vegetation such as black cottonwood, willow, Russian olive, cattail, bullrush, and sedges. These species are common where water is available. Although sage and rabbitbrush are the most evident perennial species on the rangeland, spring brings an array of buttercups, balsam root, lupines, larkspur, and phlox.

There are no officially listed threatened and endangered plants in the study area. At the time that a Federal list is adopted and officially published in the Federal Register by the U.S. Fish and Wildlife Service BPA will work with them to explore appropriate mitigation measures.

WILDLIFE

Aquatic habitat consists primarily of segments of the Columbia and Snake Rivers (Fig. 3). These rivers support large runs of anadromous fish including chinook, sockeye, and coho salmon and steelhead trout. The anadromous nonsalmonids, American shad and pacific lamprey are also present. Several resident species, including bass and crappie are found,

expecially in backwater areas. These rivers, associated riparian habitat and adjoining agricultural lands attract large numbers of waterfowl during migration and wintering periods. Other concentration areas include McNary National Wildlife Refuge, McNary Wildlife Recreation Area, and the Smith Canyon canal. Common species include mallard, pintail, greenwing teal, widgeon, coot and Canada goose. A variety of shore and songbirds also inhabit these same areas. Mammals found in or near watercourses include beaver, muskrat, otter, and mink.

Other wildlife habitat within the area consists primarily of shrubs/grass and irrigated and dryland crops. Extensive areas of cover are scarce and deer populations are generally low and uniform throughout the area. Birds found in these areas include large populations of ring-necked pheasant, valley quail, and mourning dove. Other birds characteristic of the area include, horned lark, magpie, and several species of birds-of-prey. The Northern long-billed curlew occurs in the area, however, habitat of this bird is being lost to agricultural development. The Federally endangered American peregrine falcon may also be present at times. Small mammals characteristic of the area include black-tailed jackrabbit, Townsend ground squirrel, badger, deer mouse, kangaroo rat, and pocket gopher.

RESOURCE USE AND SOCIOECONOMIC RESOURCES

The following sections relate man's use of the natural resources previously described.

DEMOGRAPHIC AND ECONOMIC CONSIDERATIONS

Table 2 provides some basic demographic information on the three incorporated cities located adjacent to the planning study area boundaries. Although all three cities experienced growth from 1970 to 1975, the population of Umatilla more than doubled. The study area has an agricultural economic base, however, the urban areas provide a diverse range of other job opportunities.

Table 2. - Population Statistics

Location	Number of People			Percent Change		
	1960	1970	1975	1960-70	1960-75	1970-75
Kennewick	14,244	15,212	18,253	6.8	28.1	20.0
Pasco	14,522	13,920	14,450	-4.1	-0.5	3.8
Umatilla	617	679	1,620	10.0	162.6	138.6

Source: U.S. Bureau of Census, 1973. Census of Population, 1970, Vol. 1. Characteristics of the Population; Center for Population Research and Census (PSU); Population Studies Division (State of Washington).

Between 1970 and 1975 the population for the City of Umatilla changed from 679 to 1,620. (See Table 2). Part of the population increase resulted from the October 1973 annexation of the McNary townsite. The population of the McNary townsite at the time of annexation was approximately 250. In the 6 months following annexation the townsite had grown by an additional 100 persons. A gradual population growth is likely to continue.

LAND USE

As part of the Environmental Analysis and Preliminary Planning, the Walla Walla, Franklin, Benton and Umatilla County Planning agencies were contacted for information on existing zoning and land use plans. Although all plans will impact to varying degrees land use in the affected counties, there was no expression of incompatability in the A-95 review except from Franklin County. Franklin County felt that plan A would have an exceptionally high impact or conflict with agricultural land. The compatibility of the proposed facilities with state and local land use plans will be presented further in the Draft Facility Location Supplement.

Agriculture

Soils are sandy and require irrigation water for production, water must be applied by a sprinkler irrigation system. Side roll, central pivot and solid set systems are the predominant types used. Irrigation water is pumped from the Snake and Columbia Rivers. Typical irrigated crops such as grapes, early potatoes, late potatoes, sugar beets, alfalfa hay, and cereal grains are grown. Per acre yields range, for grapes from 3-1/2 to 5 tons (3 to 5 MT), early potatoes 22 to 25 tons (20 to 23 MT), late potatoes 23 to 27 tons (21 to 24 MT), sugar beets 25 to 30 tons (23 to 27 MT), alfalfa hay 6 to 9 tons (5 to 7 MT), and wheat 80 to 100 bushels (28 to 35 hl). (Bill LFord, Franklin County Extension Agent). These yields compare favorably with the Lower Yakima Valley and exceed the production for the main Columbia Basin. The study area is at a lower elevation and has a longer growing season.

Additional irrigation development is continuing. The area was used for dryland grazing prior to the present irrigation development. Evidence indicates it was over-grazed. Areas with very shallow soils, and steep or odd shaped parcels are still in rangeland vegetation. These areas are not fenced and are not being utilized for grazing. In the Study Area much of the farmland is Class 3 (U.S. Soil Conservation Service Classification); with the application of irrigation water most of the land, not presently being irrigated, may become Class 1.

Forestry

There are no forest-related lands or activities located within the study area.

Urban and Residential

Urbanized land uses do not constitute a significant portion of the study area except for several locations near the Snake and Columbia Rivers. In Walla Walla County there has been a recent increase in residential development near the community of Burbank and in the vicinity of Ice Harbor Dam. Near Burbank there is some concentration of industrial land use. Otherwise, the Walla Walla County land in the study area is used and zoned for agriculture.

In Franklin County there is a similar pattern of residential and urban land use near the confluence of the Snake and Columbia Rivers. The area within 1.5 miles (2.4 km) of the Snake River upstream to Ice Harbor Dam is zoned for industry. The remaining portion of Franklin County in the study area is zoned for agriculture.

In Benton County, just southeast of Kennewick, there has been a considerable amount of residential development. This area, with a zoning designation of "unclassified," is expected to continue a process of conversion of agricultural land to residential uses. There is also a small area of residential land use near the town of Plymouth one mile northwest of McNary Dam.

Only a very small portion of Oregon's Umatilla County is in the study area. Along the Columbia River the zoning designation is for "Open Space" and "Farm Zone." Residential development located nearby is on the fringe of the town of Umatilla.

Other

The major highway transportation routes through the study area are Oregon State Highways 14 and 124 and U.S. Highways 12, 395, and 410, (see Fig. 1). The two railroads with routes within the study area are the Burlington Northern and the Union Pacific. The Burlington Northern follows the Columbia River to Pasco where it turns and parallels the Snake River. The Union Pacific has tracks on the south side of the Columbia River in the central portion of the study area and on the south side of the Snake River in the north portion.

Scattered throughout the study area are canals and water tanks. There are several utility pole lines and an aquaduct. There are many sand and gravel pits in the study area. These constitute the only mining operations within the study area.

ESTHETIC

The landscape in the study area is primarily one of rolling hills with a cover of grasses, sagebrush, and similar vegetation typical of a dry climate. The Snake and Columbia Rivers are major visual features, but when out of view their positive influence on the landscape is lost.

Form, color, and texture, created by diverse topography, waterforms and vegetation are major determinants of many methodologies for the evaluation of visual quality. Using these criteria for judgment, the scenic quality of the study area is generally low. We recognize, however, that esthetics is an area of great subjectivity. Therefore, individual reactions to this or any other landscape can vary widely.

A new and growing element in this landscape is irrigation development. The color and texture contrast afforded by these changes are modifying the appearance of the land. In time they may change the visual character of the landscape from "rangeland" to "rolling farmland."

