Section 3.3
WATER RESOURCES

This section describes the existing surface water and groundwater resources in the Wild Horse Wind Power Project (WHWPP) area. It discusses precipitation, surface water features (e.g., creeks and springs), groundwater features, including aquifers; floodplains; and potential impacts of construction, operations, and maintenance. The Water Resources section also assesses the potential impacts of the proposed on these resources from construction and operation, and describes the mitigation planned for the project.

Information used to describe the affected environment and analyze potential impacts of the project was derived primarily from Section 3.3 of the Application for Site Certification (ASC) (Wind Ridge Power Partners LLC, 2004) prepared by the Applicant's consultant for the WHWPP.

3.3.1 Affected Environment

Precipitation at Ellensburg, approximately 10 miles southeast of the project site, averages 8.9 inches annually. Most precipitation occurs in late autumn, winter, and early spring (Kittitas County Conservation District 2001). In general, surface soils on the area of the proposed Wild Horse Wind Power Project (WHWPP) consist of silty, sandy clay that has slow to moderate permeability. The presence of slow to moderate permeability soils at the site results in a moderate to relatively high runoff potential. Although soil permeabilities are classified as low and the runoff potential ranges from slow to very rapid, it is anticipated that the erosivity of area soils would be mitigated by factors such as grade and the fact that area soils are well drained. Therefore, it is estimated that the erosiveness of native soils immediately underlying the project would be in the medium range. However, the erosivity index pertains to *in situ* (undisturbed) soils, as opposed to soils disturbed by construction (see Section 3.1, "Earth," for detailed discussion).

3.3.1.1 Surface Water

During operations, the project would not generate process water, and there would be no point source discharge to nearby surface waters. However, because the project area is located within 0.5 mile of nearby surface waters, brief descriptions of these creeks and springs are provided below. Most project facilities would be located on exposed ridge tops away from surface waters, as shown in Figure 1-2, "Proposed Layout of Most Likely Scenario (136 Turbines/1.5 MW)". Several of the project wind turbine strings are within approximately 0.25 mile horizontally of several small intermittent creeks and their tributaries, springs, stock watering ponds, and other unnamed ephemeral creeks. These include Whiskey Dick, Skookumchuck, and Whiskey Jim Creeks; and Wild Horse, Skookumchuck Heights, Dorse, Reynolds, Thorn, Government, Pine, and Seabrock Springs.

Creeks

Whiskey Dick, Skookumchuck, and Whiskey Jim Creeks all originate within the proposed project boundary, at an elevation of approximately 3,400 feet. Whiskey Dick and Skookumchuck Creeks flow east and southeast to an elevation of about 700 feet at their mouths at the Columbia River. Both creeks have a relatively steep gradient, with an average creekbed slope of 200 to 250 feet per mile over the 10- or 12-mile lengths of these creeks. Whiskey Jim Creek has an average gradient of 250 to 300 feet/mile until it joins Parke Creek at the eastern edge of the Kittitas Valley. Both creeks collect water from surface runoff, springs, and seeps. In the project area, these channels are narrow, shallow systems with intermittent flows. The creeks transition from intermittent flow in their upper elevations to perennial flow (downstream of the project) as they pick up flow from runoff, springs, and seeps on the descent to lower elevations.

Springs

Wild Horse, Skookumchuck Heights, Dorse, Reynolds, Thorn, Government, Pine, and Seabrock Springs are mapped in the project area. One additional spring exists just east of turbine C-5 in the south part of the project area and is mapped simply as “spring” on the U.S. Geological Survey (USGS) base mapping. Ranchers in the area have developed several of these springs to the extent that they collect a portion of their flow and contain it for stock watering. The flow was approximated for several of these springs in May 2003. The observed flow rates were found to be in the range of 1 to 5 gallons per minute. The majority of these springs exist between elevations of 3,300 and 3,400 feet in the project area. Because of the relatively short distance from the top of the ridges down to the location of the springs, the recharge area is relatively small, and it is anticipated that spring flow would decrease later in the summer and fall.

3.3.1.2 Groundwater

As noted in Section 3.1, “Earth,” the project site is located within the Yakima Fold Belt subprovince of the Columbia Plateau physiographic province. The variation in the geology of the overburden, multiple basalt flows and interbedded sedimentary units results in a complex groundwater system in the region. In order to simplify the description of the hydrogeologic conditions in the vicinity of the site, the aquifers in the area can be grouped into two main units: the overburden and the basalt aquifers discussed below.

Overburden Aquifer

The overburden in the structural basins of the Columbia Plateau readily transmits water and contains groundwater table aquifers. These aquifers are generally coarse-grained and highly permeable within a few feet of the ground surface and fine-grained and less permeable at depth. Groundwater movement in the overburden aquifer is downward from the anticlinal ridges toward adjacent streams and rivers (such as the Yakima and Columbia Rivers) in the intervening synclinal basins (Bauer and Hansen 2000). The groundwater level contours for this aquifer tend to mimic surface topography (Whiteman 1986; Lane and Whiteman 1986; Hansen et al. 1994).

Recharge in the overburden aquifer is from infiltration of applied irrigation water and precipitation, with precipitation being the predominant source of recharge in the site vicinity (Bauer and Vaccaro 1990; Bauer and Hansen 2000). Discharge is to rivers, creeks, lakes, springs, and waterways and to the underlying basalt bedrock. Downward movement of groundwater to the underlying basalt is controlled by interbedded fine-grained sedimentary layers and by the head difference between the units (Bauer and Hansen 2000).

Groundwater was not observed in test pits excavated at the site to depths ranging from less than 1 to 9 feet in 2003. The test pits were excavated during a geotechnical evaluation of the site (CH2M Hill 2003; see Figure 3.3-1).

Basalt Aquifers

Groundwater in the basalts occurs in joints, vesicles, fractures, and in the pore spaces within the interbedded sedimentary rocks. The basalt forms a highly complex heterogeneous aquifer system with interflow zones that potentially function as a series of small semiconfined to confined aquifers. The basalt transmits water most readily through these interflow zones, which represent about 5 to 10% of the total thickness of a typical basalt flow (Hansen et al. 1994). Deeper basalt aquifers are generally confined. However, because the hydraulic connection between units is sufficient to allow continuous vertical movement of water between them, the confined units are considered to be semiconfined (Bauer and Hansen 2000).

Water level data indicate that over most of the plateau, the vertical component of regional groundwater flow in basalts is downward except near discharge areas, which are generally located along streams and rivers (Lane and Whiteman 1986). Localized anomalies to this pattern are caused primarily by geologic structures of both known and uncertain nature and secondarily by groundwater pumping and irrigation (Bauer and Hansen 2000). Similar to the overburden aquifer, groundwater movement in the basalt aquifers of the Yakima Fold Belt is from anticlinal ridges toward the streams and rivers (such as the Yakima River) in the intervening synclinal basins (Bauer and Hansen 2000).

Groundwater Quality and Beneficial Use

Groundwater has not yet been extracted for beneficial use via drilled wells within the site, based on a search of well logs in the area on file with the Washington State Department of Ecology (Wind Ridge Partners LLC 2004). The groundwater wells mapped in the general vicinity of the site are at least 2 miles from the site boundary, and at least 1,000 feet lower in elevation. However, groundwater is used extensively in the surrounding areas for domestic, irrigation, and other agricultural purposes, especially in the Kittitas Valley to the west. A review of nearby well logs indicates that these wells typically penetrate and draw water from the basalt aquifer, at depths of 100 to 500 feet.

