3.2 Air

This chapter describes how implementation of the proposal could affect air and odor under all of the alternatives, including the No Action Alternative. This section is based in part on the revised NERTS Air Quality Assessment in Appendix A. The discussion includes a description and comparison of the air quality emissions, greenhouse gas (GHG) emissions, and odor nuisances for each of the alternatives. As discussed in Section 2.2.3.5, in early 2025, a pilot program began at CHRLF that shifted from a seven-day operating schedule to a five-day operating schedule. This means that no transfer trailer hauling would occur on the weekend under normal operations. However, transfer trailer hauling could still occur via overtime operations or if the pilot program is not ultimately implemented permanently. Analyses in this Section are based on the five-day operating schedule, with some continued weekend hauling.

The environmental review determined that with mitigation, no significant unavoidable adverse impacts to air quality, including odor, would be anticipated during construction or operation of the alternatives.

3.2.1 Regulatory Context

Under the action alternatives, development that has potential to impact air quality would require compliance with federal, state, and local regulations. Several federal, state, and local agencies support the protection of human health and the environment. These agencies and their functions are described in the following sections.

3.2.1.1 Federal Regulations

3.2.1.1.1 Environmental Protection Agency

3.2.1.1.1.1. Ambient Air Quality Standards

Under the Clean Air Act, The EPA established National Ambient Air Quality Standards (NAAQS) to protect the public from air pollutants that have been proven harmful to public health and the environment. There are two types of NAAQS. Primary standards protect public health, including sensitive categories such as elderly, children, and asthmatics. Secondary standards protect animals, crops, vegetation, and buildings and are effective against degradation of visibility. Air pollutants regulated by the NAAQS are called “criteria” pollutants. Criteria pollutants include nitrogen dioxide; carbon monoxide; sulfur dioxide; particulate matter with aerodynamic diameter equal to or smaller than 10 micrometers (PM_{10}) and particulate matter with aerodynamic diameter equal to or smaller than 2.5 micrometers ($PM_{2.5}$); lead; ozone and its precursors, including nitrogen oxides; and volatile organic compounds. The Clean Air Act also gives the authority to states to establish air quality rules and regulations aimed at meeting air quality standards.

Table 3.2-1. summarizes the current NAAQS. Current Washington State Ambient Air Quality Standards are established in the Washington Administrative Code (WAC) Title 173. Ecology adopted the NAAQS in accordance with WAC 173-476. Puget Sound Clean Air Agency enforces these standards and has also established a more stringent daily average goal for particulate matter less than or equal to $PM_{2.5}$.

3.2.1.1.1.2. Greenhouse Gases

Gases that trap heat in the atmosphere are referred to as GHGs because, like a greenhouse, they capture heat radiated from the earth. The accumulation of GHGs is a driving force in global climate change. Definitions of climate change vary among regulatory authorities and the scientific community. In general, climate change can be described as significant changes in global temperature, precipitation, wind patterns, and other measures of climate that occur over several decades or longer that can be caused by natural fluctuations and human activities that alter the composition of the global atmosphere. The average annual air temperature in the Puget Sound region has increased 1.3 degrees Fahrenheit (°F) from 1895 to 2014 and is projected to be 5.5°F warmer by the 2050s (King County 2023a).

On December 7, 2009, EPA determined that the presence of GHGs in the atmosphere endangers public health and public welfare and included them as contributors to air pollution. In 2022 the Supreme Court ruled that the EPA could not put state-level caps on carbon emissions under the Clean Air Act. In response, when Congress passed the Inflation Reduction Act of 2022, it amended the Clean Air Act and reinforced that carbon dioxide emitted from fossil fuels is an air pollutant and the EPA has the authority, and responsibility, to regulate it. There are seven GHGs:

- Carbon dioxide (CO_2)
- Methane
- Nitrous oxide
- Hydrofluorocarbons
- Perfluorocarbons
- Sulfur hexafluoride
- Nitrogen trifluoride

The primary human activities that release GHGs include combustion of fossil fuels for transportation, heating, and electricity; agricultural practices that release methane, such as livestock production and decomposition of crop residue; and industrial processes that release smaller amounts of gases with high global warming potential (GWP) such as sulfur hexafluoride. Deforestation and land cover conversion also contribute to global warming by reducing the earth's capacity to remove CO_2 from the air and instead allowing more solar radiation to be absorbed (Jacobs 2023a).

Table 3.2-1. National and Washington State Standards Ambient Air Quality Standards.

Criteria Pollutant	Averaging Time	Primary Standard	Secondary Standard	Details
Ozone	8 hours	0.070 ppm	0.070 ppm	Annual fourth highest 8-hour concentration, averaged over 3 years
Carbon Monoxide	1 hour	35 ppm		Not to be exceeded more than once per year
	8 hours	9 ppm		Not to be exceeded more than once per year

Table 3.2-1. National and Washington State Standards Ambient Air Quality Standards.

Criteria Pollutant	Averaging Time	Primary Standard	Secondary Standard	Details
Nitrogen Dioxide	1 hour	100 ppb		98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	Annual arithmetic mean	0.053 ppm	0.053 ppm	Not to exceed this level in a calendar year.
Sulfur Dioxide[a]	1 hour	0.75 ppm		99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	3 hours		0.5 ppm	Not to be exceeded more than once per year
PM_{10}	24 hours	150 µg/m^3	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years
$PM_{2.5}$[b]	24 hours	35 µg/m^3	35 µg/m^3	98th percentile, averaged over 3 years
	Annual arithmetic mean	12 µg/m^3	15 µg/m^3	Annual mean, averaged over 3 years
Lead	Rolling 3-month average	0.15 µg/m^3	0.15 µg/m^3	Not to be exceeded

Source: EPA 40 CFR Part 50 (https://www.epa.gov/criteria-air-pollutants/naaqs-table) and WAC Chapter 173-476

[a] "Sunset" provisions apply to the annual and 24-hour sulfur dioxide standards under WAC 173-476-130(1)(a) and (b). The Proposed Action area has been in attainment for more than 1 year and therefore it is not subject to these standards.

[b] PSCAA has also established a health goal of 25 µg/m^3 on a daily average. The health goal is the $PM_{2.5}$ level that PSCAA would eventually like to achieve; however, it is not a codified standard as are the NAAQS.

µg/m^3 = microgram(s) per cubic meter
CFR = Code of Federal Regulations
ppb = part(s) per billion
ppm = part(s) per million

The principal GHGs of concern considered in this analysis are generated by the combustion of fuel in mobile sources and include CO_2, methane, and nitrous oxide. Each of the principal GHGs has a long atmospheric lifetime, existing in the atmosphere for one year to several thousand years. In addition, the potential heat trapping ability of each of these gases varies significantly. Therefore, GHGs are ranked by their GWP. The GWP is based on the capacity of a GHG to absorb solar radiation, as well as its residence time in the atmosphere, compared with CO_2. EPA's Mandatory GHG Reporting Rule, 40 CFR 98 Subpart A, Table A-1 provides the 100-year GWPs for selected compounds. Based on the table, CO_2 has a GWP of one, methane has a GWP of 25, and nitrous oxide has a GWP of 298. Emissions of GHGs are typically estimated as carbon dioxide equivalents (CO_2e). Estimates of individual GHGs are converted to CO_2e by multiplying each pollutant by its GWP relative to CO_2. While methane, nitrous oxide, and sulfur hexafluoride have much higher GWPs than CO_2, CO_2 is emitted in such vastly higher quantities that it accounts for the majority of GHG emissions in CO_2e, both from residential developments and human activity in general (Jacobs 2023a).

3.2.1.2 State Regulations

In March 2008, the Washington legislature enacted House Bill 2815, which directed Ecology to develop rules for the mandatory reporting of GHG emissions by sources that emit more than certain specified

threshold amounts. These rules are codified in WAC Chapter 173-441. According to WAC 173-441-030 (1)(a), any source that emits 10,000 metric tons of CO_2e per calendar year is required to report its GHG emissions to Ecology. The document titled *Guidance for Ecology Including Greenhouse Gas Emissions in SEPA Reviews* indicates that for projects emitting at least 10,000 metric tons of CO_2e per year, but less than 25,000 metric tons per year, a qualitative disclosure of GHG emissions is required under SEPA (Ecology 2011). For projects emitting more than 25,000 metric tons per year, a quantitative disclosure of GHGs is required. There is no standard significance threshold for GHG emissions in the Washington SEPA rules (Washington Administrative Code [WAC] 197-11-330). However, in 2020, Ecology was directed by the governor to develop regulations to guide greenhouse gas assessments for industrial and fossil fuel projects in Washington, including new public or private facilities, or changes to an existing facility, that require review under SEPA. The purpose of this rulemaking is to create a new rule, Chapter 173-445 WAC, Greenhouse Gas Assessment for Projects, also known as the GAP rule. The rulemaking is currently paused.

While GHG concentrations are global and not localized, all of the project alternatives will directly result in GHG emissions due to emissions from mobile sources.

In 2020, the Washington Legislature set new GHG emission limits (RCW 70A.45.020) in order to combat climate change. Under the law, the state is required to reduce emissions levels (Seattle FEIS 2021):

- 2020—reduce to 1990 levels.
- 2030—45% below 1990 levels.
- 2040—70% below 1990 levels.
- 2050—95% below 1990 levels and achieve net zero emissions.

The State Agency Climate Leadership Act (RCW 70.235.050 and 060) requires some state agencies to reduce their GHG emissions. The Act was updated in 2020 to require state agencies to reduce their carbon pollution to these targets:

- 2020—15% below 2005 levels
- 2030—45% below 2005 levels
- 2040—70% below 2005 levels
- 2050—95% below 2005 and achieve net-zero GHG emissions.

Ecology adopted a rule in 2019 to transition away from using GHGs known as hydrofluorocarbons (HFCs) in products and equipment starting in 2020. A law passed in 2021 expands on that program, establishing a program to reduce leaks from large air conditioning and refrigeration equipment, limiting the impacts for refrigeration chemicals, and requiring Ecology to recommend options for capturing HFCs when equipment reaches the end of its useful life.

The Clean Buildings for Washington law (HB 1257), establishes energy use intensity (EUI) targets for large commercial buildings (over 50,000 square feet), which will be updated over time. Owners of these buildings

must first meet these energy performance standards between 2026 and 2028, depending on square footage of the building.

The 2019 Clean Energy Transformation Act (CETA) (SB 5116) requires all electric utilities in Washington to transition to carbon-neutral electricity by 2030 and to 100 percent carbon-free electricity by 2045. The Washington Department of Commerce and the Washington Utilities and Transportation Commission (UTC) are leading the implementation efforts.

3.2.1.2.1 Mobile Source Air Toxics

The Clean Air Act identifies 188 air toxics, also known as hazardous air pollutants (HAPs). EPA assessed and identified a subset of 21 HAPs emitted by mobile sources, which are set forth in an EPA final rule, *Control of Emissions of Hazardous Air Pollutants from Mobile Sources* (40 Federal Register 59, 80, 85, and 86). Washington State regulates more than 430 toxic air pollutants from commercial and industrial sources, including the 21 HAPs emitted by mobile sources.