RECREATION

Much of the recreation within the Planning Study Area is related to the Columbia and Snake Rivers. Both of these rivers are of Statewide significance as defined by the "Shorelines Management Act of 1971." In the southern end of the area, the Corps of Engineers maintains McNary Wildlife Park, McNary Beach, boat ramps, picnic areas, viewpoints, and fish viewing facilities (Fig. 3). Water-oriented recreation developments in the north include Sacajawea State Park, Hood Park, and Two Rivers Park. Fishing, boating, swimming, and camping opportunities are available. The study area contains high-quality waterfowl habitat and opportunities for viewing, photographing and hunting waterfowl exist throughout. Particularly important areas for waterfowl and other wildlife are McNary National Wildlife Refuge and McNary Wildlife Recreation Area. Ring-necked pheasant, quail, and mourning dove are hunted in and near the agricultural areas. Water, bicycle, and foot trail corridors have been identified in the area by the Interagency Committee for Outdoor Recreation for planning purposes (IAC 1974).

HISTORICAL, ARCHITECTURAL, AND ARCHEOLOGICAL

In the planning study area of Benton County the following properties are eligible for inclusion in the National Register of Historic Places: Paris archeological site, Wooded Island archeological district, Rattle Snake Springs sites, Ryegrass archeological district, Hanford Island archeological site, Hanford north archeological district, Locke Island archeological district, Snively Canyon archeological district, and Benton County Courthouse. Glade Creek site has been nominated for listing in the National Register. In Franklin County, Strawberry Island Village archeological site has been nominated for listing in the National Register. Savage Island archeological district, and Franklin County Courthouse are eligible for inclusion in the National Register.

The Oregon Historic Preservation Officer reports the Umatilla Landing Site, the Cold Springs Landing Site, and the Umatilla River Arch as historical properties on the Statewide Inventory of Historic Places. He has also reported several archeological sites in the Oregon portion of the study area, mapped by the Smithsonian Institution in 1974.

Nominations to the Washington Statewide Inventory include the James Moore House, the B. B. Horrigan House, Pentecostal Church of God, Franklin County Courthouse, and the Pasco-Kennewick Highway Bridge, all located at Pasco; the Pasco Reclamation Company Pumping Plant, British Imperial Claim Site at Sacajawea State Park, and the Burlington Northern Railroad Bridge, are also in the study area, east of Pasco.

BPA will comply with the requirements of the "National Historic Preservation Act of 1966" (P.L. 89-665), as well as Executive Order 11593. Procedures applicable to these laws are described in Section XII, Historic and Archeological Appendix to the Fiscal Year 1979 Program Statement.

P L A N O F S E R V I C E A N A L Y S I S

POTENTIAL IMPACT OF THE PROPOSAL

The Draft Facility Planning Supplement was submitted for public and agency review on September 1, 1977. BPA has identified Alternative Plan B as the Proposed Plan. The following discussion of impacts relate to that plan. Alternative Plans A, C, D, and E retain this original letter designation and are discussed as well.

The range and duration of potential impacts from the Proposed Plan (Alternative B) would be limited primarily to Agriculture. Grape vineyards and sprinkler irrigation systems may entail a high degree of impact and a high likelihood of impact occurrence (see Figure 4).

A more complete discussion of impacts typically associated with transmission facility construction and maintenance can be found in Appendix B, Chapters V, VI, and VII of the Role EIS.

NATURAL RESOURCES

Atmosphere

Construction, operation, and maintenance activities related to the Proposed Plan would contribute small amounts of air pollutants. Primary pollutants would be fugitive dust raised by moving equipment and vehicles and exhaust from construction equipment and motor vehicles. Substation expansion and the establishment of access roads will result in some windblown dust. These pollutants would be concentrated in the immediate vicinity of construction activities and would occur at intermittent intervals. The new access roads could result in some long-term impacts if the roads remain unsurfaced. Besides the impact on air quality, such pollution could have an esthetic impact because of dust and exhaust visibility. However, the pollutants would be quickly dispersed and the impact short-lived. The mitigating measures normally taken by BPA or the contractors they engage to lessen these impacts are discussed in BPA's Role EIS, Appendix B.

The atmospheric impacts related to the construction, operation, and maintenance activities associated with Alternative Plans A and C would be essentially the same as those described for the Proposed Plan. Atmospheric impacts for Alternative Plans D and E would be similar to those discussed for the proposed Plan, however, the accumulative impacts would be greater due to the additional line length.

Geology, Soils, and Minerals

The anticipated impacts to the geologic and soil resources in the planning study area for the activities required in the Proposed Plan are similar to those described for Alternative Plan A below. However, the transmission line in the Proposed Plan is 6 miles (10 km) and the expansion at Sacajawea Substation will require 6 acres (2.4 ha).

No impact to the geology of the study area is expected from the construction of the facilities in Alternative Plan A. The impacts to the soil environment resulting from the facilities required in Alternative Plan A are expected to be short-term and relatively minor. One of the principal disturbances will occur in the expansion of the Levey Substation. Approximately 2 acres (0.8 ha) of land will be altered at that location for adding the necessary facilities. Another impact could occur if access roads for the 5 miles (8 km) of new transmission line are needed. The dry, light weight soils in the study area are relatively stable, provided the vegetative cover is not disturbed or removed. Once the soil is exposed, it is subject to erosion especially from wind. Spring and fall can be critical times because frost action causes some soil disturbance, especially where the soil is bare. In winter, frozen soils prevent water from percolating downward and erosion in exposed areas can be a problem. Compaction would be a consideration where heavy construction equipment crosses agricultural land. Transmission line impacts to the soil environment should be minor and related primarily to the placement of structures. The mitigating measures normally taken by BPA to keep impacts to a minimum while constructing these facilities are discussed in the Role EIS.

Alternative Plan C will require an additional 11 acres (4.5 ha) for a tap point at the Lower Monumental-John Day line.

No substation expansions are required in Alternative Plan D, however the transmission line is 27 miles (43 km) long. Consequently, the cumulative impacts could be significant even though the anticipated impacts will be similar to those described for the previous plans. Alternative Plan E, will require 20 miles (32 km) of transmission line. Access road impacts for both Alternative Plans D and E, should be reduced if existing rights-of-way and roads are used.

Hydrology

The Proposed Plan and Alternative Plan C are not expected to impact the hydrological resources of the study area in any way different than described for Alternative Plan A below.

No significant impact to the hydrologic resources in the Planning Study Area are anticipated from Alternative Plan A. Construction and maintenance activities and vehicular movement may cause some minor soil erosion which could result in turbidity and sedimentation to local water bodies. For a discussion of the standard mitigating measures taken by BPA to keep hydrological impacts to a minimum, see BPA's Role EIS.

Alternative Plans D and E will have similar impacts to those described for Alternative Plan A. However, the transmission line required in Alternative Plan D will cross the Columbia River twice--once below McNary Dam and once just above the confluence of the Snake and Columbia Rivers. In addition, this line will have to cross the Columbia Canals Nos. 1, 2, and 3 southeast of Kennewick. Alternative Plan E will only cross the Columbia River once below McNary Dam. No significant impacts to these resources are anticipated with proper location and installation of the structures.

Vegetation

Although the approximate 6 mile (10 km) transmission line required for both the Proposed Plan and Alternative Plan C is slightly longer than Plan A, overall impacts to vegetation would be similar to those described for Plan A. An additional 2 acres (0.8 ha) of grassland habitat will be removed at the existing Sacajawea Substation, and 11 acres (4.5 ha) at the Lower Monumental-John Day tap point for Plan C. Similar habitat to that being removed is abundant nearby.

Approximately 5 miles (8 km) of transmission line required for Alternative Plan A would cross some grassland habitat. Minimal habitat type modification would occur and impacts on natural vegetation are expected to be low. An approximate 2 acre (0.8 ha) additional increase in the Levey Substation required for Plan A would remove some grassland.

Twenty-seven miles (43 km) of 230-kV line for Alternative D and 20 miles (32 km) of 230-kV line for Alternative E would also result in minimal impact on the natural grassland vegetation. If, however, the existing lines are not paralleled or replaced, new access roads may be required with increased vegetation disturbance. Riparian vegetation on the wetlands of the two Columbia River crossings for Plan D will be left if at all possible. Plan E would require only one river crossing near McNary Dam, where riparian vegetation is relatively low growing and probably would not have to be disturbed.

