3.2 AIR QUALITY

Air quality is generally assessed in terms of whether air pollutant concentrations are higher or lower than ambient air quality standards set to protect human health and welfare. Three agencies have jurisdiction over ambient air quality in the project area: the U.S. Environmental Protection Agency (EPA), the Washington State Department of Ecology (Ecology), and the Puget Sound Clean Air Agency (PSCAA). These agencies establish regulations that govern both the concentrations of pollutants in the outdoor air and contaminant emissions from air pollution sources. Although their regulations are similar in stringency, each agency has established its own standards. Unless the state or local jurisdiction has adopted more stringent standards, the EPA standards pertain.

In order to measure existing air quality, the Department of Ecology and PSCAA maintain a network of monitoring stations throughout the Puget Sound region. Generally these stations are placed where there may be air quality problems, and so they are usually in or near urban areas or close to specific large air pollution sources. Other stations in more remote areas provide an indication of regional air quality. Based on monitoring information collected over a period of years, the state (Ecology) and federal (EPA) agencies designate regions as being "attainment" or "nonattainment" areas for particular air pollutants. Attainment status is therefore a measure of whether air quality in an area complies with the National Ambient Air Quality Standard (NAAQS).

3.2.1 Affected Environment

Typical sources of air pollution in the project area include vehicular traffic and residential wood-burning devices. Residential wood burning produces a variety of air contaminants, including large quantities of fine particulate matter (PM10 and PM2.5). With vehicular traffic the air pollutant of major concern is carbon monoxide (CO). Of the various vehicular emissions, CO is the pollutant emitted in the largest quantity for which ambient air standards exist. The project site is located in an area that is designated as maintenance for ozone and carbon monoxide and attainment for PM10. This suggests that overall air quality in the project area is good.

Existing Air Quality

Ozone

Ozone is a highly reactive form of oxygen created by sunlight-activated chemical transformations of nitrogen oxides and volatile organic compounds (hydrocarbons) in the atmosphere. Unlike CO concentrations that tend to occur very close to the emission source(s), ozone problems tend to be regional in nature because the atmospheric chemical reactions that produce ozone occur over a period of time. During the delay between emission and ozone formation, ozone precursors can be transported far from their sources. Transportation sources are one of a number of sources that produce ozone precursors.

During the summer of 1990, ozone concentrations exceeded the 0.12 parts per million (ppm) 1-hour NAAQS several times at monitoring stations in both Enumclaw and Lake Sammamish State Park. Because of these violations, EPA designated all of Snohomish, King, and Pierce Counties as nonattainment for ozone. In late 1992, the ozone nonattainment area was reduced

to include all of Pierce County, all except a small portion in the northeast corner of King County, and the western portion of Snohomish County.

In September 1997, EPA adopted a new, more stringent standard for ozone based on an 8-hour average. Nationally, the new 0.08-ppm 8-hour standard was intended to replace the 0.12-ppm 1-hour standard, but court action delayed implementation of this standard. EPA is currently in the process of implementing the new standard. Until this process is complete, PSCAA continues to apply the 0.12-ppm 1-hour ozone standard.

In 1997, the EPA determined that the Puget Sound ozone nonattainment area had attained the public health-based 1-hour NAAQS for ozone. Based on this determination, EPA re-designated the Puget Sound region to attainment for ozone, and approved the associated air quality maintenance plan (Ecology 1997). This plan includes measures to continue controlling ozone emissions and is intended to assure the standard is maintained for at least ten years. The project site is therefore in an ozone air quality maintenance area.

The 1-hour ozone standard was exceeded twice in 1998 at each of three sites in the southern portion of the region, including two sites near Enumclaw and one site in the Pack Forest in La Grande, Washington. There have been no measured concentrations exceeding the ozone standard since 1998. If the 1-hour ozone standard is exceeded more than three times in a three-year period, it would tip at least a portion of the region back into nonattainment for ozone. Under current air quality plans and policies, this status has no direct implications for the proposed project, but this could change as strategic regional air pollution control plans are updated.