Groundwater in the basalt aquifer system is generally suitable for most uses. According to a report on the geochemistry of the Columbia Plateau aquifer system (Hansen et al. 1994), the dominant water type is calcium magnesium bicarbonate, and sodium bicarbonate is the next most common water type. However, sodium concentrations increase with residence time, and the largest concentrations are found in samples from the deepest wells.

3.3.1.3 Feeder Lines

The Bonneville Power Administration (BPA) and Puget Sound Energy (PSE) feeder lines would cross areas with aquifer and groundwater conditions similar to those described for the project site. The shallow aquifer is likely hydraulically connected to Parke Creek in the vicinity of the proposed BPA feeder line crossing.

3.3.1.4 Floodplains

The project is located on ridge tops and away from nearby surface waters and floodplains. Because project facilities would be located significantly outside the floodplain of the Yakima and Columbia Rivers and other water bodies (the project is located 2,000–3,000 feet above the respective river elevations, see Figure 1-1, “Project Vicinity Map”), the risk of flood impacts is insignificant. Figure 3.3-2 shows a Federal Emergency Management Agency (FEMA) Flood Zone Overlay map indicating that the nearest 100-year flood zone occurs in Parke Creek below 2,000 feet in elevation, more than 2 miles downgradient from the nearest project feature, which is the BPA transmission feeder line.

3.3.1.5 Kittitas Valley Alternative

The project site is located within the Yakima River drainage basin. Portions of the project are within approximately 0.5 mile of the Yakima River, Dry Creek (an ephemeral creek), other unnamed ephemeral creeks, the North Branch Canal of the Kittitas Reclamation District, and livestock watering ponds. Groundwater in the project area has domestic, irrigation, and other uses. The closest floodplain to the project site is the 100-year floodplain of the Yakima River, and the closest access road or turbine is more than 500 feet in elevation above the level of the river.

3.3.1.6 Desert Claim Alternative

There are 19 streams within the Desert Claim project area and the immediate vicinity characterized as having perennial or intermittent flow. From west to east, the following named streams bisect the project area: Green Canyon (perennial); Reecer Creek (perennial); Robbins Canyon (intermittent); Jones Creek (intermittent tributary to Currier Creek); and Currier Creek (intermittent). Reecer Creek was identified as the highest-quality stream in the project area, with sustained flow throughout the year and riparian habitats along most of the channel. It drains to the Yakima River west of Ellensburg and about 6 miles south of the project area.

Grande Ronde Basalt, Ellensburg Formation sandstone, and undifferentiated alluvial and glacial deposits also comprise the three main aquifer systems beneath the Desert Claim site and immediate surrounding areas. The Grande Ronde Basalt and Ellensburg Formation aquifers are generally characterized as relatively deep, confined to semi-confined aquifers. The undifferentiated alluvial/glacial aquifer is shallower and is interpreted to exhibit semi-confined to unconfined aquifer conditions.

The Desert Claim project area is located on the northern edge of the Ellensburg Basin. Kittitas Drift and Quaternary-age alluvial material dominate the near-surface geology but pinch out to the north where Grande Ronde Basalt crops out. A review of area well logs reveals that most wells are producing water from fracture and flow top and bottom aquifers in Grande Ronde Basalt or Ellensburg Formation sandstones.

Recharge to the alluvial aquifers is provided by infiltration of runoff from surrounding bedrock ridges, stream flow, direct precipitation, and leakage from irrigation sources (including ponds and the North Branch Canal). Regional groundwater flow in the alluvial aquifers of Kittitas Valley generally corresponds to the topography, eventually flowing down the Yakima River Valley. Groundwater flowing in the alluvial aquifer is interpreted to discharge primarily into the Yakima River, streams, irrigation lakes and the North Branch Canal, and underlying bedrock.

Recharge to bedrock aquifers is provided by overlying alluvial aquifers, flow from other bedrock aquifers, and direct precipitation. The up-folded limbs of Grande Ronde Basalt and Ellensburg Formation that crop out north of the project area also receive water from direct precipitation and stream flow. Groundwater flow in the bedrock aquifers is typically controlled by the orientation of structures such as folds and fractures, and the physical characteristics and orientation of the individual stratigraphic layers. Water flowing in the various bedrock aquifers likely discharges to other bedrock aquifers (both shallower and deeper), overlying alluvial aquifers, and surface water.

Large well yields are common in the Ellensburg area. Unconsolidated deposits in the Ellensburg Basin of Kittitas Valley are up to 1,000 feet thick and yield up to 3,200 gallons per minute (gpm) to wells for public supply, domestic, commercial, and agricultural (primarily irrigation) purposes. Closest to the Desert Claim wells are located surrounding and within (4 wells) the project area for a total of 166 wells, over 92 square miles. Five wells are used for irrigation purposes and the remaining wells are for single-family domestic use (according to well logs and water rights claims).

A study of the hydrology of Kittitas Valley and a review of well logs for this study indicate that well yields average 20 to 23 gpm in the Desert Claim project vicinity (Owens 1995). The study concludes that groundwater yield and flow in the Kittitas Valley is largely dependent on stratigraphic and structural controls and high well yields do not necessarily correlate to depth although on average yield increases with depth. All of the homes in the area use on-site septic systems to discharge waste water; therefore, a large portion of the water used is returned to the shallow subsurface. Water rights data obtained from Ecology indicate that irrigation in the project vicinity uses substantially more groundwater than single-family residences. Approximately 350,000 gpd of water is used for irrigation (estimated from Ecology data).

3.3.1.7 Springwood Ranch Alternative

The Yakima River bounds the Springwood Ranch site along most of its north and east sides. Taneum Creek intersects the northern and southern portions of the site. An intermittent stream with two branches crosses the northern portion of the site and empties into the Yakima River, and another intermittent stream drains from the middle of the site and flows into the Yakima River. Two irrigation canals cross the northwestern portion of the site, and two ponds are located just to the west of the northwest corner of the site.

The Yakima River (downstream of the Springwood Ranch) is listed by Washington Department of Ecology (Ecology) as impaired for fish rearing, harvesting, spawning and migration as a result of agricultural activities, habitat modification, and removal of vegetation. Taneum Creek is listed by Ecology as limited for instream flows and temperature.

Three major aquifers are present beneath the Springwood Ranch site and surrounding areas, and are characteristic of the hydrology of the Wild Horse and Desert Claim sites. Groundwater wells in the Ellnsburg formation produce relatively low (5-15 gpm) groundwater yields, whereas wells near the site in the Grande Ronde Basalt formation range form less than 20 gpm to 700 gpm. Wells near the site are used for domestic single-family residences. Other wells near the site are used for municipal or irrigation water supply.

3.3.1.8 Swauk Valley Ranch Alternative

The project site is located within the Yakima River drainage basin. The south boundary of the project is within approximately 0.5 mile of the Yakima River. An unnamed perennial stream, a tributary to the Swauk Creek, bisects the eastern portion of the site. No other perennial streams are located within the site.