Wildlife

Although the approximately 6 mile (10 km) long transmission line required for the Proposed plan is slightly longer and of higher voltage than Plan A, overall impacts to wildlife would be similar to those described for Plan A. Relatively little habitat modification would be required for construction of the line. The plan would require removing an additional 6 acres (2.4 ha) of habitat at the existing Sacajawea Substation. Similar habitat to that being removed is abundant nearby and no significant impact on wildlife is expected.

The approximately 5 mile (8 km) long transmission line required for Alternative Plan A would cross primarily crop and grassland habitat. Minimal habitat modification would occur in such areas and impacts on wildlife are expected to be low. Construction activities could cause short-term disturbances to wildlife, however, most species would probably adapt to this temporary intrusion. If construction occurred during the spring, localized disturbance of ground nesting birds could result. No noticeable impacts on such populations are expected. The construction of access roads could result in removal or modification of habitat. In addition, new roads could result in increased human access to wildlife habitat with possible long-term disturbances to wildlife. The line would cross the Smith Canyon Canal, and could result in a slight potential for waterfowl collision mortality. The approximate 2 acre (0.8 ha) increase in Levey Substation required for Plan A would remove some grassland habitat. Such habitat is abundant and no noticeable impact on wildlife is expected. Plan A should result in no impacts to endangered or threatened species.

The transmission line and substation enlargement required for Alternative Plan C, would result in impacts to wildlife not significantly different from those of the Proposed Plan. Plan C, however, would require approximately 11 acres (4.5 ha) for a tap point at the Lower Monumental-John Day line. Some habitat would be removed, however, because of the relatively small amount and the abundance of similar habitat in the surrounding area, no significant impact on wildlife is expected.

As with the above plans, the transmission line required for Alternative Plan D would cross primarily grass and cropland where relatively little habitat modification would occur. Because of its longer length, approximately 27 miles (43 km), cumulative modification would be greater. If the line were located parallel to existing lines, existing access roads could probably be used. If however, the line were not parallel, new roads required would increase habitat modification and result in increased human access into the area. Such access, both authorized and unauthorized could result in increased disturbance to wildlife. The transmission line would cross the Columbia River at McNary and at Pasco. The crossings would be in areas of high waterfowl concentrations and could result in some collision mortality. This potential would be somewhat reduced if the crossings were near existing lines. There is no indication that any

significant collision mortality has resulted from existing line crossings in the area. No significant increase in sedimentation should result from the river crossings and no noticeable fishery impacts are expected.

Although 7 miles (12 km) shorter, the transmission line required for Alternative Plan E would potentially be located in the same area and result in similar wildlife impacts as the line in Plan D. Plan E would require only one Columbia River crossing and would have a lower potential for waterfowl collisions than Plan D.

RESOURCE USE AND SOCIOECONOMIC RESOURCES

Demographic and Economic Considerations

The Proposed Plan would have socioeconomic implications similar to those described for Alternative Plan A below.

The temporary population increase expected from the construction of the facilities proposed in Alternative Plan A is estimated to be between 10 and 20 people (Table 3 on next page). These individuals will require room and board for a 2 to 3-month period. Motels are normally used by construction crews if they are available. It is also estimated that some 5 to 11 temporary jobs would be available to local residents for the duration of the construction projects required in Alternative Plan A. If these people are not available locally, they will have to be recruited elsewhere. The potential income from these jobs to the planning study area is estimated to be about $45,000.

BPA and the contractors they engage make an effort to use local facilities and equipment whenever it is convenient. Although the multiplier effect of providing services and supplies for these construction projects and their personnel has not been taken into consideration in Table 3, it could be significant.

Alternative Plan C would require 4 to 6 months for completion of the work and the potential income to the local area would be approximately $68,000 (Table 3).

Alternative Plan D would require 6 to 8 months to complete the job and the potential income to the local area would be about $58,000. Alternative Plan E would require 4 to 6 months to complete the work and the potential income to the local area would be around $43,000 (Table 3). Otherwise, the socioeconomic implications from both aspects of Alternative Plans D and E would be similar to those described for Alternative Plan A.

Land Use

Agriculture

Grapes are a perennial crop grown in the study areas of the Proposed Plan, as well as Alternatives A and C. A permanent solid set irrigation system

Table 3 . Socio-Economic Considerations Related to Construction *

Considerations	Alternative Plan A		Proposed Plan (Alternative Plan B)		Alternative Plan C		Alternative Plan D	Alternative Plan E
	Substation Expansion	Line Construction	Substation Expansion	Line Construction	Substation Tap Point Expansion	Line Construction	Line Construction	Line Construction
Total Number Employed	10-12	10-20	10-12	10-20	10-12	10-20	10-20	10-20
Number Hired From Local Area	3-6	2-5	3-6	2-5	3-6	2-5	4-5	4-5
Length of Job (months)	2-3	2-3	2-3	2-3	4-6	2-3	6-8	4-6
Average Wage ($ per hour)	8.00	9.00	8.00	9.00	8.00	9.00	9.00	9.00
Est. Potential Increase to Local Area ($)	23,000	21,600	23,000	21,600	46,000	21,600	57,600	43,200

* Although this information is very general in nature, it is intended to provide some indication of the potential socio-economic impacts associated with substation and line construction.

** This does not take into consideration the income derived from services (i.e., food, entertainment, etc.) provided to construction crews by local businesses.

Source: Line and Substation Construction Sections, Branch of Construction, BPA.

provides the water. Mains and laterals are buried with risers extending above the grapes. The grapes are harvested with a mechanical harvester requiring a radius of 30 feet to turn. A tower in the vineyard would not only require irrigation modification but may eliminate 4 rows of grapes for a distance of 80 feet per tower site.

Agriculture would have a short term impact in the construction phase as the Proposed Plan and each of the alternatives will cross over cultivated farmlands and native grassland. Some farming operations may have long term impacts from the transmission line corridor and substation projects. Alternative Plan A may require about 5 miles (8 km) of 230-kV transmission line and 2 acres (0.8 ha) of additional land at Levey Substation. Alternative Plan C includes 6 miles (10 km) of 115-kV line and will require 2 acres (0.8 ha) at Sacajawea Substation and 11 acres (4.5 ha) of land at Lowr Monumental-John Day tap line. Alternative Plan D will include 27 miles (43 km) of 230-kV and Alternative Plan E is planned for 20 miles (32 km) of 230-kV line. Each of these alternatives have similar relationships in that they cross agricultural farmlands and/or native sagebrush-grasslands consisting primarily of Big Sagebrush, rabbitbrush, needle and thread grass, and Indian ricegrass. The length of the line and more towers increases the impact effect.

All of the agricultural lands are irrigated because of the low precipitation of about 7 inches (179 mm). Irrigation provides for high yields and checks wind erosion. The principal irrigation systems are center pivot, side roll, solid-set and rill (gravity). The proposed transmission line could have long-term effect on layout and design and operation of irrigation systems in the vicinity of the towers.

The transmission lines could effect safety in aerial application of herbicides, insecticides, fungicides, and fertilizer. Extreme precaution must always be practiced in handling and upending irrigation pipe to avoid contact with the conductor.

Some soil erosion could occur in the disturbed construction areas but can be eliminated in a short period of time by grading, diversion ditches and seeding. Much of the grape acreage is irrigated by solid-set systems, which can be affected by transmission line tower location. The effects are greater with high value cash crops.

Annual and perennial weeds in the transmission line right-of-way are of great concern, however, they would be of short-term impact because of control by herbicides.

Urban and Residential

Construction of facilities under the Proposed Plan is not expected to have any impact on urbanized land uses.

Construction of facilities under Plan A would not have any direct impact on urbanized land uses. The expansion of Levey Substation would be visible from several nearby rural residences. Depending on final location the transmission line may be seen from a limited number of rural residences.

Impacts from Plan C would be similar to the Proposed Plan.