Inhalable Particulate Matter (PM10)

Federal, state, and local regulations set limits for particles less than or equal to about 10 micrometers (microns) in diameter. This fraction of particulate matter is called PM10, and is the important size fraction in terms of potential human health impacts because particles this size can be inhaled deeply into the human lung. PM10 is generated by industrial activities and operations, fuel combustion sources like residential wood burning, motor vehicle engines and tires, and other sources. Such sources occasionally cause high PM10 levels in the Puget Sound region, and three areas in Seattle, Tacoma and Kent have in the past been declared nonattainment because PM10 concentrations sometimes exceed health standards. The project area is included in a PM10 attainment area, and given the general lack of major sources, such as nearby industrial or manufacturing sources, heavy mobile equipment traveling on unpaved roads, material handling, or crushing and grinding operations, it is likely that PM10 concentrations near the project site are below the limits set by the health standards.

Fine Particulate Matter (PM2.5)

In 1997, EPA implemented a new federal standard for particulate matter less than or equal to 2.5 microns in diameter. Implementation of this standard also was delayed by court action, but this standard is now in effect. This fine fraction of particulate matter is called PM2.5, and is a subset of PM10. Because most particulate matter from residential wood-burning and vehicle exhaust emissions are in this range, it is likely that the preponderance of wintertime emissions in the area are PM2.5. Such small particles (e.g., a typical human hair is about 100 microns in diameter) can be breathed deeply into lungs, and are thought to represent the most dangerous size fraction in terms of human health.

The EPA is currently re-assessing the PM2.5 standard; conclusions should be reached some time in 2003. Even without the final determination, there have been no measured violations at the monitor closest to the project area in the past three years (the monitor is approximately 2 miles to the northeast). A wind rose from PSCAA indicates that the wind at the South Park monitor blows predominantly from the south-southeast (PSCAA 2003). Based on these two factors, it is probable that PM2.5 levels in the project area do not exceed the standard.

Carbon Monoxide (CO)

Carbon monoxide is the product of incomplete combustion. It is generated by transportation sources and other fuel-burning activities like residential space heating, especially heating with solid fuels like coal or wood. Carbon monoxide is usually the pollutant of greatest concern related to transportation sources because it is the pollutant emitted in the greatest quantity for which short-term health standards exist. Short-term standards (as opposed to annual-average standards) are often the controlling, or most restrictive NAAQSs. There are two air quality standards for carbon monoxide: a 1-hour average standard of 35 ppm and an 8-hour average standard of 9 ppm. These levels may be exceeded once per year without violating the standard.

Unlike ozone, CO is a pollutant whose impact is usually localized, and CO concentrations typically diminish within a short distance of busy roads. The highest ambient concentrations of CO usually occur near congested roadways and intersections during wintertime periods of air stagnation. Typical meteorological conditions during which the highest CO levels occur in the Puget Sound region include cold temperatures, light winds, and a stable atmosphere. Such weather conditions reduce the mechanisms that disperse pollutants emitted into the air.

The project area is located in the Puget Sound region CO maintenance area that encompasses a large portion of the Everett-Seattle-Tacoma urban area. This area was designated nonattainment in 1991, when several locations in the Puget Sound region recorded violations of the CO standards. The EPA redesignated the Puget Sound region as attainment for CO in 1997 and monitoring stations had not recorded violations of the standards in recent years. EPA also approved the associated maintenance plan to insure the area remains attainment for the CO NAAQS. That plan relies on continuing the existing vehicle Inspection and Maintenance program. The proposed project area is therefore included in a CO maintenance area.

Traffic generated by the proposed project would affect CO emissions in the CO maintenance area. Consequently, any major changes to the road network or other elements of the transportation system may be subject to review under state and federal air quality conformity rules. These rules are intended to ensure that projects and actions affecting air quality will conform to existing plans and time tables for attaining and then maintaining federal health-based air quality standards.