On-road mobile sources include automobiles and light-duty and heavy-duty trucks used for employee commutes and material transport. Non-road sources include various types of construction equipment. On-road and non-road mobile sources emit air toxics that are included in EPA's list of HAPs and Washington State toxic air pollutants that can cause cancer and other health risks. Nationwide mobile source air toxics emissions are expected to be lower than present levels in future years as a result of EPA's national emissions control programs and fuel economy standards. Two recent examples of increasingly rigorous programs and standards include:

- Multi-Pollutant Emissions Standards for Model Years 2027 and Later Light Duty and Medium-Duty Vehicles. In April 2024, under the Clean Air Act, the EPA adopted final rules for new, more protective emissions standards for criteria pollutants and greenhouse gases (GHG) for light-duty vehicles and Class 2b and 3 (''medium-duty'') vehicles that will phase-in over model years 2027 through 2032. EPA projects that the new standards in the final rule will result in meaningful reductions in emissions of criteria and toxic pollutants from light and medium-duty vehicles. We also project that the final standards will impact corresponding ''upstream'' emission sources like EGUs (electric generating units) and refineries. (EPA 2024)

Control of Air Pollution from New Motor Vehicles: Heavy-Duty Engine and Vehicle Standards. In December 2022, under the Clean Air Act, the EPA adopted final rules that set stronger emissions standards to further reduce air pollution from heavy-duty vehicles and engines starting in model year 2027. The final program includes new emission standards that are significantly more stringent and that cover a wider range of heavy-duty engine operating conditions compared to today's standards; further, the final program requires these more stringent emissions standards to be met for a longer period of when these engines operate on the road. The requirements in the final rule will lower emissions of NOX and other air pollutants (PM, hydrocarbons (HC), carbon monoxide (CO), and air toxics). (EPA 2024a)These revised standards follow previous increases in emissions control programs and fuel economy standards promulgated in 2022, 2015, 2014, 2011, 2009, and earlier that are still affecting vehicles coming into use now and for the next several years. (EPA 2024b)

3.2.1.3 Local Laws, Plans, and Policies

3.2.1.3.1 Puget Sound Clean Air Agency

PSCAA enforces general emission standards that apply to all facilities in PSCAA jurisdiction and will be applicable to the construction and operation of the proposed NERTS facility. PSCAA Regulation I, Sections 9.03, 9.07, 9.09, 9.11, 9.13, 9.15, 9.18, and 9.20 address fugitive dust, visible emissions, odor, and concealment. PSCAA Regulation 1, Section 9.11 addresses odor strictly as a nuisance and responds to the issues on a complaint basis. The regulation states:

a) *It shall be unlawful for any person to cause or allow the emission of any air contaminant in sufficient quantities and of such characteristics and duration as is, or is likely to be, injurious to human health, plant or animal life, or property, or which unreasonably interferes with enjoyment of life and property.*
b) *With respect to odor, the Agency (PSCAA) may take enforcement action under this section if the Control Officer or a duly authorized representative has documented all of the following:*
    a. *The detection by the Control Officer or a duly authorized representative of an odor at a level 2 or greater, according to the following odor scale:*
        i. *level 0 – no odor detected.*
        ii. *level 1 – odor barely detected.*
        iii. *level 2 – odor is distinct and definite, any unpleasant characteristics recognizable.*
        iv. *level 3 – odor is objectionable enough or strong enough to cause attempts at avoidance.*
        v. *level 4 – odor is so strong that a person does not want to remain present.*
    b. *An affidavit from a person making a complaint that demonstrates that they have experienced air contaminant emissions in sufficient quantities and of such characteristics and duration so as to unreasonably interfere with their enjoyment of life and property.*
    c. *The source of the odor.*
c) *Nothing in this Regulation shall be construed to impair any cause of action or legal remedy of any person, or the public for injury or damages arising from the emission of any air contaminant in such place, manner or concentration as to constitute air pollution or a common law nuisance (PSCAA 1999).*

The new NERTS facility will be required to submit to PSCAA a Notice of Construction application for construction of the facility, and also to determine applicability of the Emissions reporting program, the Operating Permit program, or the status as a major or area source of hazardous air pollutants.

3.2.1.3.1.1. Emergency/Backup Generators

PSCAA Regulation 1 states that notifications and permits are not required for standby internal combustion engines operating fewer than 500 hours per year [Section 6.03 I(3)I] provided that they are not operated at a facility with a power supply contract that offers a lower rate in exchange for the power supplier's ability to curtail energy consumption with prior notice.

Owners of reciprocating internal combustion engines that commenced construction after July 11, 2005, must comply with the New Source Performance Standards under 40 CFR Part 60, Subpart IIII. New and existing stationary internal combustion (IC) engines are also subject to the National Emission Standard for Hazardous Air Pollutants (NESHAP) under 40 Code of Federal Regulations Part 63, Subpart ZZZZ; however, new stationary engines that comply with 40 CFR 60 Subpart IIII already meet Subpart ZZZZ, therefore only Subpart IIII will be discussed below.

Subpart IIII requires that RICE be certified to comply with a certain emission standard: Tier 1, Tier 2, Tier 3, or Tier 4. Higher tiers correspond to stricter standards, and the required standard depends on model year, engine size/rating, and application. Engines classified as emergency engines must also comply with operational and record-keeping requirements under 40 CFR 60.

3.2.1.3.2 King County

King County Code (KCC) 18.17 Green Building Program ensures that the planning, design, construction, maintenance, and operation of any King County project is consistent with the latest green building and sustainable development practices. This policy intends to improve energy efficiency, reduce GHG emissions, advance equity and social justice, reduce waste, reduce water use, increase sustainable materials use, improve sites, and improve stormwater management. KCC 18.17 summarizes strategies to increase sustainable development and provides support to these efforts through programs like the GreenTools program (see website: King County GreenTools).

King County implemented a Strategic Climate Action Plan (SCAP) in 2020. The SCAP is a 5-year blueprint for the County's climate action, integrating climate change into all areas of County's operations and working with King County cities, partners, communities, and residents. The SCAP is updated every five years to reflect the County's continuous learning approach to climate action. The countywide goal is to reduce countywide sources of GHG emissions, compared with a 2007 baseline, by 25 percent by 2020, 50 percent by 2030, and 80 percent by 2050. The Plan states (GHG 1.3.4) that King County's Wastewater Treatment Division (KCWTD) and Solid Waste Division shall each independently achieve carbon-neutral operations by 2025.

In addition, the SCAP includes goals to:

- Implement near-term actions to support Ordinance 19052, which targets conversion of 50 percent of heavy-duty county-operations vehicles to electric vehicles by 2038 and 100 percent by 2043
- Build, maintain and operate County facilities consistent with the highest green building and sustainable development practices. These include goals to minimize operational resource use, maximize reuse and recycling, and choose products and services with low environmental and carbon impacts. In particular, Performance Measure GHG 21 aims for 100 percent of King County new construction and whole building renovation projects to achieve certifications that demonstrate a net zero GHG emissions footprint by 2030 (King County 2021e).

3.2.1.3.3 City of Kirkland

The City of Kirkland regulates air quality through KZC 115.15 by incorporating the Washington Clean Air Act under Chapter 70.94 RCW and by defining certain emissions of air contaminants as public nuisances that are a violation of the code. The City also includes consideration of air quality in its tree management and landscape requirements under KZC Chapter 95. The City also amends Section 307 of the 2021 International Fire Code to specify allowance of bans on fires due to air quality or fire danger in KMC 21.20.050.

3.2.1.3.4 City of Woodinville

The City of Woodinville does not directly regulate air quality from stationary and mobile sources, deferring to PSCAA regulations and implementation of State and Federal regulations. However, the City does include the protection of air quality and proactive efforts to address climate change adaptation and mitigation as one of the goals of the City of Woodinville Comprehensive Plan, embodied in critical areas regulations under WMC 21.51 that are intended to encourage development that meet the goals and policies of the Plan. The City also considers the need for air quality studies to accompany project permit application submission requirements under WMC 21.80 and for consideration of tree protections under WMC 21.50 Development Standards. The City also amends Section 307 of the 2021 International Fire Code to specify allowance of bans on fires due to air quality or fire danger in WMC 21.62.180.

3.2.2 Affected Environment

3.2.2.1 Study Area

This section describes the existing air resources (air quality and odor) in the study areas of the proposed alternative sites.

The study areas for air quality are defined as the counties that could be directly or indirectly affected by the construction or operation of this project in the Puget Sound Basin. With respect to greenhouse gas emissions and their effect on climate, the study area is the global environment. The study areas for indirect impacts are the areas affected by the transport of construction workers and materials to the alternative sites.

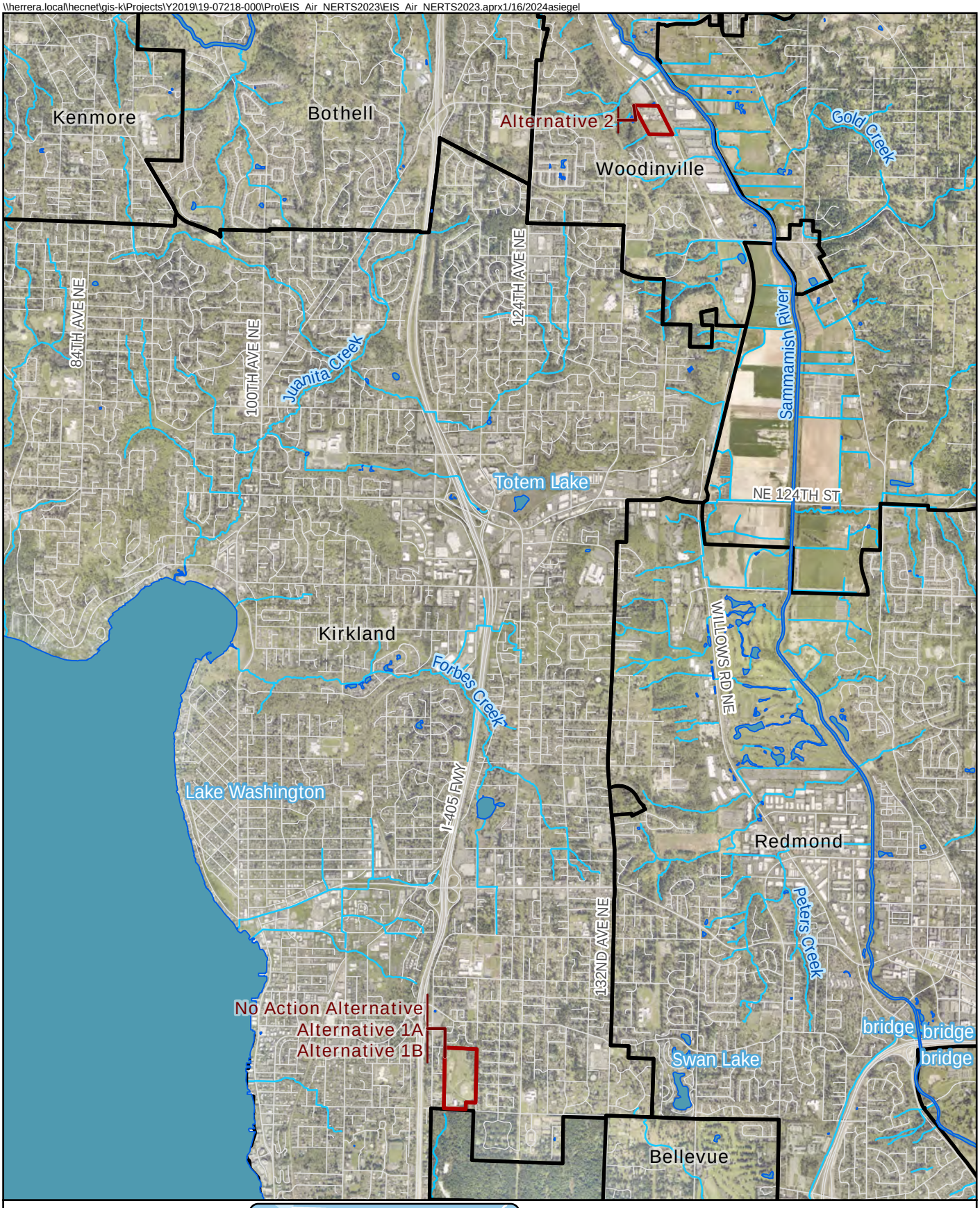
3.2.2.2 Regional Topography and Climate

The proposed alternatives are all located in King County within the Puget Sound Lowlands region (Figure 3.2-1). The climate in the region is mild oceanic that is the product of the interaction between the distance from Puget Sound, the complex terrain, and airflow patterns. Airflow in the region comes from over the ocean from the northwest through the Strait of Juan de Fuca or the southwest through the Chehalis River valley. Occasionally, cold air moves into the area from the interior of Canada's Fraser River canyon.

The prevailing wind direction is south or southwest during the wet season and northwest in summer. The average wind velocity is less than 10 miles per hour. There is sufficient wind most of the year to disperse air pollutants released into the atmosphere. Air pollution is usually most noticeable in the late fall and winter

season, under conditions of clear skies, light winds, and a sharp temperature inversion, which can occur in the north-south trending river valleys and lake basins of western Washington, including the Sammamish River valley. These conditions generally only prevail for a few days before a weather system moves through, removing the pollution by wind and rain (WRCC 2023).

With an increase in distance from the Puget Sound, winter temperatures decrease, and summer temperatures increase. The No Action Alternative and Alternative 1 are located in Kirkland, Washington, approximately 12 miles directly east of Puget Sound. Alternative 2 is located in Woodinville, Washington, which is in the northern end of the Sammamish River valley on the north border of Kirkland and approximately 10 miles east of Puget Sound. Average temperatures and rainfall are based on data collected from the Seattle-Tacoma International Airport. Based on data from 1945 to 2022, the average temperatures generally range from 37°F to 79°F, with a record minimum temperature of 0°F recorded on January 31, 1950, and a maximum temperature of 108°F on June 28, 2021 (NOAA 2023). Based on data from 1991 to 2020, total precipitation varies from 0.6 inch in July to 6.31 inches in November. The average annual precipitation is 39.34 inches (NOAA 2023.).