Construction of facilities under Plan D would result in the intrusion of new transmission facilities near the confluence of the Snake and Columbia Rivers. Because this area is undergoing residential development it is likely that there would be visual, noise, and dust impacts on nearby residents. Near McNary Dam the transmission line could have similar impacts on residential land in the vicinity of Plymouth, Washington.

Under Plan E the impacts to urbanized land uses would be limited to the vicinity of Plymouth, WA, as described above. If the existing 115-kV line were replaced there would be no reduction in the amount of land available for residential development.

Audible noise levels for a 500/115-kV or 500/230-kV transformer at the proposed substation, when energized would be about 76 dB(A) measured at a distance of 100 feet from the noise source, 70 dB(A) at 200 feet, 64 dB(A) at 400 feet, and 58 dB(A) at 800 feet. Because the substation would be located at a considerable distance from any residences, commercial businesses or offices, recreational facilities (camps, parks, or resorts), or other noise-sensitive property, exposure to the transformer noise emissions would not be a source of annoyance. Operational noise levels specified in the Washington Administrative Noise Code (WAX-173-60-040). The maximum permissible noise level for a substation (industrial noise source) is 70 dB(A) measured at the property boundary of the agricultural land.

Other

Other land uses are not expected to be impacted as a result of the construction or operation of the proposed facilities.

Esthetic

Under the Proposed Plan the transmission line would cross State Highway 124 where, due to the terrain and lack of vegetative cover, it could be visible for several miles. There are a few farm residences in the area from which the line could be seen. The additions to Sacajawea Substation would be visible from the south access road to Ice Harbor Dam. The changes, however, would not be apparent to the casual viewer.

Under Plan A the transmission line would likely cross the Pasco-Kahlotus Road where, due to the terrain and lack of vegetative cover, it would be visible for several miles. The line could also be visible from some

of the limited number of residences in this portion of the study area. Depending upon final location, portions of the line could be seen from the Snake River. The additions at Levey Substation would be visible from the north access road to Ice Harbor Dam and several nearby residences. Because of the existing visual impacts created by the substation and transmission facilities the additions would not be readily apparent. Portions of the transmission line may parallel an existing line with a reduction in the overall visual impact of the new line.

Under Plan C the impacts would be similar to the Proposed Plan except for the additional impact of the substation facilities at the Lower Monumental-John Day tap point. The substation might be visible from a farm residence near the existing line.

Under Plan D, the transmission line would cross the Columbia River twice and would be situated in growing residential areas southeast of Kennewick. Although there are existing transmission facilities in this area, the close proximity to residents and users of the Columbia River would cause the addition of new facilities to be readily apparent. In other portions of the study area the additional transmission line would not significantly increase existing visual impacts. If the new line were not parallel to an existing line, visual impacts could increase because of the intrusion of a transmission line into a new area. It is unlikely that a new corridor could entirely avoid the congestion of residential development southeast of Kennewick and near the confluence of the Snake and Columbia Rivers.

Under Plan E the visual impacts on residential areas southeast of Kennewick could be avoided. If the 20 miles (32 km) of new line replaced an existing transmission line there would likely be no change in existing conditions. A route parallel to the existing line would add to the visual complexity of the corridor but should not significantly alter existing conditions. If the new line were not parallel to existing lines the visual impact would be greater because of the intrusion of a transmission facility into a previously undisturbed area.

Recreation

The facilities required for the Proposed Plan and Alternative C could result in some visual impact on hunters as described below for Plan A, but would be less likely to affect recreationists using the Snake River. The transmission line would cross Highway 124 which is used by recreationists, possibly resulting in additional visual impact.

Alternative Plan A is not expected to have any direct impact on developed recreational areas. The facilities would be located in an area used by upland bird and waterfowl hunters. The facilities could interfere with hunting activities in localized areas. This interference would involve the effect of the facilities on the visual component of the recreational experience. Depending on the final alinement there also could be visual

impacts to recreationists on and near the Snake River. Visual impacts are covered in the section, "Esthetics."

Alternative Plans D and E would have impacts similar to those described for Plan A. The potential for both short and long-term visual impacts to recreationists using the Columbia and associated recreation areas is greatest for Plan D as this would require two river crossings. Such impacts, for both D and E, would probably be less if the crossings were adjacent to existing lines. The transmission line in Plan D would probably cross Sacajawea State Park in a corridor with existing transmission lines. The line would add to the long-term visual impact created by the existing lines. Short-term impacts resulting from noise and dust would occur in the park during construction.

Historical, Architectural, and Archeological

At this stage in the planning process no effect is expected on the Strawberry Island Village Archeological Site, now pending nomination to the National Register. Historic sites identified in the Washington Statewide Inventory of Historic Places are not expected to be affected by the Proposed Plan or Alternatives A or C. There is a low likelihood that Alternatives D and E may be viewed from the three historical properties on the Oregon Statewide Inventory of Historic Places, depending on ultimate line location.

An archeologic and historic evaluation will occur at the Facility Location stage. Should any additional properties be discovered during this process, procedural steps and protective measures as described in BPA's Role EIS would be taken. Additionally, contract specifications require that if a site is discovered during construction, work would be halted until the site has been evaluated.

NONCONSTRUCTION

Nonconstruction of the above described facilities will result in overloads on Ice Harbor transmission lines during outage conditions and when Ice Harbor generators are peaking and local load is low. Overloading will occur when stream flow and Ice Harbor generators are low but irrigation demand is high. Without additional Ice Harbor transmission support, water will have to be spilled and hydroenergy wasted during these periods of high stream flows especially during periods of nonirrigation or outages on other nearby lines. With additional transmission support it would be possible to utilize all of the energy from the area which is now wasted.

SUMMARY OF PLAN OF SERVICE ANALYSIS

INTRODUCTION

Resources and uses previously identified as highly important, critical or unique are given special attention in planning and construction of

transmission facilities. Predictions of potential impacts to these important features (Fig. 4) are based upon past BPA experience, information from numerous agencies and individuals, and on the expertise from environmental specialists within BPA. Predictions of possible impacts are meant to facilitate comparisons of the environmental aspects of system alternatives which at the planning stage are represented by broad corridors.

In Figure 4, two factors are considered in evaluating impacts (1) the likelihood of an impact occurrence, and (2) the expected degree of impact.

LIKELIHOOD OF IMPACT OCCURRENCE

The following designations are used to evaluate the likelihood of an impact:

Low - Resources or use is a point source or occupies a small portion of the study area and could be avoided in final alinement. "Low" includes those resources and uses in degree of impact category "none."

Medium - Resource or use partially occupies a corridor and may be impacted in final alinement.

High - Resource or use entirely transverses a corridor and would be impacted if final alinement were within the presently defined corridors.

DEGREE OF IMPACT

These designations are used to evaluate the degree of impact:

Slight - Modifications as a result of construction and maintenance activities with no noticeable long-term changes in conditions expected.

Moderate - Modifications as a result of construction and maintenance activities with noticeable long-term changes in conditions possible.

High - Modifications as a result of construction and maintenance activities with highly noticeable long-term changes in conditions possible.

None - Due to the compatibility of the resource with transmission facilities, or the low likelihood of an interaction between the resource and the transmission facility, we expect no significant measureable adverse impacts.

Unknown - Due to the nature of the resource, or lack of available data, we are unable to predict impacts.

DRAFT FACILITY LOCATION SUPPLEMENT

FRANKLIN AREA SYSTEM REINFORCEMENT

FY 79-1

DESCRIPTION OF THE TRANSMISSION LINE ROUTES, THEIR POTENTIAL IMPACT AND MITIGATION

At this time, only alternative transmission line routes have been identified for the proposed plan of service Plan B. A proposed route will not be selected until environmental, economic, and engineering studies have been completed and public and agency inputs received and evaluated.

DESCRIPTION OF ROUTES CONSIDERED

INTRODUCTION

Two routes are being evaluated. Other routes satisfying Plan B would either impact homes, interfere with a private airstrip, cross more dryland or irrigated cropland, cost more, or a combination of these.

