3.2 Land Resources

3.2.1 Affected Environment

3.2.1.1 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.

3.2.1.2 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 3.2-1** provides a summary of the soil unit characteristics including susceptibility to water erosion. **Figure 3.2-1** shows the location of the various soil units within the overall project study area; **Figure 3.2-2** illustrates the location of soil units in relation to project components between the plant site and McNary Substation.

Table 3.2-1
Summary of Soil Units

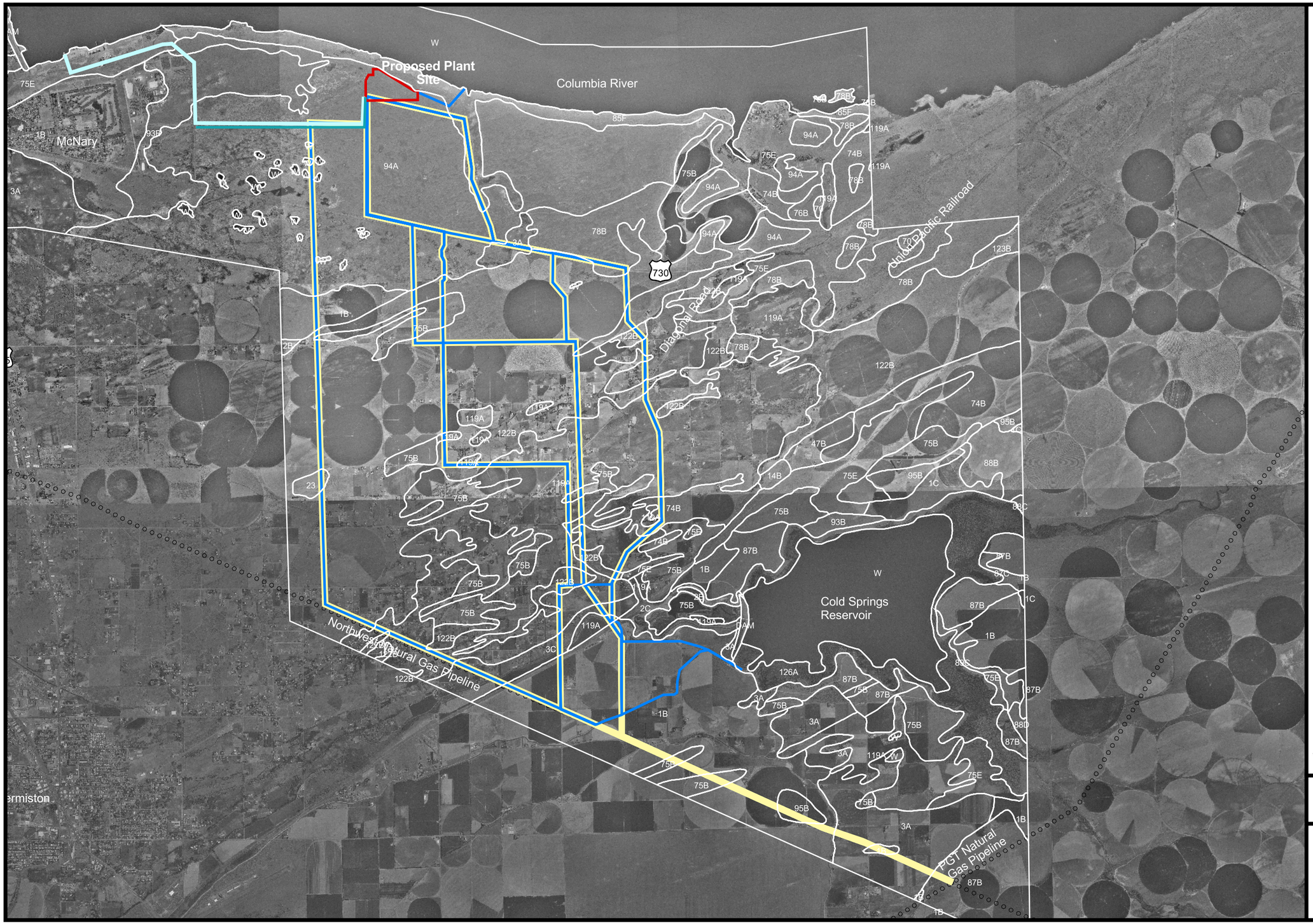
Map Symbol	Soil Units	Characteristics
1B	Adkins Fine Sandy Loam, 0 to 5 Percent Slopes	Deep, well-drained soil located on the terraces of the Columbia River. It consists of fine sandy loam that is generally used for irrigated crops or as rangeland. It has slight water erosion and moderate wind erosion 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 3.2-1 (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 3.2-1 (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	Xerofluvents, 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.