Legend
- Road
- Streams
- Alternative Locations
- Waterbody
- City Limit

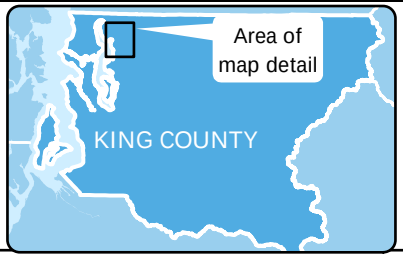


Figure 3.2-1. Vicinity Map of the Alternatives.

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SCALE: 1" = 4,000'-0"
0 2,000 4,000
Feet

King County

3.2.2.3 Attainment, Nonattainment, and Maintenance Areas

EPA designates areas as being in attainment, nonattainment, or unclassifiable for regulated air pollutants discussed in Section 3.2.1.1.1.1, as follows:

- Attainment status indicates that air quality in an area meets the federal, health-based ambient air quality standards.
- Nonattainment status indicates that air quality in an area has violated those standards. When nonattainment areas come back into compliance with federal standards, they are classified as maintenance areas.
- Areas in which EPA is not able to determine an attainment status are designated unclassifiable.

EPA, Ecology, and PSCAA maintain a network of air quality monitoring stations throughout Washington, to measure existing air quality and determine whether areas are designated as "attainment" or "nonattainment" for each NAAQS. The nearest monitoring station to the project area is a monitoring station for $PM_{2.5}$, which is located on the northern boundary of Bridle Trails State Park.

All areas of Washington, except a small area in Whatcom County, meet air quality standards and are considered to be in attainment. This designation means that the area is currently meeting air quality standards, and EPA and Ecology expect the area to continue to do so. In the summers of 2017, 2018, and 2020, wildfire smoke caused unprecedented levels of fine particle pollution, and it is anticipated that the area will continue to see air quality impacts from wildfire smoke in the future (PSCAA 2021).

3.2.2.4 Sensitive Receptors

Air quality does not affect each person in the same way, and some groups are more sensitive to adverse health effects than others. Sensitive receptors are people who may have a significantly increased sensitivity or exposure to contaminants by virtue of their age and health. People using parks and playgrounds can be more exposed to air pollutants when there is poor air quality because people engaged in strenuous work or exercise have increased breathing rates. Children are considered sensitive receptors because they are more susceptible to respiratory distress and other health problems from air pollution. However, exposure times are generally far shorter for parks and playground users than for people in residential, hospital, or school locations. People tend to be more exposed to air quality in residential locations than in commercial and industrial areas because people generally spend longer periods of time there. Some outdoor air pollutants (such as ground-level ozone, particulate matter from dust and vehicle emissions, and MSATs from vehicle emissions) can also affect outdoor workers, including agricultural and migrant workers, as they may be more exposed to these pollutants, which can lead to increased incidence and severity of health problems such as respiratory illnesses, including asthma, and cardiovascular disease.

In addition, an individual's response to odors is subjective, with some people being more sensitive to certain odors than others. The body's response to odors takes a direct route to the limbic system, which is the region of the brain related to emotion and memory, so a person's response can be based on past experiences.

3.2.2.5 No Action Alternative and Alternative 1

Under the No Action Alternative, KCSWD would not site a new station in northeastern King County. KCSWD would continue to operate the existing Houghton RTS. If a new transfer station were not built, the existing transfer station would continue to offer limited recycling services for as long as it operates, and services would not be modernized or expanded to accommodate a growing population and industry changes. The facility would not be enclosed to control noise and odors. Waste would continue to not be compacted, which would affect the number of transit trucks and trailers that use the existing Houghton RTS, and there would not be space for waste storage in the event of a major regional disaster.

Odor from the existing Houghton RTS is sometimes experienced by neighbors. The existing facility is not enclosed, so noise and odors are not controlled. In 2022, the existing Houghton RTS received two odor complaints on SWD's customer service line, and neighbors have commented that additional odor experiences went unreported. In addition, the existing Houghton RTS was built to codes before King County established sustainability goals for building development. The existing station does not include green building and sustainable design features that are part of the two action alternatives.

Alternative 1A and 1B would construct the new NERTS facility at the existing Houghton RTS property at 11724 NE 60th Street in Kirkland. Alternative 1A would construct the new NERTS facility after the existing transfer station building is closed and deconstructed or demolished. Under Alternative 1B, the new NERTS facility will be constructed while the existing transfer station building is open and operating, and then after the new station is open, the existing station would be closed and repurposed or replaced. See Chapter 2, Alternatives, for additional detail.

The existing Houghton RTS property is near potential sensitive receptors. To the north and northeast are Taylor Fields and the existing ballfields and to the south is Bridle Trails State Park. Single-family homes are to the west and the east, a daycare approximately 120 feet to the east of the site, and Benjamin Franklin Elementary School approximately 0.28 miles to the east of the site. Existing conditions of the No Action Alternative and Alternative 1 site are shown in Figure 3.2-2, Figure 3.2-3, and Figure 3.2-4. The existing site is designated as "attainment" meaning that the area is currently meeting air quality standards, and EPA and Ecology expect the area to continue to do so. The No Action and Alternative 1 site is anticipated to be designated as "attainment."

3.2.2.6 Alternative 2

Alternative 2 would construct the new NERTS facility on six tax parcels in the 15000 block of Woodinville-Redmond Road NE in Woodinville. See Chapter 2, Alternatives, for additional detail. The Alternative 2 site is currently used for commercial uses, including construction, portable toilet rental, manufacturing, and automotive businesses, which would be relocated. A portion of the site is vacant and undeveloped.

Existing conditions of the Alternative 2 site are shown in Figure 3.2-2, Figure 3.2-3, and Figure 3.2-4. The existing site is designated as "attainment" meaning that the area is currently meeting air quality standards, and EPA and Ecology expect the area to continue to do so. No sources of odor are known to exist on the site. The site is near sensitive receptors, including the Chrysalis School across Woodinville-Redmond Road

NE and east about 300 feet, but fewer than Alternative 1 as it is bordered to the north, south, and east by commercial and light industrial uses. To the west is a sloped greenspace, a rail line, and residential properties. It is anticipated that the Alternative 2 site and study area will continue to be designated as "attainment." The Alternative 2 site is 12.9 acres, with a potential site development area of at least seven acres with additional area potentially available dependent on compliance with federal, state, and local environmental regulations.

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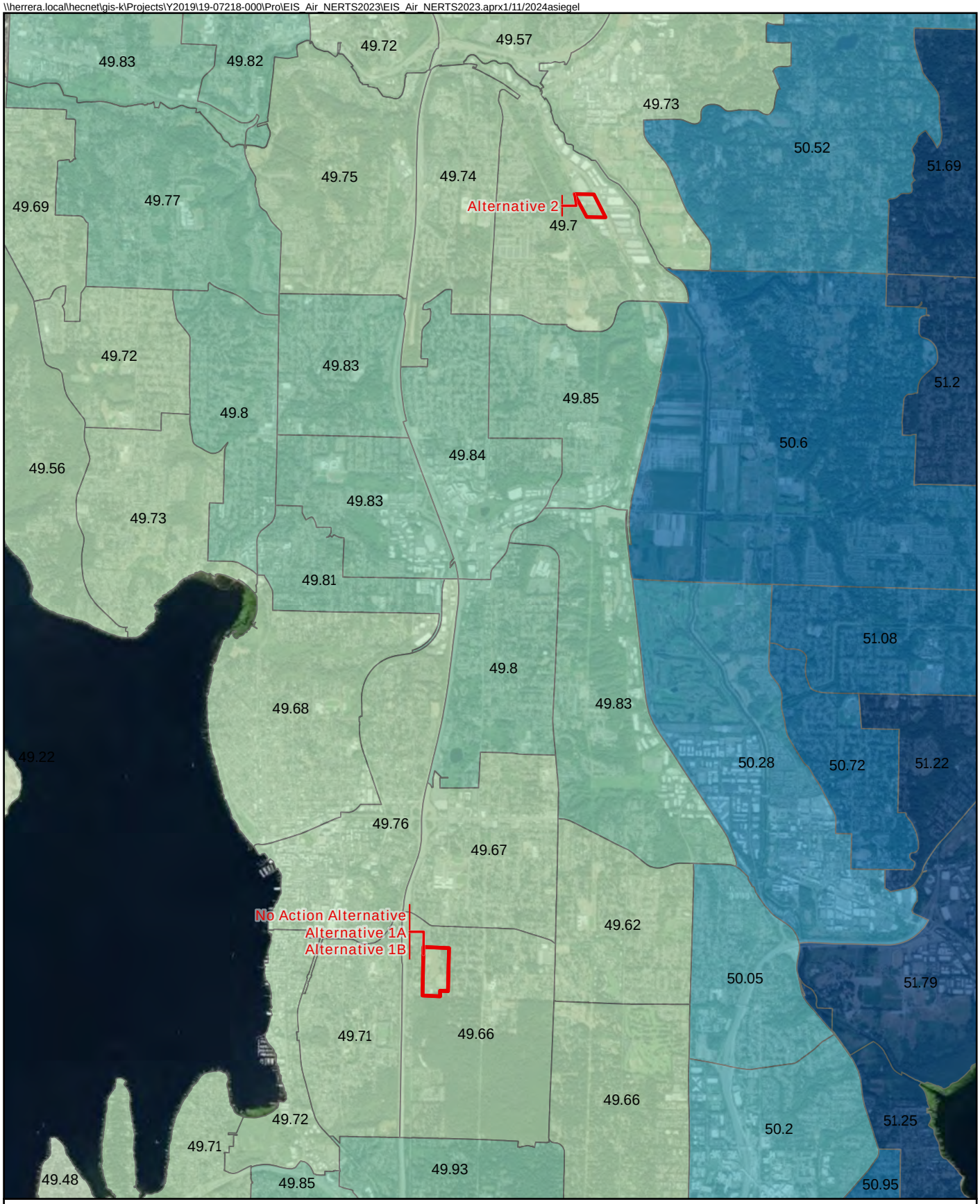

Legend

Three-year mean concentration of daily maximum 8 hour rolling averaged ozone

- 50 - 49
- 50 - 50
- 51 - 50
- 51 - 50
- 51 - 51
- 52 - 51
- 52 - 52

Alternative Locations

Figure 3.2-2. Ozone Air Pollution in the Vicinity of the Alternatives.

N

PLAN

SCALE: 1" = 5,000'-0"