The area studied and routes identified are shown on Figure 6 on the next page. Natural and socioeconomic resource information presented in the previous section may be supplemented in some of the impact discussions to follow. Appropriate sections will identify impacts, routes, and specific mitigating measures as they relate to resources.

LOCATION DESCRIPTION

Note Figure 6 with following discussion

Route 1. This 5.2-mile (8.4 km) route would begin at the existing Sacajawea Substation, 0.5 miles (0.8 km) southwest of Ice Harbor Dam, and proceed southeast for 1.6 miles (2.6 km). Route 1 would then turn due east along a section line for 3.6 miles (5.8 km) to where it would tap the existing single-circuit Lower Monumental-John Day 500-kV line.

Route 2. This 6-mile (9.7 km) route would also begin at the Sacajawea Substation and proceed one mile (1.6 km) southeast, 1.3 miles (2.1 km) due south along the range line between R31E and R32E, and 3.7 miles (6.0 km) due east along township line separating T8N and T9N to a tap point on the Lower Monumental-John Day 500-kV line.

GENERAL CONSTRUCTION REQUIREMENTS

Tower Design and Material Requirements

The steel towers of the Lower Monumental-John Day 500-kV single-circuit line, as shown on Figure 7 following Figure 6, are similar to the towers that would be used for Route 1 or Route 2. The tower steel would average 90 tons (81.63 metric tons) per mile and the conductor 32 tons (28.5 metric tons). A tower base would occupy 0.02 acres (0.01 ha). There would be four to five structures per mile (3 structures/km). Up to

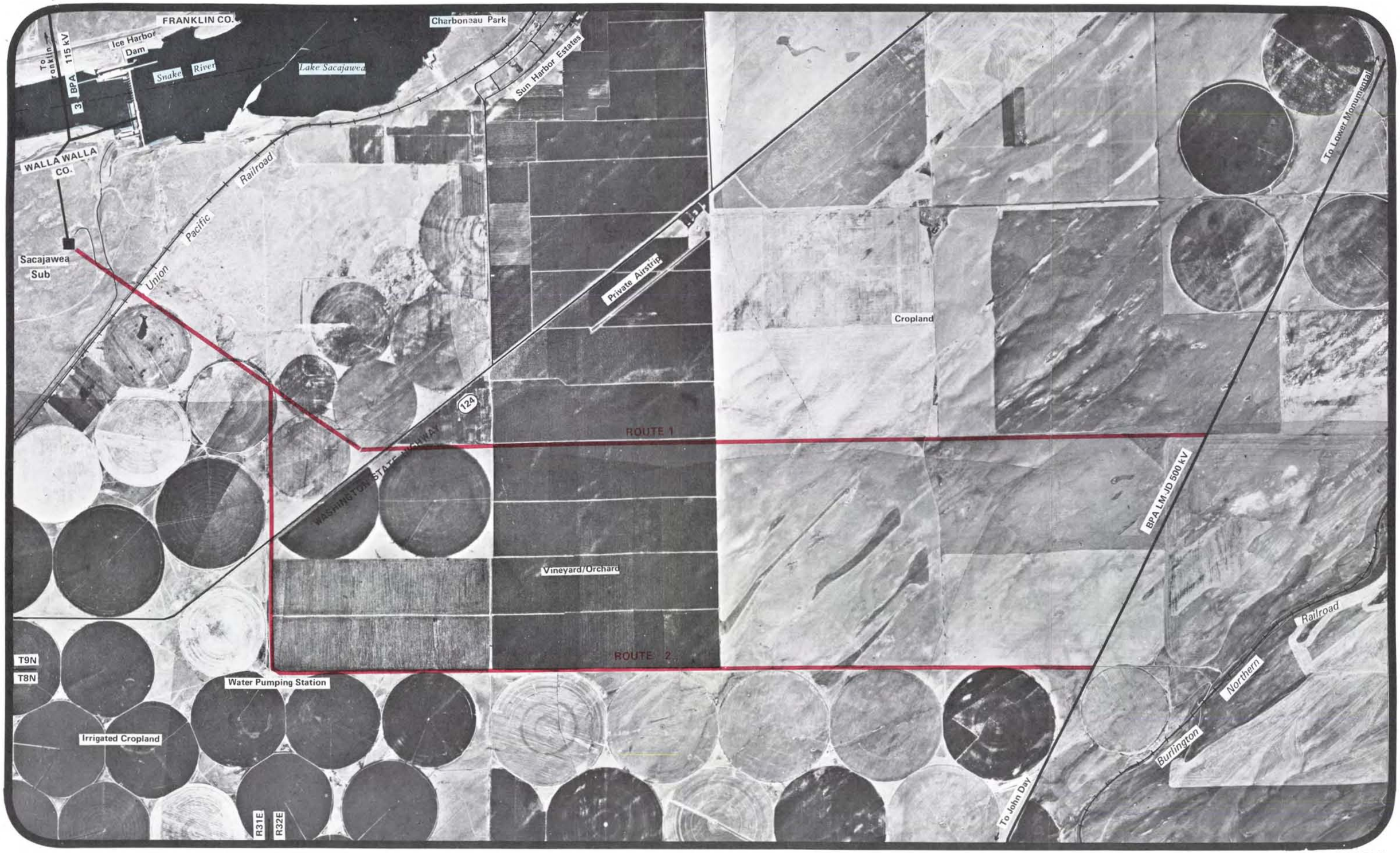
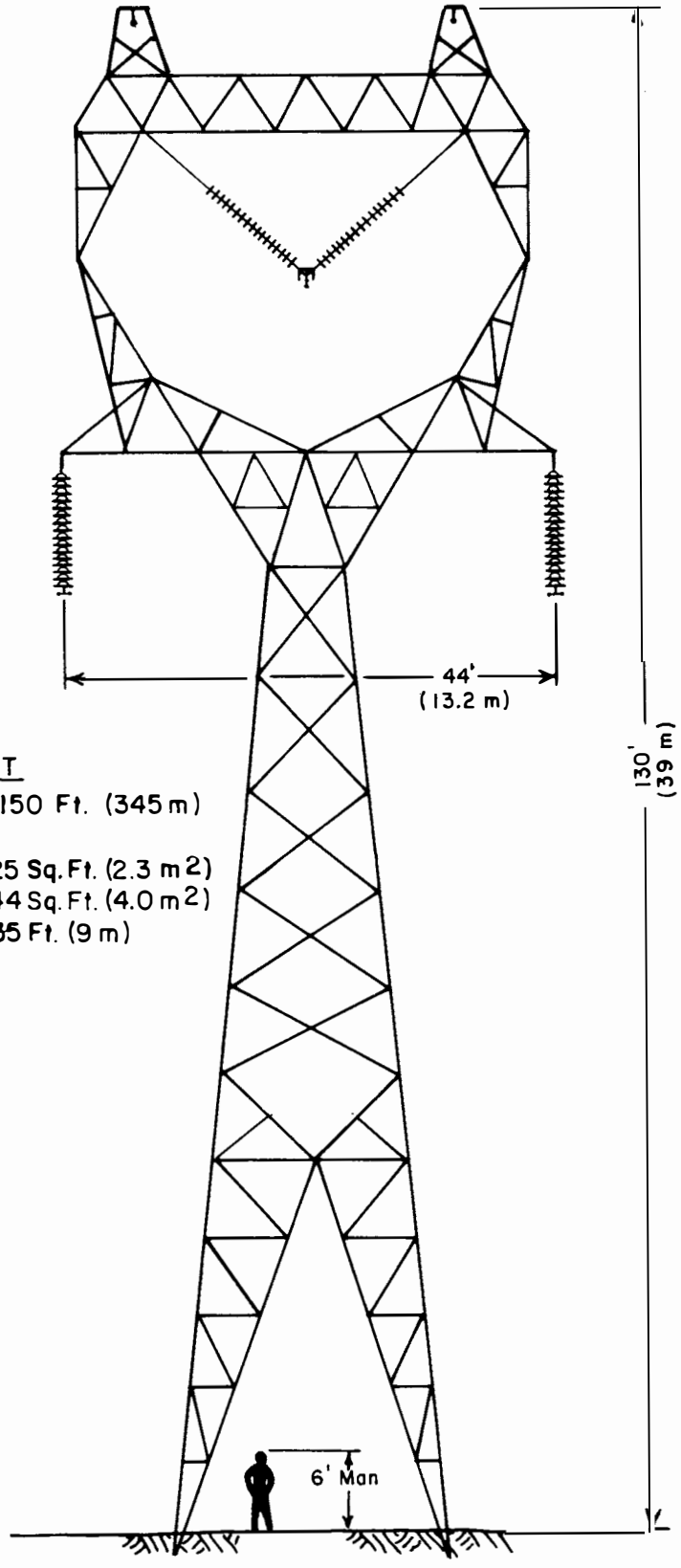