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

Gas Pipeline Route Alternatives
Plant Discharge Water Pipeline Route Alternatives
Potable Water / Sanitary Sewer Lines
Water Supply Pipeline

0 2000 4000 Feet

Wanapa Energy Center EIS

Figure 3.2-1

Soils - Pipeline Route Alternatives

12/1/04

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

N
W
E
S

0 800 1600 Feet

Wanapa Energy Center EIS

Figure 3.2-2

Soils-Transmission Line Route Alternatives

11/11/04

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.

3.2.2 Environmental Consequences and Mitigation

3.2.2.1 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.

3.2.2.2 Soil

Soil Erosion from Surface Water Runoff

As shown in **Table 3.2-2**, 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[1] – Starbuck very fine sandy loam (2.6 acres);
- Natural Gas Supply/***Plant*** Discharge ***Water*** 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.***3***, Water Resources, for additional information).
- 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.

[1] Water supply line ROW would be utilized for potable water and sanitary sewer pipeline.

Table 3.2-2
Acreage of Sensitive Soils for the Wanapa Energy Center Project
Project Area

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.

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 3.2-2**, 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 3.2-1**.

- Water Supply Line[2] – 6.4 acres of high wind erosion soils.

- Natural Gas Supply/***Plant Discharge*** Water Pipeline Route – 2***3.1*** 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/***plant*** discharge ***water*** 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/***plant*** discharge ***water*** pipeline route crosses native vegetation communities.

[2] ***Water supply line ROW would be utilized for potable water and sanitary sewer pipeline.***

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/***plant*** discharge ***water*** pipeline routes to reduce wind erosion.

Potential Reductions in Agricultural Productivity

Construction of the natural gas supply/***plant*** discharge ***water*** 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/***plant*** discharge ***water*** 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.

The addition of plant discharge water to Cold Springs Reservoir is not expected to increase TDS significantly during the irrigation season or have any potential impact on crops irrigated with reservoir water. Prior to and during the irrigation season, large volumes of Umatilla River water and Columbia River water are added to the reservoir. This large addition of low TDS water more than offsets the addition of TDS from plant discharge water.

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 soil.

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 3.2-2**, 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.

3.2.3 *Proposed Action* 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/***plant*** discharge ***water*** 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/***plant*** discharge ***water*** 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/***plant*** discharge ***water*** pipelines. The construction techniques and disposal methods would be designed to minimize effects on other environmental resources.

3.2.4 Component Alternatives Impact Summaries

Comparisons of the relative soils impacts of No Action, Proposed Action, and constructing and operating project component alternatives in different locations are presented in Table 3.2-3 (gas/plant discharge water pipelines), Table 3.2-4 (transmission lines), and Table 3.2-5 (plant discharge locations).

Table 3.2-3
Natural Gas Supply/Plant Discharge Water Pipeline Alternatives Comparison – Soils