0 2,500 5,000 Feet

King County

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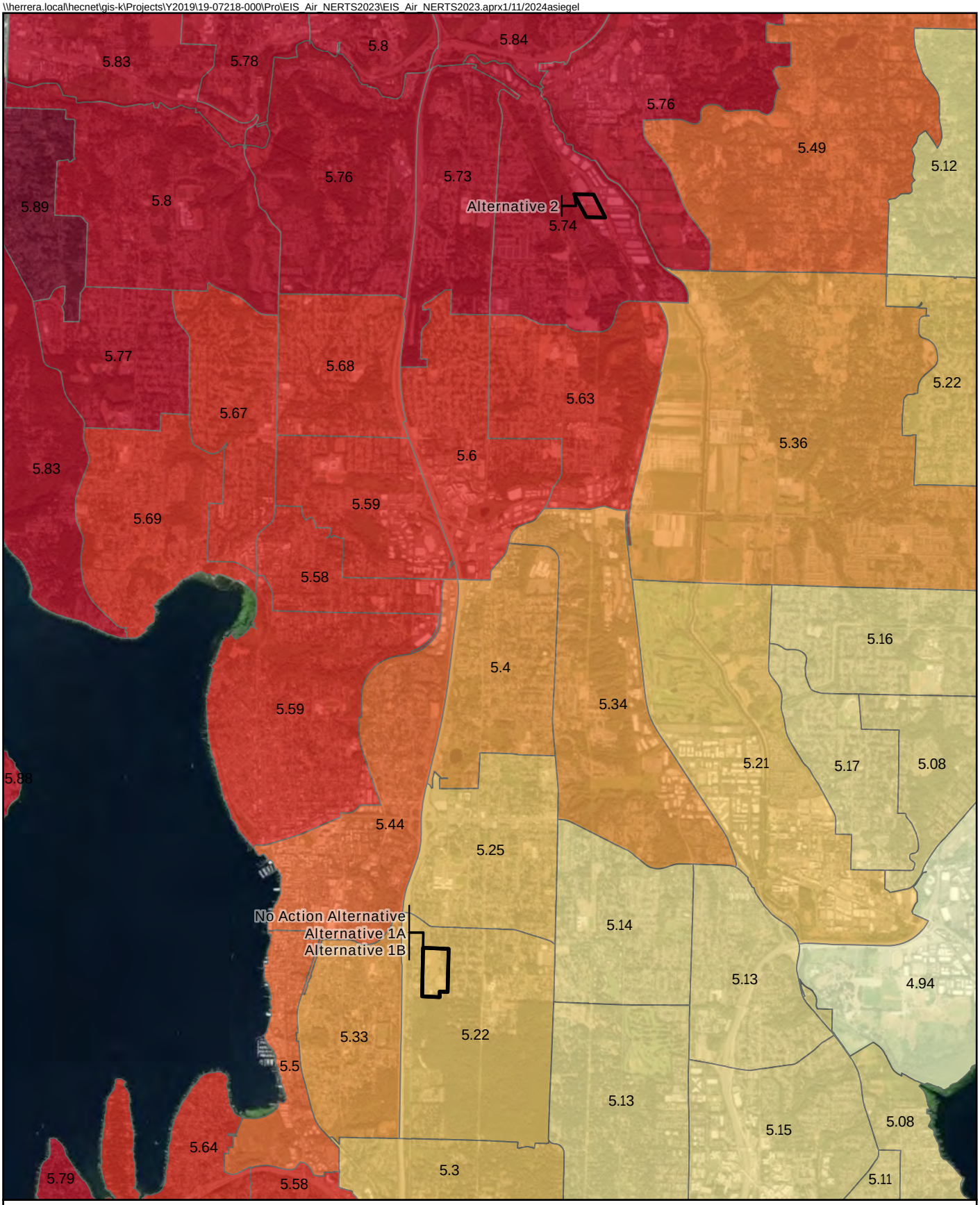

Legend

Three-year mean concentration of annual particulate matter 2.5

- 4.9 - 5.0
- 5.1 - 5.2
- 5.3 - 5.3
- 5.4 - 5.4
- 5.5 - 5.5
- 5.6 - 5.7
- 5.8 - 5.9
- 6.0 - 6.0

Alternative Locations

Figure 3.2-3. PM2.5 Air Pollution in the Vicinity of the Alternatives.

N

PLAN

SCALE: 1" = 5,000'-0"

0 2,500 5,000

Feet

King County

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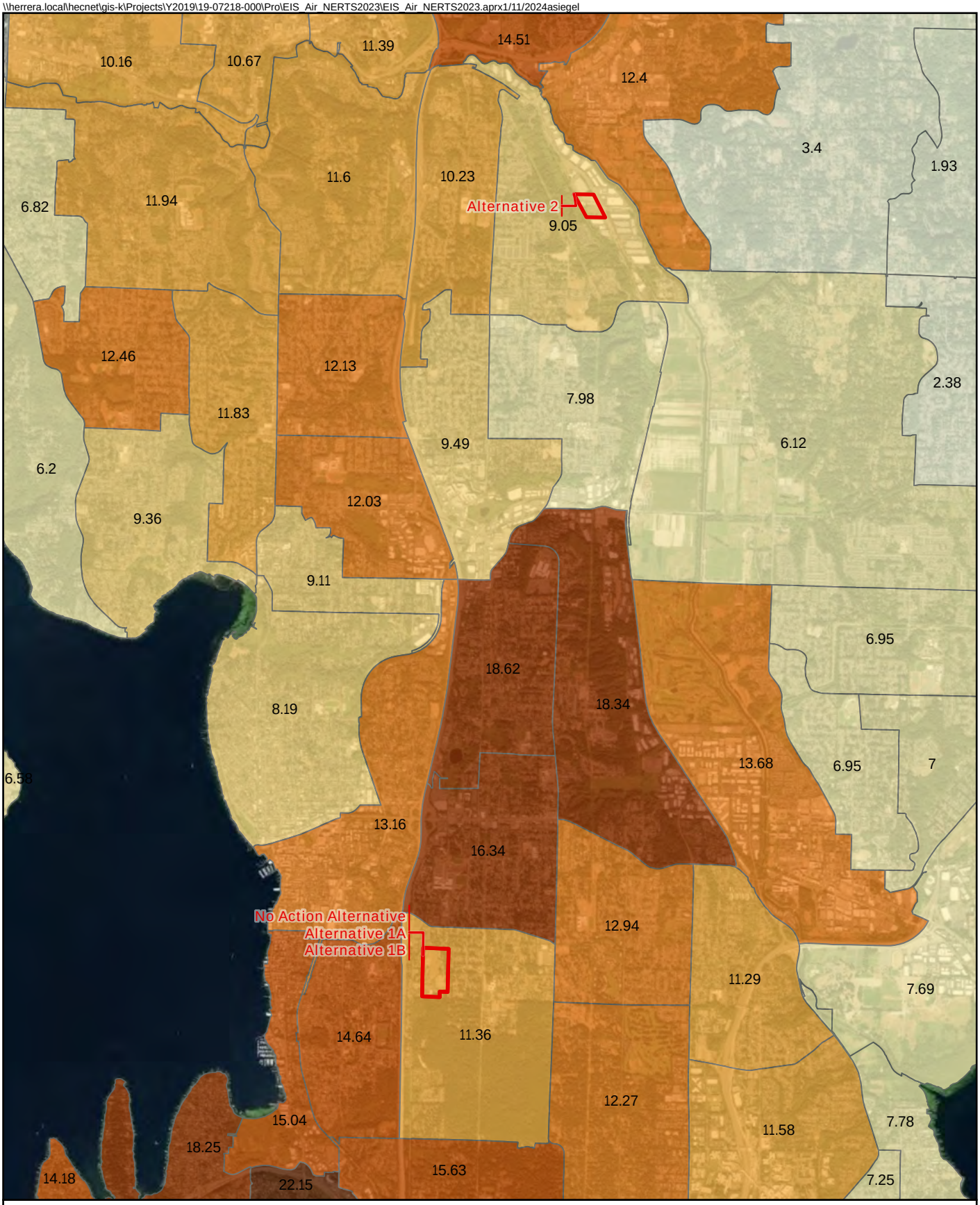

Legend

Diesel emission in annual tons/km2

- 1.9 - 5.0
- 5.1 - 8.0
- 8.1 - 10
- 11 - 12
- 13 - 14
- 15 - 16
- 17 - 20
- 21 - 26

Alternative Locations

Figure 3.2-4. Diesel Air Pollution in the Vicinity of the Alternatives.

PLAN

SCALE: 1" = 5,000'-0"

0 2,500 5,000 Feet

King County

3.2.3 Environmental Impacts

This section describes and compares the air quality and odor impacts from the No Action and action alternatives and identifies mitigation measures that could avoid, minimize, or reduce the impacts below the level of significance.

3.2.3.1 No Action Alternative

This section describes the potential air quality and odor impacts from the No Action Alternative located at the existing Houghton RTS property at 11724 NE 60th Street. Under the No Action Alternative, the existing Houghton RTS would continue to operate and no new NERTS facility would be developed.

3.2.3.1.1 Impacts from Construction

Under the No Action Alternative, a new transfer station would not be built. Direct construction related air quality and odor impacts would not occur.

3.2.3.1.2 Impacts from Operation

The No Action Alternative would continue the current and future emissions from the existing Houghton RTS facility at the Alternative 1 site, and no changes would be made to the Alternative 2 site and would continue to emit air emissions typical of the existing businesses on the site. Existing air emissions for each of the alternative sites would continue as-is under existing conditions.

Because the current facility is not enclosed, existing impacts related to fugitive dust emissions and odors would continue. The revised NERTS Air Quality Assessment in Appendix A presents a comparative analysis of air emissions for the alternatives, including details on methodology, assumptions, results, and calculations. Vehicle trips and vehicle miles traveled (VMT) associated with the project were estimated based on potential routes that the vehicles would take from the center of each relevant zip code to the proposed project sites. Vehicle operation emissions were estimated for Criteria Air Pollutants (CAPs), greenhouse gases (GHGs), and Mobile Source Air Toxics (MSATs) using MOVES4 based on project-provided data of daily VMT, and average vehicle speeds in the project areas.

Under the No Action Alternative, waste would not be compacted, and the lack of compaction would keep the number of transfer trucks and trailers needed to transport the waste to CHRLF or other disposal facility as currently projected, compared with the action alternatives. Waste hauling to CHRLF would occur on weekdays only. All other vehicle traffic would also remain as currently projected corresponding with anticipated growth in the population and waste stream. Current estimates for daily project trip totals for existing conditions and the No Action Alternative in 2029/2040 are presented in Section 3.13. The higher number of trips in 2029/2040 would result in higher emissions of some CAPs, GHGs, and one MSAT from mobile sources by 2029, but all categories except GHGs show fewer emissions in 2040 than under existing conditions, as shown in Table 3.2-2. These reductions are due largely to the emissions control programs and fuel economy standards discussed in Section 3.2.1.

Table 3.2-2. Operation Emissions Summary – Existing Conditions and No Action Alternative.					
			2023	2029	2040
			Existing Condition	No Action	No Action
CAPs					
	VOC	ton/year	0.82	0.81	0.20
	NOx	ton/year	9.71	8.51	3.18
	CO	ton/year	8.97	10.66	4.90
	SOx	ton/year	0.008	0.011	0.008
	PM10	ton/year	0.74	0.78	0.42
	PM2.5	ton/year	0.44	0.35	0.07
GHGs					
	Transportation CO2e	$MTCO_2e$/year	1,921	2,706	2,123
	Energy CO2e	$MTCO_2e$/year	22	22	22
MSATs					
	Naphthalene	ton/year	0.005214	0.004697	0.000081
	1,3-Butadiene	ton/year	0.001962	0.001566	0.000000
	Acetaldehyde	ton/year	0.022598	0.021541	0.003749
	Acrolein	ton/year	0.003819	0.003529	0.000257
	Benzene	ton/year	0.009241	0.008088	0.001598
	Ethyl Benzene	ton/year	0.005525	0.006177	0.002816
	Formaldehyde	ton/year	0.047058	0.043740	0.003082
	DPM	ton/year	0.428222	0.307550	0.019724
	PAH	ton/year	0.002622	0.002167	0.000032
	Total	ton/year	0.526261	0.399053	0.031340

Notes: CAPs = Criteria Air Pollutants; GHG = greenhouse gas; MSAT = mobile source air toxics; $MTCO_2e$ = Metric tons of carbon dioxide equivalents; DPM – diesel particulate matter; PAH = polycyclic aromatic hydrocarbons

With the five-day waste hauling operation (see Section 2.2.3.5), some full transfer trailers (fully enclosed) would be stored on site under all alternatives, including the No Action Alternative. KCSWD anticipates that zero to approximately fourteen trailers could be stored on site under the No Action Alternative. The five-day hauling operation will increase KCSWD's hauling capacity during the weekdays enabling the stations to generally be cleared out prior to the weekends. Fully enclosed trailers would be stored as they accumulate over the weekend and would be cleared out on a "first in, first out" basis by early- to mid-following week. Waste received on weekends is primarily received from self-haul customers and is mostly "dry," containing fewer organic materials. This reduces the risks of odors. KCSWD has committed to an odor monitoring and response plan while the operation is in its pilot phase. Long term odor monitoring and response could also be considered under the No Action Alternative.

3.2.3.2 Impacts Common to All Action Alternatives

For all action alternatives, the construction period is expected to last approximately 30 months, with the new facility anticipated to open for business in 2029. The new transfer facility will be designed for an approximate 50-year lifespan. The approximate footprint of the building area would be between 80,000 and 125,000 square feet. Buildings, parking areas, and roadways at the new transfer station would result in approximately seven to nine acres of impervious surfaces. This would provide space for solid waste, recycling administration, and disaster event storage. Buffers between the active area of the station and neighboring uses would be appropriately sized and designed to reduce or eliminate impacts. The number of employees based at the station on any given day would range from six to 15, with transfer truck drivers, maintenance, and other staff on site as needed.

The air quality impacts from the construction and operation under the proposed actions would not have significant impacts on air quality. Potential air quality impacts would further be limited because construction and operation of the facility would employ best management practices (BMPs) to control air emissions. Potential impacts on air quality during construction and operation are discussed in the remainder of this section.