Groundwater in the project area has domestic, irrigation, and other uses. The closest floodplain to the project site is the 100-year floodplain of the Yakima River. Information on groundwater well yields has not been collected as part of this analysis.

3.3.2 Impacts of Proposed Action

Precipitation during construction could result in sediment-laden surface runoff because of ground disturbance and exposed soils. If not properly mitigated, development under any of the three project scenarios could adversely affect nearby surface waters. This impact would be greatest under the 158-turbine/1-MW scenario, which would result in the largest amount of ground disturbance during construction (401 acres), see Table 3.3-1. However, all design scenarios will adhere to the surface water setbacks, best management practices (BMPs) will be employed on site, and compliance with applicable permits regarding runoff and sediment control will be maintained in all design scenarios. Thus, it is anticipated that these measures and the facility design will minimize potential impacts that may result from construction of the project.

There is no significant difference for potential impacts of operations under the different project scenarios (see Table 3.3-2) because the road, underground trench, and overhead collector line lengths are unchanged under each scenario. Also, the 104-turbine/3-MW scenario requires excavation of larger foundations for a smaller number of wind turbine generators (WTGs), while the 158-turbine/1-MW scenario requires excavation of smaller foundations for a larger number of WTGs; hence there is no significant difference in foundation area (see Table3.3-2). Similarly, the estimated requirements for water during construction are within 5% variance of the estimated 4.2 million gallons under the 104-turbine/3-MW and 158-turbine/1-MW scenarios (see Table 3.3-3). During operations, the project would require water only for the limited needs of the Operations and Maintenance (O&M) facility and would be the same for any of the proposed scenarios (less than 1,000 gallons per day). In addition, each scenario would be built along the same string path, and therefore the proximity to water resources would not change. All design scenarios will adhere to the surface water setbacks outlined below. BMPs will be employed on site and compliance with applicable permits regarding runoff and sediment control will be maintained in all design scenarios. It is anticipated that these measures and the facility design would minimize potential impacts that may result from construction or operation of the project.

Table 3.3-1. Comparison of Temporary Disturbance Areas under Different Scenarios

Project Component	104 Turbines/3 MW (acres)	136 Turbines/1.5 MW (Most Likely Scenario) (acres)	158 Turbines/1 MW (acres)
Temporary laydown and working areas at turbines	215.0	281.0	326.0
Temporary material laydown areas	10.0	10.0	10.0
Temporary meteorological tower laydown	0.4	0.4	0.4
Temporary disturbance for underground trenched cable	18.0	18.0	18.0
BPA feeder line construction trail and pole laydowns	28.3	28.3	28.3
PSE feeder line construction trail and pole laydowns	18.4	18.0	18.4
Total acres temporarily disturbed	**289.0**	**356.0**	**401.0**

Source: Wind Ridge Power Partners LLC 2004

Table 3.3-2. Comparison of Permanent Area Impacts under Different Scenarios

Project Component	104 Turbines/3 MW (acres)	136 Turbines/1.5 MW (Most Likely Scenario) (acres)	158 Turbines/1 MW (acres)
WTG foundations (total acres)	9.3	9.4	9.2
New road	67.0	67.0	67.0
Major and minor improved road	28.0	28.0	28.0
Road turnaround	26.0	26.0	26.0
Substation	9.0	9.0	9.0
O&M building and parking	4.0	4.0	4.0
Rock quarry	15.0	15.0	15.0
Overhead collector line (total acres)	0.1	0.1	0.1
BPA and PSE transmission feeder line (total acres)	0.3	0.3	0.3
Permanent met tower	0.3	0.3	0.3

Project Component	104 Turbines/3 MW (acres)	136 Turbines/1.5 MW (Most Likely Scenario) (acres)	158 Turbines/1 MW (acres)
Batch plant	6.0	6.0	6.0
Total acres permanently disturbed	**164.7**	**164.7**	**164.6**

Notes:

These estimates include reasonable contingency estimates.

Truck turnarounds are estimated at 1 acre each.

Three substations estimated at 3 acres each.

Three quarries estimated at 5 acres each.

Overhead collector line estimated at 250-ft. spans and 10-ft. x 10-ft. pole disturbed areas.

Transmission feeder lines estimated at 600-ft. spans, two pole H frames, and 8-ft. x 8-ft. disturbed areas.

Permanent met towers estimated at five towers, 50-ft. x 50-ft. affected area each.

Underground collector trench considered a temporary disturbed area and not included here.

Source: Wind Ridge Power Partners LLC 2004

Table 3.3-3. Summary of Potential Water Resources Use and Potential Impacts

Project Component	104 Turbines/3 MW	136 Turbines/1.5 MW	158 Turbines/1 MW
Construction Impacts			
Surface runoff from ground disturbance and exposed soils	289 acres	356 acres	401 acres
Water consumption	10,500,000 gallons	10,700,000 gallons	10,800,000 gallons
Encountering groundwater during turbine foundation construction	Excavation depth of 22 ft. (for spread footing foundations) to 35 ft. (for mono-pier foundations) (104 turbines)	Excavation depth of 18 ft. (for spread footing foundations) to 35 ft. (for mono-pier foundations) (136 turbines)	Excavation depth of 14 ft. (for spread footing foundations) to 35 ft. (for mono-pier foundations) (158 turbines)
Damage to existing groundwater wells from blasting	Low	Low	Low
Operations and Maintenance Impacts			
Erosion potential/area of permanent ground disturbance	165 acres	165 acres	165 acres
Water consumption	<1,000 gallons daily at O&M facility	<1,000 gallons daily at O&M facility	<1,000 gallons daily at O&M facility
Decommissioning Impacts			
	Similar to those described for construction	Similar to those described for construction	Similar to those described for construction

Source: Wind Ridge Power Partners LLC 2004

3.3.2.1 Construction Impacts

Surface Water, Runoff, and Erosion

Surface water runoff potential would be greatest during the construction of the project, when large quantities of soil would be disturbed for construction of roads, tower foundations, and other infrastructure. There is no information addressing existing sediment load conditions at the project site; however, it is anticipated that sediment and erosion control practices would minimize or eliminate sediment discharge to drainages. Construction would occur considerable distances from all wetlands, springs, seeps, and riparian areas.

As discussed above, it is estimated that the erosiveness of native soils immediately underlying the project would be in the medium range, but the erosivity index pertains to *in situ* (undisturbed) soils. Hence, the erosiveness index is not directly applicable to soils that would be disturbed by project construction activities, but rather to factors such as the effectiveness of project BMPs such as stormwater control procedures.

Wetlands in the form of seeps, ponds, and springs are described above, within the project area; however, all project facilities would be located a considerable distance from them. Project facilities would be located outside the designated buffers of any wetlands, as required by Section 17A.04.020 “Buffer width requirements” of the Kittitas County (County) Code. The closest project facility is a turbine access road with an underground collector cable, a low intensity use, which would be located approximately 200 feet away from a small, unnamed spring just east of turbine C-5. The maximum setback that would be required by Ecology guidelines and Washington Energy Facility Site Evaluation Council’s (EFSEC’s) proposed rules for combustion turbine standards would be 50 feet. The construction methods and control measures discussed below in Construction General Stormwater Pollution Prevention Measures would serve to minimize impacts and protect all wetlands and riparian corridors. No project facilities, transmission feeder line poles, rock quarry/concrete batch site, or trails would be built in or near any streambed, riparian corridor, or wetlands.