FIGURE 6
POTENTIAL ROUTES
FRANKLIN AREA SERVICE
79–1



TOWER DESIGN CHART

Avg. Span Length	= 1150 Ft. (345 m)
Tower Base Dims.	
(Suspension)	= 25 Sq. Ft. (2.3 m^2)
(Dead End)	= 44 Sq. Ft. (4.0 m^2)
Min. Ground Cl.	= 35 Ft. (9 m)

TYPICAL 500 KV

SINGLE CIRCUIT SUSPENSION TOWER

NOT TO SCALE

FIGURE 7

TYPICAL TOWER CONFIGURATION
FRANKLIN AREA SERVICE
79–1

0.5 acre (0.20 ha) could be required at each tower site for tower assembly and erection. Along the routes, it is unlikely that terrain would warrant blading of tower sites.

Right-of-Way Requirements

Either route would be on new right-of-way, neither replacing or paralleling an existing electrical transmission line. Right-of-way width would be 125 feet (37.5 m) or 15.2 acres per mile (62. ha per km). Note summary Table 4 on the next page.

Access Road Requirements

For construction and maintenance, access would be required to each tower site. Existing roads will be used where possible. BPA acquires easement on existing private roads where needed. In agricultural areas the property owner would also be paid for crop damage caused during construction, and during subsequent operation and maintenance of the transmission line. Development of the access road system would be coordinated with landowners to accommodate their present and future road requirements to the extent possible. The 2 miles (3.2 km) of line to be constructed on the east end of Route 1 is through cultivated dry wheatland with potential for irrigation. Due to the fragile sandy soils in this area and heavy equipment needed for construction of the line, a gravel base, 16 feet (4.9 m) wide will be required for part or all of the road. The road will be built on or near the section line. All other roads required during construction or maintenance will be kept to the minimum width possible. A 20-foot (6 m) wide easement would be acquired on existing private roads. New access roads would need a right-of-way 16 feet (4.8 m) wide plus cuts and fills. See Table 4 on next page.

Other Construction Characteristics

For details on construction activities, their sequence, and scope, see Chapter V of Appendix B of the Role EIS. No clearing would be necessary except for tower sites, access roads, and pulling and reeling sites. No trees are in the study area. Pulling and reeling sites could be located at Sacajawea Substation, the tap point and two or three sites between.

Cost Requirements

Note Table 4 for route cost comparison. Due to its greater length and additional angle structures, Route 2 is more expensive.

OPERATION AND MAINTENANCE REQUIREMENTS

See Chapter VI of Appendix B of the Role EIS for information concerning operation and maintenance requirements.

Table 4. -- Route Construction Requirements Summary

Requirement		Route 1	Route 2
Line length (miles/kilometers)	1/	5.2/8.4	6.0/9.6
Tower height, average (feet/meters)		125/37.5	same
Conductor to ground clearance, minimum (feet/meters)		35/10.5	same
Tower sites area required for construction total (acres/hectares)		12/4.9	14/5.7
Tower bases, total permanent area required (acres/hectares)		0.5/0.2	0.6/0.2
Tower Steel, total (tons/metric tons)		484/439	580/526
Conductor, total (tons/metric tons)		170/154	197/179
Pulling and reeling sites, maximum number		4	5
Transmission line right-of-way (R/W) 2/ requirements (acres/hectares)		79/32.0	91/36.9
Tower type; steel single-circuit Delta 500-kV		same	same
Access Roads (miles/kilometers):			
Existing private roads			
on R/W		1.4/2.2	3.7/5.9
off R/W		0.3/0.5	0.7/1.1
Permanent new roads			
on R/W		2.1/3.4	none
off R/W		none	none
Temporary roads			
on R/W		0.5/0.8	0.8/1.3
off R/W		0.7/1.1	0.5/0.8
Cost of transmission line		$1,510,000	$1,770,000

1/ All values are estimates
2/ R/W - Right-of-way

THE POTENTIAL IMPACTS OF THE ROUTES AND THEIR MITIGATION

NATURAL RESOURCES

Discussions to follow will describe routes, impacts, and specific mitigation measures to important natural resources found in proximity to each alternative route. Refer to the "Description of the Environment" and "Plan of Service Analysis" sections for basic information.

Atmosphere

Atmospheric conditions and potential impacts have been described in the planning supplement.

Geology, Soil, and Mineralization

The geology and soil resources along each route are similar. Limited gravel extraction has occurred adjacent to this area, but gravel extraction has not occurred, nor is it anticipated along the alternate routes.

Both routes are on old Snake River terraces approximately 100 feet (30 m) above the current river level. Elevation along the routes ranges from 500 feet (150 m) near Sacajawea Substation to 980 feet (294 m) near the southern tap point. Slopes on these terraces range from 0 to 10 percent.

From Sacajawea Substation, southeast, 1.5 miles (2.4 km), the two routes are identical. In this area fine sands and sandy loam soils would be crossed. These soils are 1 to 2 feet (0.3 to 0.6 m) deep and overlie 10 to 20 feet (3 to 6 m) of silt and sand intermixed with gravel deposits. Near the substation, small outcrops of basalt would be crossed. These soils have a low to moderate production capability and are currently used for rangeland and irrigated crops.

Eastward from the point where the two routes separate, rock exposures are rare.

Soils in this area are of the same texture, but generally greater than 5 feet (1.5 m) deep. Locally, gravel deposits occur in the subsoil. Soils in this area have a moderate production capability and are currently used for irrigated crops.

Impacts to the geology and soils would be slight along these routes. Refer to Table 4 for access road requirements. Temporary access roads would reduce the time soil is exposed and limit the potential of wind erosion. Construction of access roads would produce minimal soil disturbances in this area.

Excavation for tower footings would be necessary and could include blasting in basalt to achieve adequate tower footings. Vehicle operation

and tower footing excavations would disturb the soil surface and increase the potential for wind erosion.

The use of access roads could produce slight compaction; exposed soil could be subject to wind erosion; and soil exposed near irrigation systems could be subject to water erosion. These potential impacts would be mitigated as set forth in the Role Statement, Appendix B, Chapter VIII.

Hydrology

The Snake River is the major hydrologic resource in the area. A minor aquifer of undetermined extent was identified by the Corps of Engineers during test boring near Ice Harbor Dam. The aquifer had an artesian effect and yielded 37 gallons per minute (140 litres per minute). Neither of these resources would be directly impacted by construction of the transmission line.

Vegetation

Much of the natural vegetation along both routes has been displaced by irrigated farmland. Approximately 5.1 acres (2 ha) of natural vegetation would be disturbed with 0.5 acres (0.2 ha) permanently lost. Impacts would be minimal except for the possible spread of noxious weeds resulting from the disturbance of soil during the construction phase of the transmission line. BPA would follow any noxious weed program as identified by local agencies.

No known, threatened and/or endangered plant species listed by the U.S. Fish and Wildlife Service have been identified within the study area.

Wildlife

The area along Routes 1 and 2 is primarily irrigated or dryland cropland habitat with minor amounts of shrub/grassland.