3.2.3.2.1 Impacts from Construction

3.2.3.2.1.1. Direct Impacts

Criteria pollutants, air toxics, GHG, and fugitive dust emissions would be expected from the construction and deconstruction or demolition activities associated with the proposed action. Project construction would have the potential to emit criteria pollutants, air toxics, GHGs, engine exhaust from vehicle trips traveled by construction workers and haul trucks, non-road construction equipment, fugitive dust from earth-moving activities and re-entrained dust from vehicle travel on paved and unpaved roads, and off-gas emissions from paving of the roadways. These local impacts should be short-term.

Criteria and Toxic Air Pollutants

Exhaust emissions during construction would be generated by the combustion of fuel used in construction equipment and from motor vehicles used to transport people and goods to and from the action alternative site during construction. Construction vehicle activity would result in increased motor vehicle emissions within certain areas around the site or along roadways providing access to the sites. Potential air quality impacts would be short- term (less than 30 months), occurring only while construction work is in progress. EPA research indicates that air quality is generally influenced within about 500-600 feet downwind from the vicinity of heavily traveled roadways (such as highways) or along corridors with significant trucking traffic, and that concentrations generally decrease to background levels within that distance. This distance can vary by location and time of day or year, prevailing meteorology, topography, nearby land use, traffic patterns, as well as the individual pollutant (EPA 2014).

Construction equipment and vehicles used for the project would comply with EPA's emissions standards for on-road vehicles and non-road construction equipment. With the BMPs in place and compliance with the

PSCAA requirements listed in Section 3.2.1.3.1, the NAAQS are not expected to be exceeded. Vehicle emissions from construction activities may affect local air toxics concentrations but would not be large enough to affect regional air quality or the health of nearby residents and workers, including agricultural workers. An estimate of construction related CAP emissions is included with the discussions of impacts unique to each alternative.

GHG Emissions

Project construction would have the potential to emit GHGs from the combustion of fossil fuels in construction equipment and vehicles. The disruption and removal of trees, vegetation, and soil during construction would generate emissions through the loss of carbon storage. Vegetation can act as a carbon sink by absorbing CO_2 from the atmosphere, releasing oxygen through photosynthesis, and retaining the carbon within the vegetation. Indirect emissions would result from building materials, which include the embodied emissions generated from the extraction, manufacture, and transportation of the materials used in construction.

Construction vehicle activity may also result in GHG emissions associated with rerouted traffic in the site study area. However, these disruptions would be short-term in nature and would be unlikely to contribute to significant impacts related to GHG emissions. SWD's construction management plan would seek to minimize disruption to area traffic by scheduling some activities for non-peak hours.

As discussed in Section 3.2.1.1.1.2, Ecology has developed rules for the mandatory reporting of GHG emissions by sources that emit more than 10,000 metric tons of CO_2e per calendar year. *Guidance for Ecology Including Greenhouse Gas Emissions in SEPA Reviews* indicates that for projects emitting at least 10,000 metric tons of CO_2e per year, but less than 25,000 metric tons per year, a qualitative disclosure of GHG emissions is required under SEPA (Ecology 2011). For projects emitting more than 25,000 metric tons per year, a quantitative disclosure of GHGs is required.

The County has developed a GHG Emissions Worksheet that can assist in estimating GHG emissions: *SEPA Greenhouse Gas (GHG) Emissions Worksheet* (King County 2019). The SEPA GHG Emissions worksheet estimates all GHG emissions that will be created over the lifespan of a project. For the analysis on construction emissions, the SEPA GHG Emissions worksheet is used to estimate emissions associated with extracting raw materials and manufacturing construction materials for the facility, and for paving (embodied emissions). The MOVES4 modeling is used to estimate all vehicle related emissions, including movement of all construction vehicles and equipment. An estimate and comparison of construction related GHG emissions is included with the discussions of impacts unique to each alternative.

Fugitive Dust Emissions

The construction would result in fugitive emissions of particulates from soil disturbances caused by the operation of motor vehicles and construction equipment on unpaved areas of the site. Construction includes excavation and grading of the site and the movement of haul vehicles and container-handling equipment and other vehicles. The deconstruction or demolition activities would result in fugitive emissions of particulates from destruction of buildings and the operation of motor vehicles and deconstruction or demolition equipment on unpaved areas of the site. The emissions that these activities would generate

would be minimized using BMPs and would be in compliance with PSCAA's nuisance regulations discussed in Section 3.2.1.3.1. An estimate based on MOVES4 modeling and comparison of construction related fugitive dust emissions is included with the discussions of impacts unique to each alternative.

3.2.3.2.1.2. Indirect Impacts

GHG emissions from the use of electricity and from embodied emissions associated with the materials used to construct the new transfer station are considered to be indirect GHG emissions.

3.2.3.2.2 Impacts from Operation

3.2.3.2.2.1. Direct Impacts

Criteria and Toxic Air Pollutants

Emissions would be generated by the combustion of fuel used in vehicles to transport waste to and from the site. Compactors installed under all action alternatives have the potential to reduce by nearly a third the total number of transfer hauling trips to and from the station under the action alternatives (King County 2019). Emissions would also be generated by personal vehicles used to transport employees to and from the site. However, emissions would be reduced from those of the No Action Alternative because of the effect of compactors on reducing hauling trips, and improvements to the on-site traffic flows associated with additional inbound and outbound scales that would minimize vehicle queuing. Also, as discussed in Section 3.2.1, because nationwide CAPs and MSATs are expected to be lower in the future, long-term operation of the action alternatives would result in a reduction of these emissions compared to the No Action Alternative. EPA research indicates that air quality is generally influenced within about 500-600 feet downwind from the vicinity of heavily traveled roadways or along corridors with significant trucking traffic, and that concentrations generally decrease to background levels within that distance. This distance can vary by location and time of day or year, prevailing meteorology, topography, nearby land use, traffic patterns, as well as the individual pollutant. (EPA 2014) Vehicle emissions from operational activities may affect local air toxics concentrations but would not be large enough or widely dispersed enough to affect regional air quality or the health of nearby residents and workers.

The facility will be equipped with an emergency/backup generator for backup power. If an emergency/backup generator is selected in the future, the facility is expected to demonstrate compliance with local and federal air regulations by reviewing and abiding by all applicable federal regulations. There are no limits to use of a generator during emergency situations. For non-emergency use, engines may only operate up to 100 hours/year, and 50 of these 100 hours must be used for readiness testing and maintenance checks. The remaining 50 hours can be used for these or other non-emergency purposes, with some restrictions (40 CFR § 60.4211(f)). The operator must keep records of the operation of the engine in emergency and non-emergency service that are recorded through the non-resettable hour meter. Engines must be maintained in accordance with manufacturer instructions, and new emergency engines must be fitted with a permanent label stating they are for emergency use only.

An estimate and comparison of operations related CAP and MSAT emissions is included with the discussions of impacts unique to each alternative.

GHG Emissions

Emissions would be generated by the combustion of fuel in vehicles used to transport people and goods to and from the site after the project is completed, transfer trucks and trailers used to transport waste to and empty trailers from CHRLF, and from energy used for building operation.

For the operations analysis, the SEPA GHG Emissions worksheet is used to estimate emissions associated with energy consumed during a building's operation (energy emissions). The MOVES4 modeling is used to estimate all vehicle related emissions, including transfer of waste, self-haul of waste, commercial waste haulers, MRW self-haul, MRW transfer, and employee commutes.

The station will offer sufficient queuing space for customers and storage space for waste, including dedicated areas for recycling services. All action alternatives would include the addition of compactors to reduce the volume of garbage before it is hauled to the landfill or other disposal facility. Compactors have the potential to reduce the total number of transfer hauling trips to and from the new station by nearly a third, thus reducing the cost of operations, and traffic and air emission impacts compared with the No Action Alternative (King County 2019).

The proposed facilities will offer full recycling services compared with the existing facility, supporting King County's Re+ program. The program reinvents the region's waste system to cut GHG emissions by recycling and reusing materials that are currently being sent to the landfill. Re+ contributes to the County's Strategic Climate Action Plan goal of cutting countywide GHG emissions in half by the end of the decade while transitioning the region to a sustainable, circular economy.

If used, there will be additional emissions of GHG from the emergency/backup generator. The additional impact should be minimal, since the engines are limited to less than 100 hours per year of operation, unless there is an emergency.

An estimate and comparison of operations related GHG emissions is included with the discussions of impacts unique to each alternative.

Fugitive Dust Emissions

Fugitive emissions should be minor during operation and significantly less than emissions under the No Action Alternative. Enclosing the transfer station and use of a misting system or equivalent technology will reduce the amount of windblown garbage and dust from the facility.

Odors

Odors from storage and transportation of waste can vary depending on the type of waste and the method of transport. Typical odor causing compounds from waste transportation include volatile organic acids and methyl mercaptan. These are often associated with decomposing putrescible wastes. Although odors are sometimes present in areas surrounding the existing Houghton RTS, odors will be minimized under the action alternatives compared with the No Action Alternative because the new NERTS facility and transfer

trailers will be enclosed, and a misting system, or equivalent technology, and mechanical exhaust ventilation system with filtration media will be incorporated into the transfer station building design. Some full transfer trailers (fully enclosed) would be stored on site under all action alternatives. KCSWD anticipates that zero to approximately seven trailers could be stored on site under the action alternatives, and zero to approximately fourteen trailers under the No Action Alternative. The five-day hauling operation will increase KCSWD's hauling capacity during the weekdays enabling the stations to generally be cleared out prior to the weekends. Fully enclosed trailers would be stored as they accumulate over the weekend and would be cleared out on a "first in, first out" basis by early- to mid-following week. Waste received on weekends is primarily received from self-haul customers and is mostly "dry," containing fewer organic materials. This reduces the risks of odors. Additional mitigation through an odor monitoring and response plan could also be considered.

BMPs that are currently being used at the existing transfer station will continue to be followed. The BMPs include limiting the time the waste sits on site by following the rule of first in, first out, so that fully loaded transfer trailers are removed from the station in the order that they are filled, and cleaning the station on a regular basis. In addition, the tipping floor would be cleared at the end of each day and waste stored in the sealed compactor, and the tipping floor cleaned regularly.

3.2.3.2.2.2. Indirect Impacts

GHG emissions would be indirectly generated from the use of electricity, gas, or other power sources during the operation of the project after it is constructed. The project would use electricity supplied by Puget Sound Energy (PSE). PSE is committed to working toward the following goals:

- Reducing emissions from PSE electric and gas operations and electric supply to net zero by 2030. By 2045, PSE will have a 100 percent carbon-free electric supply.
- To reach net zero carbon emissions for natural gas used in customer homes and businesses by 2045, with an interim target of a 30 percent emissions reduction by 2030. (PSE 2023)

The impacts from facility energy use under Alternatives 1 and 2 should not be significantly different from each other but would be greater than the facility energy use under the No Action Alternative. The new facilities will be larger, have additional HVAC systems, and have the addition of a compactor powered by electricity; however, the new facilities will also be designed to be more energy efficient. Because the project would be completed in 2029, operation would use 100 percent carbon-neutral energy. Therefore, there would be no indirect GHG emissions associated with the electricity use.

Also under each action alternative, there would be indirect, beneficial impacts with regard to GHG emissions. Under the action alternatives, the new NERTS facility would provide areas for source-separated yard waste collection to be recycled and composted. Yard waste is made up of grass clippings, leaves, stalks, twigs, branches, and general yard debris. When yard waste is sent to landfills, harmful methane gas is developed due to anaerobic decomposition. Whereas when yard waste is composted, it decomposes aerobically, with oxygen, which produces mainly CO2, itself a greenhouse gas but one with a fraction of the global warming potential of methane.

3.2.3.2.3 Cumulative Impacts

Construction and operation of the action alternatives, in combination with past, present, and reasonably foreseeable future projects could contribute to cumulative air quality impacts in the study areas, and globally for GHG emissions. This includes emissions from all of the action alternatives, in combination with potential emissions from construction and operation of other projects in Kirkland, such as a regional transit center and apartment buildings; or in Woodinville such as Gardens District, Woodin Creek Village, Woodinville Wine Village, and other apartments and hotels, in the same time period.

However, because operation of any of the action alternatives would reduce impacts related to criteria and toxic air pollutants, fugitive dust, and odor throughout the study area compared with the No Action Alternative, a reduction in cumulative impacts from these emissions would result. The contribution to local cumulative impacts differs by alternative, but the air quality impacts from the construction and operation of the proposed actions would not have significant cumulative impacts on air quality with implementation of structural and operational BMPs, and through compliance with federal, state, regional, and local air quality regulations.