Precipitation could result in surface runoff from project facilities during project construction. However, the project site grading plan and roadway design will implement BMPs and incorporate measures from the Stormwater Pollution Prevention Plan (SWPPP) to ensure that most surface runoff would infiltrate directly into the surface soils surrounding project facilities. Potential surface water impacts resulting from runoff related to construction of the project and measures to control such runoff are described below under Construction General Stormwater Pollution Prevention Measures. The project will implement a formal SWPPP and BMPs as are also described below in detail under Construction General Stormwater Pollution Prevention Measures, to reduce and/or eliminate the discharge of suspended sediment and turbidity above the turbidity criteria stipulated in the Water Quality Standards for Surface Waters of the State of Washington (WAC 173-201A).

Some soil compaction would occur in areas disturbed during temporary construction activities. Several methods of erosion control and stormwater pollution prevention will be implemented during project construction. The erosion control and stormwater pollution prevention methods chosen for the site will be selected based on specific site conditions such as topography, surface soils, and vegetative cover. Typical structural controls that could be used include hay bales or silt-fence-type materials, rock dams, and recessed grades as illustrated in Figure 3.3.2.

It is not anticipated that surface runoff control facilities beyond the control measures described under Construction Stormwater Pollution Control Measures will be required. No stormwater conveyance and treatment facilities are anticipated in or around the project site. Project engineers will determine specific siting of the control measures after final design has been completed.

A formal SWPPP specifying the types of erosion control methods that will be used at the site will be designed and submitted to EFSEC for approval prior to construction. The project wind turbines, site roads, underground cables, and other supporting infrastructure are located on high ridge tops with good wind exposure and not in wetlands or watercourses. No project facility would be located closer than approximately 200 feet from a surface water resource. The site construction plans will include detailed provisions and specifications to help minimize erosion and stormwater pollution. After construction is completed, temporarily disturbed areas will be returned as closely as possible to their original state, excluding the access roads, crane pads, rock quarries, O&M facilities, and parking areas, which would remain in place for the life of the project. On-site construction management will monitor the area for erosion and implement additional control measures if necessary.

Feeder Lines

The BPA transmission feeder line involves a proposed riparian crossing of Parke Creek and several small intermittent drainages. Washington Department of Fish and Wildlife (WDFW) has reviewed the proposed crossing site and construction techniques and has stated that no hydraulic permit is required for Parke Creek (a copy of this letter is included in Appendix A). All construction related to the BPA feeder line would be at least 200 feet from the stream bank on either side, and no heavy equipment would be used in the stream bed or riparian corridor for construction. BMPs will be employed on site and compliance with applicable permits regarding runoff and sediment control will be maintained to ensure that surface waters and runoff are not affected by construction of the project.

Similarly, the PSE transmission feeder line crosses several small intermittent drainages and the Highline irrigation canals. The feeder line would span any drainage or canal that occurs within the corridor, no heavy equipment would used in the stream bed or riparian corridor for construction, and no construction activity would take place in a stream bed. Therefore, the proposed construction activities for the PSE transmission feeder line should not affect surface waters and runoff.

Water Use during Construction

Construction of the project would require water for road construction, wetting of concrete, dust control, and other activities. Water used for dust suppression would be applied directly using tanker trucks equipped with rear-end sprinkler systems and absorbed on site or evaporated. Water consumed during construction activities would be purchased by the Engineering, Procurement, and Construction (EPC) Contractor from an off-site vendor with a valid water right and transported to the site in water-tanker trucks. Water supplied would likely be of potable quality and likely chlorinated. No water would be used from the site. Estimated water use for all construction-related needs, including dust control, is approximately 11 million gallons (Table 3.3-3). There would be no water treatment requirements or methods on site. Environmentally benign dust palliatives such as lignin may be added to water used for dust suppression to improve efficacy and reduce water use. The City of Kittitas has expressed interest in selling water for construction of the project (Appendix A), and has confirmed that supplying all project water requirements would not cause any significant impact on the City's public water supply, even if the period of highest water use occurred during the summer months. The City operates a backup well that could be used to supply project water requirements, in addition to water supplied from the City of Kittitas water tower. Traffic impacts resulting from water deliveries are addressed in Section 3.14, "Traffic and Transportation." Because dewatering at WTG foundations is not anticipated, dewatering trucks have not been included in estimates for truck trips.

The amount of water required for dust control is highly dependent on whether a dust palliative such as lignin is used as well as timing and weather. If lignin or another environmentally safe, nontoxic dust palliative is used, the amount of water used for dust control is reduced by an estimated 50%.

Table 3.3-4. Average and Peak Construction Water Consumption

	Average (gal/min)	Peak (gal/min)
Rock crusher	83	125
Batch plant	50	60
Dust control trucks (1,000 gal)	167	667
New road construction	73	293
Total	373	1,144

Estimated water consumption rates are presented above in Table 3.3-4. Daily water requirement estimates use an average number that would fluctuate greatly throughout different phases of project construction. Daily water requirements based on total project water estimates yield an average requirement of approximately 20,000 gallons per day. However, during periods of intensive water usage for road construction the daily consumption is expected to increase to 220,000 gallons per day.

Groundwater

A review of available literature indicates that groundwater in the vicinity of the site is generally available in large quantities, primarily in the adjacent valleys. However, water for project construction activities would not be obtained from groundwater resources directly beneath the site. Instead, the construction contractor would truck in water from local providers for construction.

Excavation, drilling, and blasting for wind turbine generator foundations and rock quarries could penetrate to depths up to 35 feet into the overburden and basalt bedrock. In the event of a significant rainfall event, the foundation excavations and quarries could provide a temporary conduit for surface seepage, thus accelerating the recharge to the overburden and basalt aquifers in the immediate vicinity of the excavation site. This in turn could cause a temporary rise in turbidity in groundwater near the excavations. However, the potential impacts on the groundwater system are not expected to be adverse because of the relatively short duration of foundation construction (2 to 3 months) and the likelihood that this activity would occur during the dry season. Also, suspended sediments in turbid water would likely be retained in near-surface soil and rock layers and would not penetrate to greater depths.

Wind turbines would be located on ridges that are generally well above the anticipated local groundwater table. If groundwater (perched or otherwise) is encountered during excavation and construction activities and dewatering is required, the water generated from dewatering would be discharged to the surrounding upland areas through a hose which would be moved as the water is pumped out to distribute the water over a large surface area and allow it to evaporate and/or infiltrate. There would be no direct discharge to surface waters or riparian areas from dewatering activities. Because no dewatering activity is anticipated, no dewatering water has been included in calculations for water consumption of vehicle trips.

Because of the rocky conditions at the proposed wind turbine locations, foundation construction would require blasting, probably one to two blasts per foundation. Blasting would also take place in the rock quarries. Blasting would occur over a 2- to 3-month period. As described above under Affected Environment, the nearest known groundwater wells to the site are at least 2 miles from the site boundary and at least 1,000 feet lower in elevation. Because of these distances, well damage from blasting is not anticipated.