	Alternatives							
Resource/Impact Issue	**No Action**	**Proposed Action**	**1**	**2**	**3**	**4**	**5**	**6**
		(Figure 2.3-1)	**(Figure 2.4-1)**	**(Figure 2.4-2)**	**(Figure 2.4-3)**	**(Figure 2.4-4)**	**(Figure 2.4-5)**	**(Figure 2.4-6)**
Soils								
Presence of large rock in trenched area	No new soil disturbance would occur.	Approximately 24 acres contain outcrop or large rock in the upper 40 inches of soil.	Approximately 27 acres contain outcrop or large rock in the upper 40 inches of soil.	Approximately 25 acres contain outcrop or large rock in the upper 40 inches of soil.	Approximately 25 acres contain outcrop or large rock in the upper 40 inches of soil.	Approximately 25 acres contain outcrop or large rock in the upper 40 inches of soil.	Approximately 24 acres contain outcrop or large rock in the upper 40 inches of soil.	Approximately 24 acres contain outcrop or large rock in the upper 40 inches of soil.
Prime farmland	No new soil disturbance would occur	Approximately 37 acres temporarily affected within the ROW.	Approximately 39 acres temporarily affected within the ROW.	Approximately 45 acres temporarily affected within the ROW.	Approximately 39 acres temporarily affected within the ROW.	Approximately 37 acres temporarily affected within the ROW.	Approximately 35 acres temporarily affected within the ROW.	Approximately 34 acres temporarily affected within the ROW.
Moderate water erosion	No new soil disturbance would occur	Approximately 32 acres in the construction ROW have moderate water erosion potential.	Approximately 43 acres in the construction ROW have moderate water erosion potential.	Approximately 44 acres in the construction ROW have moderate water erosion potential.	Approximately 37 acres in the construction ROW have moderate water erosion potential.	Approximately 33 acres in the construction ROW has moderate water erosion potential.	Approximately 33 acres in the construction ROW have moderate water erosion potential.	Approximately 32 acres in the construction ROW have moderate water erosion potential.
Moderate wind erosion	No new soil disturbance would occur	Approximately 66 acres in the construction ROW have moderate wind erosion potential	Approximately 73 acres in the construction ROW have moderate wind erosion potential.	Approximately 73 acres in the construction ROW have moderate wind erosion potential.	Approximately 61 acres in the construction ROW have moderate wind erosion potential.	Approximately 61 acres in the construction ROW have moderate wind erosion potential	Approximately 39 acres in the construction ROW have moderate wind erosion potential	Approximately 40 acres in the construction ROW have moderate wind erosion potential
High wind erosion	No new soil disturbance would occur	Approximately 23 acres in the construction ROW have high wind erosion potential.	Approximately 24 acres in the construction ROW have high wind erosion potential.	Approximately 8 acres in the construction ROW have high wind erosion potential.	Approximately 32 acres in the construction ROW have high wind erosion potential.	Approximately 21 acres in the construction ROW have high wind erosion potential.	Approximately 4 acres in the construction ROW have high wind erosion potential.	Approximately 6 acres in the construction ROW have high wind erosion potential
Very high wind erosion	No new soil disturbance would occur	Approximately 29 acres in the construction ROW have very high wind erosion potential.	Approximately 26 acres in the construction ROW have very high wind erosion potential.	Approximately 42 acres in the construction ROW have very high wind erosion potential.	Approximately 18 acres in the construction ROW have very high wind erosion potential.	Approximately 23 acres in the construction ROW have very high wind erosion potential.	No soils crossed with very high wind erosion potential.	No soils crossed with very high wind erosion potential.

Table 3.2-4
Electric Transmission Line Alternatives Comparison – Soils

	Alternatives				
	No Action	**Proposed Action**	**1**	**2**	**3**
		(Figure 2.3-1)	**(Figure 2.4-7)**	**(Figure 2.4-8)**	**(Figure 2.4-10)**
Soils					
Prime farmland	No new soil disturbance would occur	Approximately 15 acres in the ROW.	Approximately 15 acres in the ROW.	Approximately 4 acres in the ROW.	Approximately 4 acres in the ROW.

Table 3.2-5
Plant Discharge Location Alternatives Comparison – Soils

	Alternatives		
	No Action	**Proposed Action**	**1**
		(Figure 2.3-1)	**(Figure 2.4-11)**
Soils			
Bedrock Construction	No new bedrock construction would occur.	Approximately 1.7 miles of pipeline construction ROW containing bedrock or large rock would have to be cleared and excavated which represent difficult revegetation conditions.	Approximately 0.3 miles of pipeline construction ROW containing bedrock or large rock would have to be cleared and excavated which represent difficult revegetation conditions.
Soils	No new soil disturbance would occur.	Approximately 2 acres of native vegetation soils, and 5 acres of cropland soils would be temporarily disturbed during construction, resulting in a local increase in soil and water erosion from unprotected surfaces. The remainder of the surface disturbance for the plant discharge water pipeline is included in the ROW for the gas supply pipeline, which is the same for both alternatives.	Approximately 5 acres of native vegetation soils would be temporarily disturbed during construction, resulting in a local increase in soil and water erosion from unprotected surfaces.