The cumulative GHG emissions driving climate change from other past and existing regional and global projects is already significant. In addition, the PSRC Vision 2050 report anticipates an increase in population in the Puget Sound Region of 1.8 million people and 830,000 households, and an increase in employment of 1.2 million jobs (PSRC 2020). This growth will induce additional GHG emissions from the resulting land use changes, deforestation, fossil fuels combustion, industrial processes, and agricultural activities anticipated to occur in response, in addition to those associated with waste handling modeled in this EIS. Existing development and this anticipated growth in the Puget Sound region could all generate GHGs that would lead to an increase in overall emissions and could contribute to a cumulative impact on climate change.

Ongoing GHG emissions are likely with all of the alternatives over the course of the project lifecycle. Together with other past, present, and reasonably foreseeable future global sources and anticipated growth in the Puget Sound region, all alternatives will continue to produce GHG emissions and contribute to an incremental cumulative effect on global climate change.

As noted above, Washington State and King County have established aggressive GHG emission-reduction goals, which may cause GHG emissions to decrease even as growth occurs. Mitigation to help meet GHG reduction goals set by the *King County Strategic Climate Action Plan* (SCAP) and to reduce the cumulative impact on global climate change are identified in Section 3.2.4.

3.2.3.3 Alternative 1A

Alternative 1A is a 10-acre site and would provide full recycling services. The existing transfer station building would be removed and replaced with a new commercial and self-haul disposal building, a public recycling building, and a new scale house. The site would also include a new facility to house future private recycling or reuse operations or service providers (TBD building). The services and providers have not been determined at this time. The alternative does not provide for an MRW collection facility.

3.2.3.3.1 Impacts from Construction

3.2.3.3.1.1. Direct Impacts

Criteria and Toxic Air Pollutants

The impacts on criteria and toxic air pollutants under Alternative 1A would be similar to those stated in Section 3.2.3.2. For Alternative 1A, Table 3.2-3 below shows estimated CAP emissions during the 30-month construction period.

Table 3.2-3. Construction Emissions of Criteria Air Pollutants Under Alternative 1A

CAP	Unit	Non-Road Construction Equipment	On-Road Vehicles	Asphalt Off Gas	Total
VOC	tons	0.44	0.34	0.00	0.78
NOx	tons	20.84	7.33	NA	28.17
CO	tons	1.24	7.34	NA	8.58
SOx	tons	0.03	0.01	NA	0.03
PM10	tons	0.32	0.49	NA	0.81
PM2.5	tons	0.31	0.26	NA	0.57

Notes: Construction emissions represent total emissions over 30-month construction period
NA=Not Applicable
CAP=Criteria Air Pollutants

For Alternative 1A, construction emissions are the highest in the first year and the lowest in third year with most emissions coming from non-road vehicles and equipment on the Alternative 1 site. Additional detail on the breakdown of emissions by individual vehicle type and construction phase is provided in Appendix A.

Also, for Alternative 1A, the development footprint over the known extent of waste in the closed Houghton landfill is smaller than under Alternative 1B. Alternative 1A would require less excavation and transportation of soil and waste to CHRLF or other off-site locations than under Alternative 1B, and fewer vehicle emissions.

Construction truck traffic is not expected to impact traffic operations in the study area (See Section 3.13.3.3.1). Any minimal effect on existing traffic flow and vehicle emissions would be along anticipated construction access routes: northbound and southbound I-405 at the NE 70th Street interchange via NE 60th Street and 116th Avenue NE. Construction emissions would be short term, and equipment and vehicles used for the project would comply with EPA's emissions standards for on-road vehicles and non-road construction equipment. Vehicle emissions from construction activities may affect local air toxics concentrations but would not be large enough to affect regional air quality or the health of nearby residents and workers.

GHG Emissions

GHG emissions would follow similar patterns as the vehicle emissions noted above, with lower emissions due to the smaller development footprint over the known extent of waste in the closed Houghton landfill under Alternative 1A compared to Alternative 1B.

MOVES4 modeling and the County's GHG Emission Worksheet estimates GHG emissions from construction for vehicle emissions, paving emissions, and embodied emissions. The King County worksheet uses a default project lifespan of 62.5 years, while the lifespan for the proposed facility is assumed to be 50 years. The calculation was run using the default worksheet emission factors and the project lifespan of 50 years (Jacobs 2023a). Table 3.2-4 shows GHG emissions results from construction for Alternative 1A in these categories.

Table 3.2-4. Construction Emissions of GHGs Under Alternative 1A

	Unit	Non-Road Construction Equipment	On-Road Vehicles	Embodied Emissions	Total
NERTS Facility*	MTCO2e	NA	NA	4,875	4,875
Pavement	MTCO2e	NA	NA	18,500	18,500
Transportation	MTCO2e	8,771	2,178	NA	10,950
Total		8,771	2,178	23,375	34,325

Notes: Construction emissions represent total emissions over 30-month construction period

Embodied Emissions are 50-year lifespan emissions that are created through the extraction, processing, construction and disposal of building materials and pavement. Because the MOVES4 modeling and the County's GHG Emission Worksheet use overlapping methods, some pavement construction emissions are double-counted, resulting in conservative estimates.

* In the King County worksheet, a transfer station was not one of the building options in the worksheet, so Warehouse or Storage was selected for the calculations.

MTCO2e = metric tons of carbon dioxide equivalent

NA=Not Applicable.

With the construction period of approximately 30 months and 50-year lifespan of the proposed facility, the NERTS facility and pavement emissions count embodied emissions during construction but account for emissions over the lifespan of the project. Transportation emissions are total emissions over the 30 months of construction. Per year emissions equate to approximately 4,900 MTCO2e during construction, less than Ecology's threshold of 10,000 metric tons of CO2e per calendar year and generally considered less than significant. Additional detail on the breakdown of GHG emissions by individual vehicle type and construction phase is provided in Appendix A.

GHG emissions would follow similar patterns of vehicle emissions noted above, with lower emissions due to the smaller development footprint over the known extent of waste in the closed Houghton landfill under Alternative 1A than under Alternative 1B. However, they would not effectively alter the GHG impact assessment, and GHG emission impacts would be similar to those stated in Section 3.2.3.2.

Fugitive Dust Emissions

The impacts from construction of Alternative 1A would be directly similar to the impacts listed in Section 3.2.3.2, though Alternative 1A includes deconstruction or demolition of the existing transfer station prior to construction of the new NERTS facility and the addition of the TBD building. Table 3.2-5 shows MOVES4 estimated fugitive dust emissions during construction of Alternative 1A.

Table 3.2-5. Construction Emissions of Fugitive Dust Under Alternative 1A

CAP	Unit	Fugitive Dust
PM10	tons	58.70
PM2.5	tons	7.31

Note: Construction emissions represent total emissions over 30-month construction period

Dust emissions from the construction of Alternative 1A would be lower than the dust emissions under Alternative 1B. Additional detail on the breakdown of fugitive dust emissions by construction activity and construction phase is provided in Appendix A.

In addition, the potential development footprint for Alternative 1A would likely include excavation of waste from the closed Houghton landfill, potentially generating both odors and fugitive dust from the buried material. During construction, KCSWD would tarp or otherwise cover all exposed areas of the closed landfill every day to mitigate for potential odors, until permanent cover and environmental controls are constructed. With the BMPs in place, Alternative 1A would not violate the PSCAA requirements listed in Section 3.2.1.3.1.

Odors

Under Alternative 1A, excavation activities have the potential to generate odors. Because the site is located on the closed Houghton landfill, activities that break the existing surface have the potential to release odors from the buried material. See additional discussion of impacts related to the closed landfill in Section 3.4, Hazardous Materials and Section 3.8, Environmental Health.

3.2.3.3.1.2. Indirect Impacts

Indirect impacts associated with construction of Alternative 1A are anticipated to be the same as those stated in Section 3.2.3.2.1.2.

3.2.3.3.2 Impacts from Operation

3.2.3.3.2.1. Direct Impacts

Criteria and Toxic Air Pollutants

The impacts on criteria and toxic air pollutants under Alternative 1A would be similar to those stated in Section 3.2.3.2. That section also contains an explanation of potential operational impacts of emergency/backup generators. Table 3.2-6 below shows estimated CAP and MSAT emissions under the 2029 and 2040 No Action Alternative compared with the 2029 and 2040 Alternative 1A.

Table 3.2-6. Operations Emissions of CAP and MSAT Under the 2029 and 2040 No Action, 2029 and 2040 Alternative 1A					
		2029	2029	2040	2040
		No Action	Alternative 1	No Action	Alternative 1
CAPs					
VOC	ton/year	0.81	0.77	0.20	0.19
NOx	ton/year	8.51	7.65	3.18	2.82
CO	ton/year	10.66	10.26	4.90	4.62
SOx	ton/year	0.011	0.010	0.008	0.007
PM10	ton/year	0.78	0.72	0.42	0.39
PM2.5	ton/year	0.35	0.31	0.07	0.06
MSATs					
Naphthalene	ton/year	0.004697	0.004405	0.000081	0.000077
1,3-Butadiene	ton/year	0.001566	0.001478	0.000000	0.000000
Acetaldehyde	ton/year	0.021541	0.020104	0.003749	0.003417
Acrolein	ton/year	0.003529	0.003294	0.000257	0.000228
Benzene	ton/year	0.008088	0.007841	0.001598	0.001598
Ethyl Benzene	ton/year	0.006177	0.006009	0.002816	0.002727
Formaldehyde	ton/year	0.043740	0.040972	0.003082	0.002870
DPM	ton/year	0.307550	0.277346	0.019724	0.017052
PAH	ton/year	0.002167	0.002014	0.000032	0.000031
Total	ton/year	0.399053	0.363464	0.031340	0.027999

Notes: CAPs = Criteria Air Pollutants; GHG = greenhouse gas; MSAT = mobile source air toxics; DPM – diesel particulate matter; PAH = polycyclic aromatic hydrocarbons

For all CAPs and MSATs, Action Alternative 1A produces lower emissions than the No Action Alternative in 2029 and also in 2040. Total emissions would also be reduced by the action alternatives. Because all intersections are expected to meet the roadway standards under Alternative 1 during the AM and PM peak hours in 2029 and 2040, with no increases in delay from the project (see Section 3.13), no increase in emissions due to idling are expected from operation of the NERTS facility. Additional detail on the breakdown of emissions by vehicle classification and VMT description, and VMT data is provided in Appendix A.

GHG Emissions

The impacts on GHG emissions under Alternative 1A would be similar to those stated in Section 3.2.3.2. Table 3.2-7 below shows estimated GHG emissions under the 2029 and 2040 No Action Alternative compared with the 2029 and 2040 Alternative 1A .

Table 3.2-7. Operations Emissions of GHGs Under the 2029 and 2040 No Action, 2029 and 2040 Alternative 1A					
		2029	2029	2040	2040
		No Action	Alternative 1A	No Action	Alternative 1A
GHGs					
Transportation	$MTCO_2e$/year	2,706	2,467	2,123	1,910
Energy Use	$MTCO_2e$/year	22	700	22	700
Total	$MTCO_2e$/year	2,729	3,167	2,145	2,610

Note: $MTCO_2e$ = Metric tons of carbon dioxide equivalents

While transportation GHG emissions are lower for Action Alternative 1A in 2029 and 2040 than the No Action Alternative, they are offset by energy use by the new facility and result in total operational GHG emissions higher for Alternative 1A than the No Action Alternative in both 2029 and 2040. Alternative 1A includes the use of a compactor, whereas the No Action Alternative does not. The addition of a compactor has the potential to reduce the total number of transfer hauling trips nearly a third compared with existing conditions and current projections (King County 2019). The station will offer sufficient queuing space for customers, which will also help reduce idling time and contribute to reduced motor vehicle emissions. The reduction in hauling trips and idling time would result in lower GHG impacts from transportation sources over the 50-year lifespan of the project compared with the No Action Alternative. However, the addition of facility energy use over the 50-year lifespan of the project causes total GHG emissions to be greater for Alternative 1A than the No Action Alternative by approximately 23,000 MTCO2e, as shown in Table 3.2-8, below.

Table 3.2-8. Operations Emissions of GHGs Under No Action and Alternative 1A Over the Project Lifespan			
		Lifespan	Lifespan
		No Action	Alternative 1A
GHGs			
Transportation	$MTCO_2e$	120,815	109,999
Energy Use	$MTCO_2e$	1,120	35,000
Total	$MTCO_2e$	121,935	144,999
	per year avg.	2,439	2,900

Note: $MTCO_2e$ = Metric tons of carbon dioxide equivalents

Per year emissions for both cases are well below Washington reporting requirements and are not considered significant.