Feeder Lines

Impacts on groundwater from feeder line construction would be minor and localized, primarily at pole locations and at the interconnection substations where drilled holes or shallow foundations would be constructed. Most of the proposed feeder line routes are located on ridges that are generally well above the anticipated local groundwater table.

3.3.2.2 Operation and Maintenance Impacts

<u>Surface Water, Runoff, and Erosion</u>

Operation of the project would not require the use of any water for cooling or any other use aside from the limited needs of the O&M facility described under Water Use during Operations below. There would be no industrial wastewater stream from the facility (only domestic-type wastewater from the O&M building that would discharge to an on-site septic system), and thus no wastewater would be used, discharged, or recycled for plant operations. Water needs would be limited to bathroom and kitchen use and general maintenance purposes and are expected to be less than 1,000 gallons per day. Therefore, operation of the project would not result in any discharges to surface water.

Presently disturbed areas that would be impervious include the individual WTG foundations with approximately 16-foot concrete diameters, nnnnn x ft by x ft impervious transformer foundations/spill containment structures, and the approximately 50-foot-x-100-foot O&M building roof. These areas are surrounded by open, undisturbed areas, gravel surfaces, and/or landscaping. The project therefore would generate very little stormwater runoff, and that which did occur would run off onto the adjacent ground and infiltrate naturally. The total acreage of WTG foundations is provided in Table 3.3-2. As previously discussed, the O&M facility and substation sites consist primarily of a graveled footprint area. The 5,000–square foot area occupied by the O&M facility would use downspouts to shed rainwater from building surfaces, and additional control measures such as French drains would be implemented if necessary. It is not anticipated that surface runoff control facilities beyond the control measures described under Construction Stormwater Pollution Control Measures would be required because of the low volume of rainfall (9 inches per year) at the project site and the small amount of impervious surfaces spread over a very large area. Impacts associated with stormwater runoff are not expected because of the mitigation methods that would be implemented, the distance between the proposed project and the nearest water resource, and the isolated and fragmented nature of the proposed impervious areas.

The permanent stormwater BMPs will include permanent erosion and sedimentation control through site landscaping, grass, and other vegetative cover. The final designs for these permanent BMPs will conform to the Ecology *Stormwater Management Manual.* No stormwater conveyance and treatment facilities are anticipated in or around the project site; if they are needed, however, stormwater from impervious surfaces would be collected into detention and treatment facilities and would not be discharged directly into a stream. Design plans are not available at this time for the O&M and substation facilities. Project engineers will determine specific siting of the control measures after final design has been completed. The Applicant will provide design plans, including storm event assumptions, when they have been completed.

Feeder Lines

Operation and maintenance of the BPA and PSE feeder lines would not affect surface water or sediment load. No transmission feeder line poles or trails would be built in or near any streambed, riparian corridor, or wetlands; therefore, the lines would span any crossed drainages. In particular, the transmission towers for the BPA line would be located at least 200 feet from the bank of Parke Creek and the transmission lines would span the drainage.

Water Use during Operation

The project would not require any water for cooling or any other use aside from the limited needs of the O&M facility; hence, there would be no industrial wastewater stream from the facility and domestic type wastewater from the O&M building would be treated by an on-site septic system. Water necessary for operation of the project would be purchased from an off-site source, trucked to the site, and stored at the O&M facility. The source of this water has not been determined but many vendors, including the City of Kittitas, exist in the area. The estimated daily water use would be less than 1,000 gallons per day during operations under all three project scenarios. This quantity of water would not result in impacts on water resources on site nor would it affect public water sources located off site.

Groundwater

Project roads, tower foundations and other facilities would be sufficiently above the groundwater table and are therefore not expected to significantly affect groundwater quantity, quality or flow direction in the immediate vicinity of these proposed elements. There would be no groundwater well installed to serve the O&M facility. Project roads will be designed and surfaced to keep groundwater system impacts low.

There would be no significant discharges to the groundwater system from project operations. Wastewater from the operations and maintenance facility would be discharged to a domestic septic tank installed in accordance with the requirements of the County Environmental Health Department. The septic system would be located just below the surface and would be a closed system. The septic system design specifications will be developed and submitted to EFSEC for approval prior to construction. Water needs would be limited to bathroom and kitchen use and general maintenance purposes and are expected to be less than 1,000 gallons per day. The source of this water is described below under Water Use during Operations.

3.3.2.3 Decommissioning Impacts

Potential impacts on water resources from decommissioning the proposed project would be similar to those from project construction (e.g., soil disturbance, stormwater). Surface water runoff potential would be greatest during the dismantling of the project, when soil is disturbed by vehicular activity and during the removal of facilities and other infrastructure. Dismantling the project would require water for dust control during construction. However, it is anticipated that sediment and erosion control practices would minimize or eliminate potential impacts on surface waters and groundwater. Mitigation of potential impacts would follow the same procedures in use during construction (i.e., BMPs, SWPPP). In addition, similar to project construction, dismantling construction would occur considerable distances from all wetlands, springs, seeps, and riparian areas, as discussed above. Dismantling would also reduce the quantity of impervious surfaces in the project area and therefore potential impacts from stormwater runoff once the dismantling is complete. Therefore, no significant impacts from decommissioning are anticipated because of BMPs and implementation of the SWPPP.

3.3.3 Impacts of Alternatives

3.3.3.1 Impacts of Off-Site Alternatives

Kittitas Valley Alternative

Impacts during construction could include sediment-laden surface runoff from ground disturbance and exposed soils. If not properly mitigated, runoff from disturbed areas could adversely affect nearby surface waters. Impacts to existing groundwater wells due to blasting for construction of turbine foundations is expected to be unlikely, because of the significant difference between the depth of existing water wells (57 to more than 720 feet, with most around 150 feet), and the comparatively much shallower turbine foundation depth.

Construction of the project would require delivery of water to the site for road construction, concrete preparation, dust control, and other activities. Estimated water use for construction related needs is 1million gallons, with up to 6.4 million gallons required for dust suppression on access roads and roadways. Construction water would be imported from certificated off-site sources. Construction activities would not result in any adverse impacts on local groundwater. The overall impact on groundwater in the project area is expected to be temporary and unlikely to affect water wells.

Project O&M would result in no significant erosion or sedimentation impacts on local surface waters. Operation of the project would require a domestic well to serve the limited needs (less than 1000 gallons per day) of the O&M facility. No significant impacts on groundwater supplies are expected because of facility operations.

Because of the far removed location of the Kittitas Valley Site from floodplains, no impacts to flood plains from construction or operation are anticipated.

Impacts on water resources from decommissioning of the project would be similar to those described for construction. Appropriate construction BMPs followed during decommissioning activities would further minimize impacts.

Desert Claim Alternative

Turbine construction would affect six stream segments and temporarily disturb a total of 3.5 acres of stream and riparian area. Permanent impacts include tower foundations occupying 0.3 acre of riparian habitat and proposed access roads that cross 15 streams (eight would be crossed twice). The underground power-collection system would entail crossing 17 streams, each several times. The project would not require surface water withdrawals or diversions during construction or operation; impacts on surface water quantity and quality are expected to be minor and temporary. BMPs will be used during construction to address water quality impacts. The volume of water required during construction for dust suppression and construction operations was not quantified.