Habitat modification from construction along both routes should be minimal with only temporary disturbance. If construction occurred during the spring, disturbances of ground-nesting birds could result. Slight mortality would occur, but overall populations are not expected to be significantly impacted. Impact to ground-nesting birds would be less if construction was not scheduled in April or May. Although the federally endangered American peregrine falcon may be present at times within the area, no impacts are expected to it or any endangered or threatened species listed by the U.S. Fish and Wildlife Service. Raptors could benefit from using the towers as perches and nesting sites.

RESOURCE USE AND SOCIAL/ECONOMIC RESOURCES

Discussions to follow will describe impacts to socioeconomic resource use found in proximity to each alternate route. Refer to the "Description of the Environment" and "Plan of Service" sections for basic information.

Demographic and Economic Considerations

All of the routes in this plan are relatively short and would require about four months to construct. The size of the construction crew would be 12 to 15 persons. This would depend on the contractor who does the work.

The nearest incorporated cities to the study area are Pasco, Kennewick, and Richland, about 10 miles (16 km) away. Population statistics for these cities are shown on Table 2 on page 8.

Because of the lack of transient facilities in the study area, the crew would probably reside in motels or mobile home parks in Pasco or Kennewick.

Crane operators, iron and other skilled workers, from the Tri-Cities area may be utilized for this project.

Land Use

We have reviewed the Walla Walla County Land Use Plan and we have determined that both of the routes are compatible with the Land Use Plan. Refer to the "Consultation and Coordination with Others" section for additional planning coordination information. Agriculture is the dominant land use proposed in the local land use plan. BPA activities would not substantially affect agricultural activities, but it could have a localized impact in a few areas. Mitigation efforts will include designing and locating structures along field lines to reduce impacts. BPA believes implementation of these mitigation measures and those in the Role EIS Appendix B will bring this project substantially in compliance with the local land use plan. Land use changes where the transmission towers are located. Suspension tower bases require 25 sq. ft. (2.3. m^2). Dead-end tower bases require 44 sq. ft. (4.0 m^2). The remainder of the easement is not changed.

Agriculture

Prime and Unique Farm Land

This resource is addressed in compliance with Section 102(2)(C), the National Environmental Policy Act (NEPA) and Council on Environmental Quality (CEQ) memorandum to heads of Federal agencies August 30, 1976.

The Walla Walla Soil and Water Conservation District has evaluated farm land crossed by the proposed transmission lines. The grape vineyard has been classified as Unique Farm Land.

If Route 1 is selected, approximately 3/4 of an acre of Unique Farm Land would likely be removed. Fair compensation is required in the appraisal and negotiation of easement rights. National importance of the proposed line is the reason for the irreversible conversion of Unique Farm Land. The national interest is to increase the supply and reliability of power during the irrigation season and to get power out the remainder of the year.

Mitigation measures will be used wherever possible. These include the location of towers between irrigation circles in dry land. Existing roads will be used wherever possible. Towers will be located along field, section, and property lines where appropriate.

The overall commercial productivity of the land in the easement area will not be significantly changed.

Route 1. It leaves Sacajawea Substation in a southeasterly direction across nonagricultural farmland for less than 0.5 miles (0.8 km). The next 1.6 miles (2.6 km) the line spans or is adjacent to three center pivot irrigation systems. It is planned that tower locations would be outside of these systems. This route would cross a vineyard for a distance of 1 mile (1.6 km). The route will cross the largest vineyard in the state of Washington. This vineyard is classified as Unique Farm Land.

Within the vineyard, the line would be on the south side of an existing access road 28 feet (8.4 m) wide. It is estimated possibly five towers would be in the vineyard. Due to machine harvesting a 30-foot (9 m) turn space is required between the towers and end of the rows, also a space of about 15 feet (4.5 m) on each side of a tower. An area 60 feet x 100 feet (18 km x 30 km) for each tower would likely be removed. Up to 8 rows would be impacted for each tower site. New anchors would have to be set for each row. The rows are 9 feet (2.7 m) apart. It is not likely this area would be replanted. East of the vineyards the apparent section line (field line) is 120 feet (36 m) south of the vineyard access road. Route 1 would continue east across wheatland with irrigation potential for a distance of about 2.3 miles (3.7 km). The line would likely be on the north side of the section line to accommodate side wheel irrigation. Towers could be spaced to permit future center pivot irrigation systems.

Impacts on this 2.3 miles (3.7 km) will be severe due to heavy vehicle traffic. This distance of line will have to either be rocked or heavily watered and graded to remain usable.

Route 2. Route 2 crosses 0.5 miles (0.8 km) of nonagricultural farm land to an angle point 1 mile southeast of Sacajawea Substation. The remainder of this route spans or is adjacent to 11 center pivot irrigation systems. Where the route turns due east, (section corner between T9N and T8N, and R31E and R32E) there is a water pumping station. This must be avoided and could therefore require two angle structures causing the route to bypass northeast of the pump station. The bypass would cause the transmission line to span a new vineyard or orchard. No impacts to Prime and Unique Farm Land are anticipated. The agricultural impact on this route is minimal. A buried pipeline to the pumping station must be avoided.

From State Highway 124 the route would be on the west side of an existing private graveled road.

Urban and Residential

Sun Harbor Estates housing development is the principal urbanized land use in the study area as shown in Figure 5. The Estates, on the south bank of Lake Sacajawea in the northern part of the study area, would not be impacted by the transmission line. Sun Harbor Estates plot no. 1, filed with the Walla Walla assessor's office reveals continued residential development south of the existing dwellings. If fully developed, the plot shows a network of roads serving 100 potential home sites.

In the Walla Walla comprehensive plan, the area from Sun Harbor Estates to State Highway 124 displays residential potential. The land south of the planned development shown in Sun Harbor Estates plot no. 1 is presently yielding grapes. It seems unlikely, due to the life span of the grapes, that any extensive residential development would be undertaken in the foreseeable future.

Both routes traverse agriculturally zoned land for their entire length.

Noise, dust, and other construction or maintenance impact could occur to the farm workers along the routes.

Little potential for any radio or television interference exists on either route.

Route 1 would cross within 4,200 feet (1260 m) of the end of a private airstrip used by agricultural spray planes. This airstrip is not listed with the FAA.

Esthetics

The visual quality along both routes is essentially the same. The contrasting elements of line, color, and texture of the vineyards and center pivot irrigated land have enhanced the visual quality of the area. However, the overall scenic quality is still considered to be low. The introduction of a transmission line upon this landscape would have unavoidable visual impacts. Expansive and uninterrupted views of either route would be possible from within the study area. Views of skylined towers would range from foreground to background depending upon the location of the observer.

Both routes cross Washington State Highway 124, designated a scenic highway with a "BX" classification. This classification identifies the highway as having above average scenic quality but does not restrict the construction of overhead transmission lines. A more detailed explanation of this rating system can be found in the Washington State Department of Highways Utilities Accommodation Policy. Recent traffic counts for highway 124 indicate most users of this highway are visitors to Ice Harbor Dam, Charboneau Park, or are local residents, as shown on Figure 5, page 34. Access to these areas would require them to pass underneath the line.

Route 1. Impacts would be the same as those described above. These impacts would be greater along the initial segment of this route because of its close proximity to public roads and homes. Also, the possible disruption to existing vegetative patterns is more prevalent here. Farther east, the line is more isolated and would follow existing land patterns creating minimal visual disruptions.

Route 2. Impacts are essentially the same as described for Route 1.

Recreation

No impacts to recreational activities are anticipated. Hunting is the primary recreational activity in close proximity to either route and would not be affected. Other recreational activities such as swimming, fishing, waterskiing, and boating take place on Lake Sacajawea out of view of the line.

Historical, Architectural, and Archeological

No adverse impacts to cultural resources have been identified. Currently, however, BPA is consulting the Washington State Historic Preservation Officer concerning the status of the Ice Harbor Indian Memorial. A historic/archeologic survey of the proposed route will be accomplished through contract with the Washington Archeological Research Center prior to construction.