Fugitive Dust Emissions

With regard to operation, as discussed in Section 3.2.3.2, fugitive emissions should be minor during operation. The main difference between Alternatives 1A and 1B is that the layout for Alternative 1A

provides a smaller buffer between the operations and the neighbors to the west. This smaller buffer could potentially result in additional dust reaching neighbors' homes under Alternative 1A. However, Alternative 1 will include construction of an enclosed facility which will mitigate dust emissions and result in less dust emissions than the No Action Alternative.

Odors

Similar to fugitive dust emissions, the layout for Alternative 1A provides a smaller buffer between the operations and the neighbors to the west compared with Alternative 1B and Alternative 2, which could potentially result in some odors reaching neighbors' homes under Alternative 1A. Both impacts are likely to be minor, as KCSWD would design an enclosed transfer building, with additional features to control odor impacts, including modern mechanical exhaust ventilation systems with filtration media, closable access doorways, misting systems (or equivalent technology), and tightly-sealing waste containers compatible with waste compactors.

As discussed in Section 3.2.3.2.2, some full transfer trailers (fully enclosed) would be stored on site under Alternative 1A. KCSWD anticipates that zero to approximately seven trailers could be stored on site under Alternative 1A. Fully enclosed trailers would be stored as they accumulate over the weekend and would be cleared out on a "first in, first out" basis by early- to mid-following week. Waste received on weekends is primarily received from self-haul customers and is mostly "dry," containing fewer organic materials. This reduces the risks of odors. Additional mitigation through an odor monitoring and response plan could also be considered to ensure impacts remain minor.

3.2.3.3.2.2. Indirect Impacts

Indirect impacts associated with operation of Alternative 1A are anticipated to be the same as those stated in Section 3.2.3.2.2.2.

3.2.3.3.3 Cumulative Impacts

Alternative 1A would result in short-term impacts on air quality during the construction phase. However, long-term impacts should be significantly lower than those under the No Action Alternative, and similar for local impacts in the Kirkland study area, therefore, cumulative impacts overall should be fewer.

GHG emissions from Action Alternative 1A would contribute incrementally to the combined past, present, and reasonably foreseeable GHG emissions. Because human created GHG emissions are identified as the most significant driver of global climate change, and because any increase in GHG emissions would contribute to climate change and be in contradiction to King County and Washington State targets for reduction in GHGs, this is considered a significant cumulative impact. Human created GHG emissions are identified as the most significant driver of global climate change. However, it is not possible to determine the cumulative impact on global climate from emissions associated with this alternative. For context, Ecology estimated that in 2019, Washington produced about 102.1 million MTCO2e (Ecology 2024). The King County SCAP estimated that geographic sources of GHG emissions in the County in 2017 totaled 20.3 million MTCO2e and that consumption-based sources of GHG emissions in the County in 2017 totaled

58.2 million MTCO2e (King County 2020). The approximately 4,900 MTCO2e per year average of construction GHGs and approximately 3,200 MTCO2e per year average of operations GHGs from Alternative 1A would represent no more than an approximately 0.02 percent of the King County 2017 geographic total and no more than approximately 0.008 percent of the 2017 consumption total.

Refer to Section 3.2.3.2.3 for additional context on cumulative impacts.

3.2.3.4 Alternative 1B

Alternative 1B is a 12.75-acre site. This alternative would provide expanded recycling services. This alternative includes a new commercial and self-haul disposal building, a public recycling building, and a new scale house, like Alternative 1A. However, the existing transfer station building could be replaced or repurposed. The future use of the replaced or repurposed transfer station building has not been determined but could house private recycling or reuse operations. This alternative does not include an MRW collection facility.

3.2.3.4.1 Impacts from Construction

3.2.3.4.1.1. Direct Impacts

Criteria and Toxic Air Pollutants

The impacts on criteria and toxic air pollutants under Alternative 1B would be similar to those stated in Section 3.2.3.2 and Section 3.2.3.3. For Alternative 1B, Table 3.2-9 below shows estimated CAP emissions during the 30-month construction period.

Table 3.2-9. Construction Emissions of Criteria Air Pollutants Under Alternative 1B

CAP	Unit	Non-Road Construction Equipment	On-Road Vehicles	Asphalt Off Gas	Total
VOC	tons	0.53	0.41	0.01	0.94
NOx	tons	25.24	8.97	NA	34.21
CO	tons	1.46	7.97	NA	9.43
SOx	tons	0.03	0.01	NA	0.04
PM10	tons	0.38	0.59	NA	0.97
PM2.5	tons	0.37	0.32	NA	0.69

Notes: Construction emissions represent total emissions over 30-month construction period

NA=Not Applicable

CAP=Criteria Air Pollutants

For Alternative 1B, construction emissions are the highest in the first year and the lowest in third year with most emissions coming from non-road vehicles and equipment on the Alternative 1B site. Additional detail on the breakdown of emissions by individual vehicle type and construction phase is provided in Appendix A.

For Alternative 1B, the development footprint over the known extent of waste in the closed Houghton landfill is larger than under Alternative 1A. Alternative 1B would require more excavation and transportation of soil and waste to CHRLF or other off-site locations than under Alternative 1A, resulting in more vehicle emissions. Both alternatives are unlikely to affect compliance with air quality standards, and while vehicle emissions from construction activities may affect local air toxics concentrations, they would not be large enough to affect regional air quality or the health of nearby residents and workers.

GHG Emissions

The impacts on GHG emissions under Alternative 1B would be similar to those stated in Section 3.2.3.2 and Section 3.2.3.3. Using the same methods and assumptions as discussed under Alternative 1A, Table 3.2-10 shows GHG emissions results from construction for Alternative 1A in these categories.

Table 3.2-10. Construction Emissions of GHGs Under Alternative 1B

	Unit	Non-Road Construction Equipment	On-Road Vehicles	Embodied Emissions	Total
NERTS Facility*	MTCO2e	NA	NA	4,875	4,875
Pavement	MTCO2e	NA	NA	18,500	18,500
Transportation	MTCO2e	10,537	2,555	NA	13,093
Total		10,537	2,555	23,375	36,468

Notes: Construction emissions represent total emissions over 30-month construction period

Embodied Emissions are 50-year lifespan emissions that are created through the extraction, processing, construction and disposal of building materials and pavement. Because the MOVES4 modeling and the County's GHG Emission Worksheet use overlapping methods, some pavement construction emissions are double-counted, resulting in conservative estimates.

* In the King County worksheet, a transfer station was not one of the building options in the worksheet, so Warehouse or Storage was selected for the calculations.

MTCO2e = metric tons of carbon dioxide equivalent

NA=Not Applicable.

Alternative 1B includes a larger construction area than Alternative 1A, which would involve additional hauling activity during certain phases, producing more GHG emissions. Per year emissions equate to approximately 5,700 MTCO2e during construction, less than Ecology's threshold of 10,000 metric tons of CO2e per calendar year and generally considered less than significant. With the BMPs in place, no alternative would violate the PSCAA requirements listed in Section 3.2.1.3.1 or effectively alter the GHG impact assessment, and GHG emission impacts would be similar to those stated in Section 3.2.3.2.

Fugitive Dust Emissions

The impacts from construction of Alternative 1B would be similar to the impacts listed in Section 3.2.3.2 and 3.2.3.3. Table 3.2-11 shows MOVES4 estimated fugitive dust emissions during construction of Alternative 1A.

Table 3.2-11. Construction Emissions of Fugitive Dust Under Alternative 1B		
CAP	Unit	Fugitive Dust
PM10	tons	64.62
PM2.5	tons	7.92

Note: Construction emissions represent total emissions over 30-month construction period

Alternative 1B may or may not include the fugitive dust associated with deconstruction or demolition of the existing transfer station building, as it could be deconstructed or demolished, or repurposed, in the future. If the existing transfer building is repurposed instead of deconstructed or demolished under Alternative 1B, there could be less fugitive dust released during construction, though still more when compared with Alternative 1A. Additionally, Alternative 1B includes a larger construction area than Alternative 1A, which would involve additional hauling activity for certain construction phases, producing marginally more dust.

Odors

Similar to Alternative 1A, excavation activities under Alternative 1B have the potential to generate odors during excavation of buried material associated with the closed Houghton landfill, but during a longer period due to the larger footprint.

3.2.3.4.1.2. Indirect Impacts

Indirect impacts associated with construction of Alternative 1B are anticipated to be the same as those stated in Section 3.2.3.2.1.2.

3.2.3.4.2 Impacts from Operation

3.2.3.4.2.1. Direct Impacts

Criteria and Toxic Air Pollutants

The impacts on criteria and toxic air pollutants under Alternative 1B would be similar to those stated in Section 3.2.3.2 and 3.2.3.3. Section 3.2.3.2 also contains an explanation of potential operational impacts of emergency/backup generators. For all CAPs and MSATs, Action Alternative 1B produces lower emissions than the No Action Alternative in 2029 and also in 2040. Total emissions would also be reduced by the action alternatives. Additional detail on the breakdown of emissions by vehicle classification and VMT description, and VMT data is provided in Appendix A.

GHG Emissions

The impacts on criteria and toxic air pollutants under Alternative 1B would be similar to those stated in Section 3.2.3.2 and 3.2.3.3. Alternative 1B also includes the use of a compactor, whereas the No Action Alternative does not. The addition of a compactor has the potential to reduce the total number of transfer hauling trips traveled by nearly a third (King County 2019). The reduction in hauling trips would result in lower impacts on air quality over time than the No Action Alternative. Alternative 1 is also closer to CHRLF than Alternative 2, so transfer hauling trips would produce fewer emissions than those under Alternative 2.

As with Alternative 1A, transportation GHG emissions are lower for Action Alternative 1B in 2029 and 2040 than the No Action Alternative, but they are offset by energy use by the new facility and result in total operational GHG emissions higher for Alternative 1B than the No Action Alternative in both 2029 and 2040. Alternative 1B would also result in lower GHG impacts from transportation sources over the 50-year lifespan of the project compared with the No Action Alternative, but greater for Alternative 1B than the No Action Alternative with the addition of facility energy use emissions.

Fugitive Dust Emissions

With regard to operation, as discussed in Section 3.2.3.2 and 3.2.3.3, fugitive emissions should be minor during operation. The main difference between Alternatives 1A and 1B is that the layout for Alternative 1B provides a larger buffer between the operations and the neighbors to the west. This larger buffer could potentially result in less dust reaching neighbors' homes under Alternative 1B.

Odors

Similar to fugitive dust emissions, the layout for Alternative 1B provides a larger buffer between the operations and the neighbors to the west compared with Alternative 1A, which could potentially result in fewer odors reaching neighbors' homes under Alternative 1B. Both impacts are likely to be minor, as with all action alternatives, KCSWD would design an enclosed transfer building, with additional features to control odor impacts, including modern mechanical exhaust ventilation systems with filtration media, closable access doorways, misting systems (or equivalent technology), and tightly-sealing waste containers compatible with waste compactors.

As discussed in Section 3.2.3.2.2, some full transfer trailers (fully enclosed) would be stored on site under Alternative 1B. KCSWD anticipates that zero to approximately seven trailers could be stored on site under Alternative 1B. Fully enclosed trailers would be stored as they accumulate over the weekend and would be cleared out on a "first in, first out" basis by early- to mid-following week. Waste received on weekends is primarily received from self-haul customers and is mostly "dry," containing fewer organic materials. This reduces the risks of odors. Additional mitigation through an odor monitoring and response plan could also be considered to ensure impacts remain minor.

3.2.3.4.2.2. Indirect Impacts

Indirect impacts associated with operation of Alternative 1B are anticipated to be the same as those stated in Section 3.2.3.2.2.2.

3.2.3.4.3 Cumulative Impacts

Cumulative impacts from Alternative 1B would be similar to the impacts listed in Section 3.2.3.2.3 and 3.2.3.3.3. Alternative 1B would result in short-term impacts on air quality during the construction phase. However, long-term impacts should be significantly lower than those under the No Action Alternative and similar for local impacts in the Kirkland study area; therefore, cumulative impacts should be fewer. As with Alternative 1A, Alternative 1B would emit approximately 5,700 MTCO2e per year average of construction GHGs and approximately 3,200 MTCO2e per year average of operations GHGs.

Refer to Section 3.2.3.2.3 and Section 3.2.3.3.3 for additional context on cumulative impacts.