Impervious surfaces associate with the project are limited and are not expected to impact groundwater recharge. As indicated above for the Kittitas Valley alternative, impacts to existing groundwater wells due to blasting activities for turbine foundation construction are not expected.

Water supply for operation and maintenance (mainly at the project's O&M facility) would likely be provided through development of a domestic well on participating landowner's property with withdrawals less than 5000 gallons per day. Septic waste form the O&M facility would be routed to an on-site septic system constructed according to state and local government requirements.

Impacts on surface water and ground water during operation of the facility would therefore be minimal.

Impacts on water resources from decommissioning of the project would be similar to those described for construction. Appropriate construction BMPs followed during decommissioning activities would further minimize impacts.

Springwood Ranch Alternative

Impacts during construction could include sediment-laden surface runoff from ground disturbance and exposed soils. If not properly mitigated, runoff from disturbed areas could adversely affect nearby surface waters. In particular, six to eight of the presumed turbine locations 9and their associated access roads) would be within approximately one-quarter mile of the Yakima River, near slopes marked with high erosion and landslide potential. Additional site specific mitigation measures would be warranted in this location of the project site. Site construction would have minimal impacts on groundwater. Runoff from disturbed areas would be infiltrated on site, resulting in a minor temporary increase in groundwater recharge.

No analysis has been performed to determine the source or volume of water required during construction activities.

Operation of a wind energy project would have minimal influence on existing surface water runoff patterns for Springwood Ranch. Therefore, long-term operation would not result in significant impacts on surface water resources. Operation of the project would likely have minimal long-term impacts on groundwater. Impervious surfaces associated with turbines, roads, and buildings would result in a minor increase in surface runoff volume, some of which could translate into a minor increase in groundwater recharge. Water demands for project operation would likely be filled through construction of a domestic well and would have no impact on groundwater supply.

Impacts on water resources from decommissioning of the project would be similar to those described for construction. Appropriate construction BMPs followed during decommissioning activities would further minimize impacts.

Swauk Valley Ranch Alternative

Impacts during construction could include sediment-laden surface runoff from ground disturbance and exposed soils. If not properly mitigated, runoff from disturbed areas could adversely affect nearby surface waters. Construction of the project would require delivery of water to the site for road construction, concrete preparation, dust control, and other activities. Construction activities would not result in any adverse impacts on local groundwater. The amount of water required would depend on the number of turbines and other facilities constructed, and the total length of access roads. Given that the hypothetical Swauk valley ranch project is smaller than the Wild Horse Project, the construction water needs would likely be less than those for the Wild Horse Project. The overall impact on groundwater in the project area is expected to be temporary and unlikely to affect water wells.

Project O&M would result in no significant erosion or sedimentation impacts on local surface waters. Operation of the project would require a domestic well to serve the limited needs of the O&M facility. No significant impacts on groundwater supplies are expected because of facility operations.

Impacts on water resources from decommissioning of the project would be similar to those described for construction. Appropriate construction BMPs followed during decommissioning activities would further minimize impacts.

3.3.3.2 Impacts of No Action Alternative

Under the No Action Alternative, the project would not be constructed or operated. However, development by others, and of a different nature, including residential development, could occur at the project site in accordance with Kittitas County's existing Comprehensive Plan and zoning regulations. Depending on the location, type, and extent of future developments at the project site, impacts on water resources could be similar to or even greater than the proposed action.

If the proposed project were not constructed, the region's base load power needs could be delivered through development of other generation facilities, most likely a gas-fired combustion turbine. Gas-fired combustion turbine projects could expose more soil to potential erosion because of the possible need to establish a gas pipeline to the facility and electrical transmission interconnections. Also, substantial amounts of water, estimated at 200 acre-feet (65 million gallons) per year, would be needed for cooling water during plant operation. Operation of a water-cooled combustion turbine facility would also result in discharge of large volumes of wastewater.

Development of other wind energy projects would result in impacts similar to those of the Proposed Action.

3.3.4 Mitigation Measures

Mitigation measures proposed by the Applicant are described in the following sections. Due to the completeness of the proposed mitigation, no additional measures have been identified.

The proposed design of the project incorporates numerous features to avoid and/or minimize impacts on water resources. The project layout (Figure 1-2) has been designed to avoid any impacts on surface waters and groundwater. Features of the project that are designed to avoid or minimize impacts include:

- minimizing new road construction by improving and using existing roads and trails instead of constructing new roads;
- not developing wells on site, and using only off-site sources of water for construction and operation; and
- locating roads, underground cables, turbine foundations, transmission poles and other associated infrastructure outside any surface water or other sensitive resources.

Other mitigation measures include avoiding drainage crossings to the maximum extent feasible; complying with federal, state, and local ordinances; and implementing a formal SWPPP and BMPs during construction.

3.3.4.1 Construction General Stormwater Pollution Prevention Measures

Stormwater Pollution Prevention Plan

A detailed Construction SWPPP will be developed for the project to help minimize the potential for discharge of pollutants from the site during construction activities. The SWPPP will be designed to meet the requirements of the Ecology General Permit to Discharge Stormwater through its stormwater pollution control program (Chapter 173-220 WAC) associated with construction activities. A SWPPP meeting the conditions of the Stormwater General Permit for Construction Activities will be prepared and submitted to EFSEC along with a Notice of Intent (NOI) for construction activities prior to the start of project construction. Similar to the Constuction SWPPP, an Industrial SWPPP meeting the conditions of the Stormwater General Permit for Industrial Activities will be prepared along with an NOI for industrial activities prior to the start of project operation. The project National Pollutant Discharge Elimination System (NPDES) permit application is included in Appendix A. The project will meet the control requirements of the NPDES permit by complying with permit guidelines and statutory requirements.

Ecology's *Stormwater Management Manual for Western Washington* would be used for developing the SWPPP and BMPs, with modifications applicable to Eastern Washington conditions, as Ecology's *Stormwater Management Manual for Eastern Washington* has not been finalized or adopted.

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

The SWPPP will be prepared along with a detailed project grading plan designed by the EPC Contractor when design-level topographic surveying and mapping are prepared for the project site. The final configuration of proposed improvements will be overlaid onto the detailed topographic maps, and the project civil design engineer will establish the locations and types of construction BMPs to be required of the EPC Contractor. These details will be included on an overall map of the project site and submitted to EFSEC prior to construction.

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

General Stormwater Pollution Control Measures

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

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

- straw mulching and vegetating disturbed surfaces,
- retaining original vegetation wherever possible,
- directing surface runoff away from denuded areas,
- keeping runoff velocities low through minimization of slope steepness and length, and
- providing and maintaining stabilized construction entrances.

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

- **Rain Level Monitoring—**The environmental monitor will be responsible for checking and recording precipitation levels at the project site using a rain gage. This benchmark will be used to determine the performance of the SWPPP measures that have been implemented during construction. After construction, the O&M group will also continue to monitor rainfall amounts and monitor the in-place erosion control systems while re-seeded areas become more established. Modifications will be performed where needed by the O&M group after project construction is completed.
- **Mulching—**Loose straw will be spread and punched into the ground in all areas where vegetation has been cleared.
- **Temporary Straw Bale and Silt Fence Sediment Barriers—**Temporary straw bale barriers and sediment fences will be inspected by the Contractor immediately after each rainfall and at least daily during prolonged rainfall. Any required repairs, relocations, or additions will be made promptly. No more than 1 foot of sediment will be allowed to accumulate behind straw bales or silt fence sediment barriers. Sediment will be removed and re-graded into slopes. New lines of barriers installed uphill of sediment-laden barriers will be considered based on the rate at which the 1 foot of sediment accumulates.