Route 2. This route would affect cultural resources in the same manner as Route 1.

LOCATION ANALYSIS SUMMARY

INTRODUCTION

Resources and uses previously identified as highly important, critical, or unique are given special attention in planning, location, and construction of transmission facilities. Predictions of potential impacts to these important features (see Figure 5) are based upon past BPA experience, information from numerous agencies and individuals, and the expertise from interdisciplinary environmental specialists within BPA.

The significance of the resources in Figure 5, in relation to each other within the study area follows in decreasing order of importance: Agriculture, Soil Erosion, Soil Compaction, Esthetics, Natural Vegetation Removal, Alteration of Wildlife Habitat, Recreation, Historic-Archeologic, and Demographic Characteristics.

In Figure 5, two factors are considered in evaluating impacts: (1) the likelihood of an impact occurrence; and (2) the expected degree of impact.

LIKELIHOOD OF IMPACT OCCURRENCE

The following designations are used to evaluate the likelihood of an impact:

Low - Resource or use is a point source or occupies a small portion of the study area and could be avoided in final alinement. "Low' includes those resources and uses in degree of impact category "None".

Medium - Resources or use partially occupies a route and may be impacted in final alinement.

High - Resource or use entirely transverses a route and would be impacted if final alinement were within the presently defined corridors.

Beneficial - Resources or use is enhanced or helped in some way.

DEGREE OF IMPACT

These designations are used to evaluate the degree of impact:

Slight - Modifications as a result of construction and maintenance activities with no noticeable long-term changes in conditions expected.

Moderate - Modifications as a result of construction and maintenance activities with noticeable long-term changes in conditions possible.

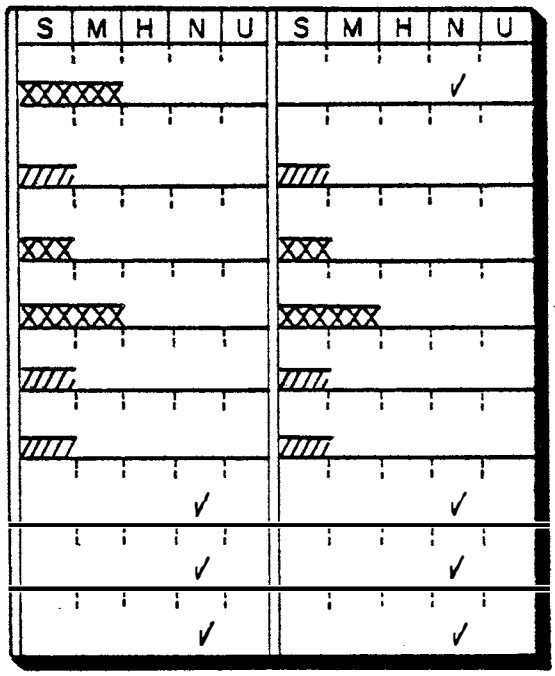
High - Modifications as a result of construction and maintenance activities with highly noticeable long-term changes in conditions possible.

None - Due to the compatibility of the resource with transmission facilities, or the low likelihood of an interaction between the resource and the transmission facility, we expect no significant measurable adverse impacts.

Unknown - Due to the nature of the resource, or lack of available data, we are unable to predict impacts.

FIG. 5 - SUMMARY OF POTENTIAL IMPACTS AND REQUIREMENTS FOR ROUTE (OR SITE) ALTS.

ALTERNATE TRANSMISSION LINE ROUTING SUMMARY IMPACT MATRIX



Degree of Impact

S - Slight

M - Moderate

H - High

N - None

U - Unknown

Likelihood of Impact Occurrence

- Low
- Medium
- High
- Beneficial
- None and Unknown

NOTE: Definitions of these designations are provided in the preceeding section. Impacts are project specific and a direct comparison between different BPA projects is to be avoided. Impact predictions assume BPA standard mitigating measures as outlined in the Role EIS Appendix B, and are being carried out.

Figure 5 - Summary of Potential Impacts and Requirements for Route (or Site) Alternatives (the nature of impacts is described in the narrative).

THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Based on present technology, the line and associated facilities needed for the alternatives will have an expected useful life of 50 years. Experience in the past years has shown that, in most cases, transmission corridors are upgraded to higher capacity in response to technological advancements and energy demands. This will likely result in a long-term use of this corridor. However, if required, complete removal of these transmission facilities, including the tower footings, would be possible in order to make the land available for other uses.

THE IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Unreclaimable steel, aluminum, and other materials used for conductors and other facilities would be irretrievably committed. Manpower and fuel for construction equipment would be irretrievably expended.

Although it would be possible to remove the entire facility at a future time, it is likely that the land used for transmission corridor would be irreversibly committed. The land used for tower sites and access roads would be unavailable or limited for any other land use.

The vegetation removed during construction, the wildlife eliminated, and the soil lost by erosion would be irretrievably committed.

CONSULTATION AND COORDINATION WITH OTHERS

PLANNING COORDINATION

The following agencies and organizations were contacted by BPA economists, engineers, and environmentalists during the planning phase of this project. Information on land use plans, resource data and engineering concerns were exchanged. Additional meetings to review locations during the location phase of the project will be held to determine their compatibility with local land use plans and zoning.

Federal

U.S. Army Corps of Engineers	Walla Walla, WA
Federal Aviation Administration	Seattle, WA
Department of Agriculture	
Soil Conservation Service	Walla Walla County, WA
Soil Conservation Service	Franklin County, WA

State

Department of Highways	Yakima, WA
Advisory Council on Historic Preservation	Olympia, WA
Washington Archeological Research Center	Pullman, WA

County

County Engineer	Walla Walla, WA
County Planner	Walla Walla, WA
County Extension Agent	Franklin County, WA
*County Planning Department	Franklin County, WA
County Planning Commission	Benton County, WA
County Planning Commission	Umatilla County, OR

COORDINATION IN THE REVIEW OF THE DRAFT FACILITY PLANNING SUPPLEMENT

The FY 1979 Draft Facility Planning Supplement was sent to Federal agencies, State clearinghouses, and to local clearinghouses where these have been established by States, or to County or metropolitan planning commissions and environmental agencies where local clearinghouses have not been established. These agencies are listed below. A notice of availability of the Draft Facility Planning Supplement was placed in the Federal Register.

AGENCIES REQUESTED TO COMMENT ON THE DRAFT FACILITY PLANNING SUPPLEMENT

Federal Agencies

U.S. Department of the Interior
- Fish & Wildlife Service
- Bureau of Mines
- Bureau of Indian Affairs
- Bureau of Land Management
- Bureau of Outdoor Recreation
- National Park Service
- Geological Survey
- Bureau of Reclamation

(An asterisk * indicates that written comments were received)

Franklin Area System Reinforcement
Study Area 79-1

U.S. Department of Agriculture
Forest Service
*Soil Conservation Service
U.S. Department of Health, Education and Welfare
U.S. Department of Housing and Urban Development
*U.S. Environmental Protection Agency
Energy Research and Development Administration
Federal Energy Administration
Federal Power Commission
Federal Aviation Administration
Advisory Council on Historic Preservation
U.S. Department of the Army
Army Corps of Engineers
U.S. Department of Transportation

State Agencies

Washington State
Office of Program Planning and Fiscal Management
Office of Community Development
Department of Ecology
Historic Preservation Commission
Archeological Research Center
Oregon State
Historic Preservation Officer
Intergovernmental Relations Division
Department of Energy

Local Agencies

Benton-Franklin Governmental Conference
Walla Walla Regional Planning Commission
East Central Oregon Association of Counties

Other

Washington Environmental Council
Environmental Defense Fund
Pacific Northwest Conservation Council
Sierra Club, Pacific Northwest Chapter
National Wildlife Federation
Federation of Western Outdoor Clubs
Friends of Earth
Natural Resources Defense Council
The Wilderness Society
Natural Resources Law Institute
Oregon Environmental Council

(An asterisk * indicates that written comments were received)

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