  Silt fences and straw bale sediment barriers will be maintained throughout the construction period and beyond, until disturbed surfaces have been stabilized with vegetation. Silt fence construction specifications, including fabric type, support spacing, and total length will be determined by actual construction conditions during final design of the facilities.
- **Check Structures and Sediment Traps—**Check structures, such as rock dams, hay bale check dams, dikes and swales will be used, where appropriate, to reduce runoff velocity as well as to direct surface runoff around and away from cut-and-fill slopes. Swales and dikes may also be used to direct surface water toward sediment traps.
- **Matting and Erosion Control Blankets—**Depending on weather conditions during the construction period, straw or jute matting or other suitable erosion control blankets will be used on the pad slopes and the drainage channel slopes if direct rainfall on the slopes would result in erosion prior to stabilization (see Figure 3.3-2).
- **Control of Excavation Dewatering—**Although no dewatering is anticipated, excavation work requiring dewatering discharge will be directed to the surrounding upland areas, away from sensitive resources (e.g., wetlands, drainages, and seeps). Dewatering water will be pumped through a hose that will be moved as the water is pumped out to distribute the groundwater over a large surface area to allow it to evaporate and/ or infiltrate and avoid causing increased erosion or stormwater pollution. There will be no direct discharge to surface waters or riparian areas from dewatering activities.

  No project facility would be located closer than approximately 200 feet from a riparian area, although the maximum setback that would be required by WDOE guidelines would be only 50 feet.
- **Stormwater Pollutants (Waste, Debris, Chemicals)—**In addition to erosion and sedimentation control on the project site, it is important to reduce potential for chemical pollution of surface waters and groundwaters during construction. Source control is the most effective method of preventing chemical water pollution. All potential pollutants, including

waste materials and demolition debris, that occur on site during construction will be handled and disposed of in a manner that does not cause contamination of stormwater.

The only potential water pollutants that would be transported and used in significant quantities during construction are diesel fuels and gasoline, which will be transported and stored in accordance with state and federal regulations by appropriately licensed and trained petroleum transport professionals. Other potential water pollutants include lubricating and mineral oils, chemical cleaners, and herbicides in small quantites below state and federal regulatory thresholds. Handling of these materials will be conducted in a manner that is protective of the environment and in accordance with applicable federal and state requirements and with the BMPs and the Spill Prevention, Containment, and Control Plan described in Section 3.15.2, "Health and Safety—Impacts of the Proposed Action."

In the unlikely event of a fuel, oil, or chemical spill, project personnel will activate the Spill Prevention, Containment, and Control Plan described in Section 3.15.2, "Health and Safety—Impacts of Proposed Action."

- **Environmental Monitor—**The proposed environmental monitor will be responsible for locating any necessary clean fill disposal sites for excess excavation spoils. To control the release of sediment from the disposal sites, silt fencing with a straw bale barrier will be installed on the downslope side of all disposal areas if additional sediment or erosion control measures are determined to be necessary. The site environmental monitor will be responsible for planning, implementing, and maintaining BMPs for:
  - neat and orderly storage of any construction chemicals and spent containers in lined, bermed areas;
  - materials handling and spill prevention procedures; and
  - regular disposal of construction garbage and debris using on-site dumpsters.
- **Revegetation—**All areas that are affected by the construction outside of the graveled areas and rock quarries will be seeded when there is adequate soil moisture. They will be re-seeded if healthy cover vegetation does not grow. The sediment fence and check dams will remain in place until the affected areas are well vegetated and the risk of erosion has been eliminated. The project operations group will remove the sediment fence at this time.

In addition the following specific facility control measures and BMPs for effective stormwater pollution prevention and erosion control measures will be implemented as part of the SWPPP:

- **Foundation Construction Stormwater Pollution Control Measures—**Foundation construction would require significant excavation at each wind turbine location as described in Section 3.1.2, "Earth—Impacts of the Proposed Action." Excavation materials will be stored adjacent to the foundation holes as the forms, rebar and bolts are assembled and as the concrete cures after it is cast in place. Sediment fences, hay bales or matting will be installed on steeper down slopes near the storage piles as necessary. Once the concrete cures, excavated materials would be used for backfilling. In affected areas adjacent to pads, mulch will be spread and the area will be re-seeded. Cobbles and rocks too large for backfilling will be crushed for gravel and used in rock check dams or to support other on-site erosion control measures.

- **Access Roads Stormwater Pollution Control Measures**—Work on the access roads would include grading and re-graveling existing roads and constructing new roads. The site would have gravel roadways that generally would be a low-profile design, allowing water to flow over them in most areas. Erosion control measures to be installed during the work on the access roads include:
  - maintaining vegetative buffer strips between the affected areas and any nearby waterways;
  - installing sediment fence/straw bale barriers on disturbed slopes and other locations shown on the SWPPP;
  - using straw mulching at locations adjacent to the road that have been affected;
  - providing temporary sediment traps and sediment type mats downstream of seasonal stream crossings;
  - installing silt fencing on steeper exposed slopes; and
  - planting designated seed mixes at impacted areas.
- **Turbines**—At each turbine location, a crane pad area of approximately 4,000 square feet would be graded in place and covered with road rock. During construction, silt fences, hay bales, or matting will be placed on the down slope side of the crane pad areas. Wind turbine equipment such as the blades, tower sections, and nacelles would be transported and off-loaded at each turbine location near the foundation and crane pad. After construction, disturbed areas around all crane pad staging areas will be re-seeded with an appropriate seed mix.
- **Underground Cable Trenching Stormwater Pollution Control Measures**—Underground electrical and communications cables would be placed in 3- to 5-foot-wide trenches along the length of each wind turbine string corridor. In some cases, trenches would run from the end of one turbine string to the end of an adjacent turbine string to link turbines via the underground network. Trenches would be excavated from 1.5 to 4 feet deep, depending on the underlying soil/rock conditions. Excavated materials would be piled alongside the cable trenches for backfilling after cable installation. The excavated materials typically would remain in an exposed state for approximately 2 weeks. Sediment fences, hay bales, or matting will be installed on steeper downslopes near the storage piles. After backfilling is completed, excess excavated soils will be spread around the surrounding area and contoured to the natural grade. Cobbles and rocks too large for backfilling will be crushed for gravel and used in rock check dams or to support other on-site erosion control measures. Finally, the area will be re-seeded with an appropriate seed mix.
- **Overhead Collector Line Construction Stormwater Pollution Control Measures**—Construction of the overhead pole lines would require excavation for setting the poles. Excavated materials would be piled alongside the excavations for backfilling after pole installation. Pole excavations are typically in an exposed state for approximately 1 week. Sediment fences, hay bales, or matting will be installed on any steep downslopes near the storage piles. After backfilling, excess excavated soils will be spread around the surrounding area and contoured to the natural grade. Cobbles and rocks too large for backfilling will be

crushed for gravel and used in rock check dams or to support other on-site erosion control measures. Finally, the area will be re-seeded with an appropriate seed mix.

- **Substation Construction Stormwater Pollution Control Measures—**The substation is generally flat, and the base area would be graded and covered with a sub-base rock and a graveled surface on top. Foundation and underground trenching excavation spoils would be handled in the same manner as described in the above sections regarding foundations and underground cable trenches. Disturbed areas surrounding the substation perimeter will be contoured to the natural grade, covered in straw mulch, protected for erosion control, and re-seeded as appropriate to the adjacent slopes. The main substation transformers, which are filled with mineral oil, are equipped with an oil level meter and float switch. Oil containment catch trenches would surround the outer foundation perimeters of transformers, as described in more detail in Section 2.2.3, "Project Facilities."
- **Final Road Grading and Site Clean Up Stormwater Pollution Control Measures—**The project would use dumpsters or drop boxes from a local waste management company to collect recyclable materials and dispose of waste materials that cannot be reused. A final site cleanup will be made before turning the project over to the O&M group. In accordance with the Erosion and Sediment Control Plan for access road improvement and construction, County roads will be restored to at least their preproject condition and to the satisfaction of the County Public Works Department.
- **Cement Batch Plant Stormwater Pollution Control Measures—**The cement batch plant would be located on site at a central location within a flat area approximately 500 feet square, surrounded by a 1-foot-high earth berm to contain spilled water runoff (see Proposed Layout of Most Likely Scenario (136 Turbines/1.5 MW) in Figure 1-2).

  The batch plant would use outdoor stockpiles of sand and aggregate. These stockpiles would be located to minimize exposure to wind. Sediment fences, hay bales, or matting will be installed near the storage areas as necessary. Cement would be discharged via screw conveyor directly into an elevated storage silo without outdoor storage. Construction managers will exercise good housekeeping practices and conduct regular cleanings of the plant, storage, and stockpile areas to minimize buildup of fine materials.

  Following completion of construction activities the Applicant's contractor will rehabilitate the sites by dragging the top of both of the 500–square foot crushing and batch plant areas with a blade machine and re-seeding the area with a designated seed mixture.
- **Rock Quarry Stormwater Pollution Control Measures—**A total of three temporary on-site rock quarries are planned for the project (see Proposed Layout of Most Likely Scenario (136 Turbines/1.5 MW) in Figure 1-2). Each rock quarry would have a disturbance footprint of approximately 5 acres, and the depth would be approximately 10–20 feet, depending on the type of rock encountered at each location. Sediment fences, hay bales, or matting will be installed near the quarries to control stormwater run on and runoff, as necessary.

  A rock crusher would be located at one of the three on-site quarry pits for the duration of the construction period. The crusher would be located in an area approximately 500 feet square, surrounded by a 1-inch high earth berm to contain spill water runoff. This area will be sprayed by a water truck several times each day for dust suppression. The crusher will contain several dust-suppression features, including screens and water spray. Effective dust-control measures will be operating at all emission points during operation, including start-up and shut-down periods. During periods of sustained high winds, contractors will shut down operation of the rock crusher if reduced visibility poses a safety hazard.

It is not anticipated that surface runoff control facilities beyond the control measures described above would be required. Project engineers will determine specific siting of the control measures after final design has been completed. The applicant will provide design assumptions, including storm events and plans, when they have been completed.

3.3.4.2 Operational General Stormwater Pollution Prevention Measures

As described above, the Applicant will prepare and define a SWPPP as part of the final design. The project operations group will be responsible for monitoring the SWPPP measures that were implemented during construction to ensure they continue to function properly. Final designs for the permanent BMPs will be incorporated into the final construction plans and specifications prepared by the civil design engineer. An operations manual for the permanent BMPs will be prepared by the EPC Contractor civil design engineer and the project's enginering team.

Operational BMPs will be adopted, as part of the SWPPP, to implement good housekeeping, preventive and corrective maintenance procedures, steps for spill prevention and emergency cleanup, employee training programs, and inspection and recordkeeping practices, as necessary, to prevent stormwater and groundwater pollution. Examples of good operational housekeeping practices, which will be employed by the project, include the following:

- prompt cleanup and removal of spillage;
- regular pickup and disposal of garbage;
- regular sweeping of floors;
- HAZMAT data sheet cataloging and recording; and
- proper storage of containers.

No project facility would be located closer than approximately 200 feet from a riparian area, although the maximum setback that would be required by WDOE guidelines. The County does not require a setback.

The project operations group will periodically review the SWPPP against actual practice. The plant operators will ascertain that the controls identified in the plan are adequate and that employees are following them.

Transformer Oil Containment

The oil containment system for the substations would consist of a perimeter containment system, large enough to contain the full volume of transformer mineral oil with a margin of safety, surrounding the main substation transformers. The trough would be poured as part of the transformer concrete foundation or would consist of a heavy oil-resistant membrane that is buried around the perimeter of the transformer foundation.

The trough and/or membrane would drain into a common collection sump area that would be equipped with a sump pump designed to pump rainwater out of the trough to the surrounding area away from nearby surface waters or sensitive areas (e.g., wetlands, springs, seeps). In order to prevent the sump from pumping oil out to the surrounding area, it will be fitted with a sensor that would shut off the sump if oil is detected. A failsafe system with redundancy is built into the sump controls—the transformers are also equipped with oil-level sensors. If the oil level inside a transformer drops as a result of a leak in the transformer tank, it would also shut off the sump pump system to prevent it from pumping oil, and an alarm would be activated at the substation and in the main project control (SCADA) system. The trough would be large enough to contain the full volume of oil plus 10% reserve volume.

Discharges from the containment system would be directed to upland areas and away from nearby surface waters or sensitive areas (e.g., wetlands, springs, seeps). Discharge from the containment system will be in compliance with laws governing the discharge of oil as specified in the Code of Federal Regulations (CFR) under 40 CFR Part 110.3:

> § 110.3 Discharge of oil in such quantities as "may be harmful" pursuant to section 311(b)(4) of the Act. [See below Note]
>
> For purposes of section 311(b)(4) of the Act, discharges of oil in such quantities that the Administrator has determined may be harmful to the public health or welfare or the environment of the United States include discharges of oil that:
>
> (a) Violate applicable water quality standards; or
>
> (b) Cause a film or sheen upon or discoloration of the surface of the water or adjoining shorelines or cause a sludge or emulsion to be deposited beneath the surface of the water or upon adjoining shorelines. [61 FR 7421, Feb. 28, 1996]
>
> Note: Act means the Federal Water Pollution Control Act, as amended 33 U.S.C. 1251 et seq., also known as the Clean Water Act.

Water in the containment system that shows obvious indicators of potentially violating appreciable water quality standards, i.e., the water exhibits an oily sheen as specified under 40 CFR Part 110(b), will be removed from the containment system and disposed of in accordance with applicable federal, state and local laws.

3.3.5 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts on water resources are expected as a result of the proposed project. The project has been designed to minimize the potential for impacts on water resources. No water resources would be directly affected by the project, and BMPs would minimize the potential water quality, sediment, runoff, and groundwater impacts associated with construction. Therefore, with implementation of the mitigation measures outlined above, significant unavoidable adverse impacts on surface water and groundwater resources resulting from project operation are not anticipated.