3.2.3.5 Alternative 2

The site for Alternative 2 is located in Woodinville. Alternative 2 would provide full recycling services and household hazardous waste services for collection of MRW, which would be stored in specialized containers on site. The Alternative 2 site is 12.9 acres, with a potential site development area of at least seven acres with additional area potentially available dependent on compliance with federal, state, and local environmental regulations. Access to the site is from Woodinville-Redmond Road NE. The site is bordered to the north and south by commercial and light industrial uses. To the east is Woodinville-Redmond Road NE and further east are commercial and light industrial uses. To the west is a sloped green space, abandoned BNSF rail line, and residential properties. The site is zoned Tourist/Industrial (T/I zone).

3.2.3.5.1 Impacts from Construction

3.2.3.5.1.1. Direct Impacts

Criteria and Toxic Air Pollutants

The impacts on criteria and toxic air pollutants under Alternative 2 would be similar to those stated in Section 3.2.3.2. For Alternative 2, Table 3.2-12 below shows estimated CAP emissions during the 30-month construction period.

Table 3.2-12. Construction Emissions of Criteria Air Pollutants Under Alternative 2

CAP	Unit	Non-Road Construction Equipment	On-Road Vehicles	Asphalt Off Gas	Total
VOC	tons	0.53	0.27	0.01	0.80
NOx	tons	25.24	5.57	NA	30.81
CO	tons	1.46	6.66	NA	8.12
SOx	tons	0.03	0.01	NA	0.04
PM10	tons	0.38	0.38	NA	0.76
PM2.5	tons	0.37	0.20	NA	0.57

Notes: Construction emissions represent total emissions over 30-month construction period

NA=Not Applicable; CAP=Criteria Air Pollutants

Construction CAP emissions are the same for Alternative 2 and for Alternative 1, and with no construction under the No Action Alternative, both action alternatives exceed construction CAP emissions compared with the No Action Alternative. As with Alternative 1, Alternative 2 construction emissions are the highest in the first year and the lowest in third year with most emissions coming from non-road vehicles and equipment on the Alternative 1 site. Additional detail on the breakdown of emissions by individual vehicle type and construction phase is provided in Appendix A.

Construction truck traffic is not expected to impact traffic operations in the study area (See Section 3.13.3.5.1). Any minimal effect on existing traffic flow and vehicle emissions would be along anticipated construction access routes: Woodinville-Redmond Road NE; 132nd Avenue NE at the eastbound and westbound SR 522 interchange; NE 175th Street; and 131st Avenue NE/ 132nd Avenue NE. As discussed in Section 3.2.3.2, construction emissions would be short term, and equipment and vehicles used for the project would comply with EPA's emissions standards for on-road vehicles and non-road construction equipment. Vehicle emissions from construction activities may affect local air toxics concentrations but would not be large enough to affect regional air quality or the health of nearby residents and workers.

GHG Emissions

GHG emissions for Alternative 2 would follow similar patterns as the vehicle emissions noted above, with some differences from Alternative 1 due to amount of deconstruction or demolition and excavation.

MOVES4 modeling and the County's GHG Emission Worksheet estimates GHG emissions from construction for vehicle emissions, paving emissions, and embodied emissions under Alternative 2 as shown below in Table 3.2-13.

Table 3.2-13. Construction Emissions of GHGs Under Alternative 2

	Unit	Non-Road Construction Equipment	On-Road Vehicles	Embodied Emissions	Total
NERTS Facility*	MTCO2e	NA	NA	4,875	4,875
Pavement	MTCO2e	NA	NA	18,500	18,500
Transportation	MTCO2e	10,537	1,771	NA	12,308
Total		10,537	1,771	23,375	35,683

Notes: Construction emissions represent total emissions over 30-month construction period

Embodied Emissions are 50-year lifespan emissions that are created through the extraction, processing, construction and disposal of building materials and pavement. Because the MOVES4 modeling and the County's GHG Emission Worksheet use overlapping methods, some pavement construction emissions are double-counted, resulting in conservative estimates.

* In the King County worksheet, a transfer station was not one of the building options in the worksheet, so Warehouse or Storage was selected for the calculations.

MTCO2e = metric tons of carbon dioxide equivalent

NA=Not Applicable.

As modeled, construction GHG emissions are slightly less for Alternative 1A than for Alternative 2 and less than Alternative 1B, generally due to the volume of excavation and filling expected. Alternative 2 also requires the deconstruction or demolition of a greater volume of structures located on the site.

A comparison of GHG emissions for all alternatives is shown in Table 3.2-14, below. As shown, both action alternatives produce higher total construction GHG emissions than the No Action Alternative.

Table 3.2-14. Construction Emissions of GHGs Under All Alternatives					
	Unit	No Action Alternative	Alternative 1A	Alternative 1B	Alternative 2
NERTS Facility*	MTCO2e	156	4,875	4,875	4,875
Pavement	MTCO2e	9,600	18,500	18,500	18,500
Transportation	MTCO2e	0	10,950	13,093	12,308
Total		9,756	34,325	36,468	35,683

Notes: Construction emissions represent total emissions over 30-month construction period

Embodied Emissions are 50-year lifespan emissions that are created through the extraction, processing, construction and disposal of building materials and pavement, as well as t

* In the King County worksheet, a transfer station was not one of the building options in the worksheet, so Warehouse or Storage was selected for the calculations.

MTCO2e = metric tons of carbon dioxide equivalent

NA=Not Applicable.

With the construction period of approximately 30 months and 50-year lifespan of the proposed facility, the NERTS facility and pavement emissions count embodied emissions during construction but account for emissions over the lifespan of the project. Transportation emissions are total emissions over the 30 months of construction. Per year emissions equate to approximately 4,900 to 5,700 MTCO2e during construction, less than Ecology's threshold of 10,000 metric tons of CO2e per calendar year and generally considered less than significant. Additional detail on the breakdown of GHG emissions by individual vehicle type and construction phase is provided in Appendix A.

Alternative 2 would result in similar GHG emissions as Alternative 1A and 1B, and all action alternatives with higher GHG emissions than emissions under the No Action Alternative.

Fugitive Dust Emissions

The impacts from construction of Alternative 2 would be directly similar to the impacts listed in Section 3.2.3.2, though Alternative 2 includes deconstruction or demolition of the existing commercial structures prior to construction of the new NERTS facility. Table 3.2-15 shows MOVES4 estimated fugitive dust emissions during construction of Alternative 2.

Table 3.2-15. Construction Emissions of Fugitive Dust Under Alternative 2		
CAP	Unit	Fugitive Dust
PM10	ton/year	52.43
PM2.5	ton/year	6.66

Note: Construction emissions represent total emissions over 30-month construction period

As modeled, construction fugitive dust emissions are lower for PM10 and PM2.5 under Alternative 2 than for Alternatives 1A and 1B, and with no construction under the No Action Alternative, all action alternatives

exceed construction fugitive dust emissions compared with the No Action Alternative. With BMPs in place, Alternative 2 would not violate the PSCAA requirements listed in Section 3.2.1.3.1.

Odors

Under Alternative 2, No odors are expected other than those typical of vehicle emissions. With the BMPs in place, Alternative 2 would not violate the PSCAA requirements listed in Section 3.2.1.3.1.

3.2.3.5.1.2. Indirect Impacts

Indirect impacts associated with construction of Alternative 2 are anticipated to be the same as those stated in Section 3.2.3.2.1.2.

3.2.3.5.2 Impacts from Operation

3.2.3.5.2.1. Direct Impacts

Criteria and Toxic Air Pollutants

The impacts on criteria and toxic air pollutants under Alternative 2 would be similar to those stated in Section 3.2.3.2. That section also has an explanation of potential operational impacts of emergency/backup generators. Table 3.2-16 below shows estimated CAP and MSAT emissions under the 2029 and 2040 No Action Alternative compared with the 2029 and 2040 Alternative 2.

Table 3.2-16. Operations Emissions of CAP and MSAT Under the 2029 and 2040 No Action, 2029 and 2040 Alternative 2

		2029 No Action	2029 Alternative 2	2040 No Action	2040 Alternative 2
CAPs					
VOC	ton/year	0.81	0.73	0.20	0.18
NOx	ton/year	8.51	7.96	3.18	2.92
CO	ton/year	10.66	9.81	4.90	4.43
SOx	ton/year	0.011	0.01	0.008	0.008
PM10	ton/year	0.78	0.70	0.42	0.36
PM2.5	ton/year	0.35	0.32	0.07	0.06
MSATs					
Naphthalene	ton/year	0.004697	0.004184	0.000081	0.000075
1,3-Butadiene	ton/year	0.001566	0.001401	0.000000	0.000000
Acetaldehyde	ton/year	0.021541	0.019271	0.003749	0.003436
Acrolein	ton/year	0.003529	0.003147	0.000257	0.000238
Benzene	ton/year	0.008088	0.007348	0.001598	0.001462
Ethyl Benzene	ton/year	0.006177	0.005599	0.002816	0.002561
Formaldehyde	ton/year	0.043740	0.038992	0.003082	0.002813
DPM	ton/year	0.307550	0.302785	0.019724	0.018668

PAH	ton/year	0.002167	0.001967	0.000032	0.000029
Total	ton/year	0.399053	0.384693	0.031340	0.029282

Notes: CAPs = Criteria Air Pollutants; GHG = greenhouse gas; MSAT = mobile source air toxics; DPM – diesel particulate matter; PAH = polycyclic aromatic hydrocarbons

For all CAPs and MSATs, Action Alternative 2 produces lower emissions than the No Action Alternative in 2029 and in 2040. Total emissions would also be reduced by the action alternatives. Some vehicle emissions under Alternative 2 would be a new source in the Alternative 2 site area. For example, Nitrogen Oxides (NOx) are one of the larger components of CAP emissions on a volume basis. The term NOx is defined as NO + NO2. Nitrogen dioxide (NO2) is a highly reactive gas that forms from the reaction of nitrogen oxide (NO) and free radicals in the atmosphere. On-road vehicles such as trucks and automobiles are the major sources of NOx in the Alternative 2 study area; industrial boilers and processes, home heaters, and gas stoves also produce NOx (PSCAA 2020). NOx is an important precursor to ozone and ground-level ozone can aggravate asthma and may have a negative correlation with agricultural production yields (Science 2022).

Under Alternative 2, local increases in daily traffic volume as a percentage of existing daily volume are expected to be less than 7 percent of existing daily traffic volume (see NERTS Transportation Assessment in Appendix H) and would serve as a maximum level for increases in NOx emissions. All intersections are expected to meet the roadway standards under Alternative 2 during the AM and PM peak hours in 2029 and 2040, with minor increases in delay from the project (see Section 3.13). Minor increases in emissions due to idling are expected from operation of the NERTS facility – about four to six percent during AM and PM peak hours compared to the No Action Alternative. These emissions are included in Table 3.2-16, above.

However, these emissions are then expected to decline by more than 70 percent by 2040 due to overall required or expected improvements in emissions control and fuel standards. As a result, impacts on air quality, residents, and workers, including agricultural workers and crop yields in the nearby Sammamish APD, are expected to be less than significant. Additional detail on the breakdown of emissions by vehicle classification and VMT description, and VMT data is provided in Appendix A.

Vehicle emissions from operational activities may affect local air toxics concentrations but would not be large enough or widely dispersed enough to affect regional air quality or the health of nearby residents and workers, including agricultural workers. Local air quality inversions in the Sammamish valley may trap vehicle, industrial, and agricultural air emissions on occasion, including those from the proposal in general, but would be temporary and likely not a significant impact on residents, visitors, and workers.

For Alternative 2, the new NERTS facility would handle household hazardous waste. The material would be placed in containers and handled according to hazardous waste storage, handling, and transportation regulations. WAC 173-350-360 requires King County to construct an MRW facility with tank systems, secondary containments areas, ventilation systems, stormwater management features, and emission control features as required by PSCAA (the permitting air authority) and that meet the performance standards of WAC 173-350-040. Combined with the facilities engineered systems, proper handling and

documentation at the MRW facility will ensure that waste is appropriately labeled, packaged, transported and documented according to regulatory standards, minimizing the risk of accidental spills, leaks or improper disposal that could lead to air emissions, including VOC emissions.

A comparison of CAP and MSAT emissions for all alternatives for 2029 and 2040 is shown in Table 3.2-17, below.

Table3.2-17. Comparison of CAP and MSAT Emissions for All Alternatives, 2029 and 2040

		2029	2029	2029	2040	2040	2040
		No Action	Alternative 1	Alternative 2	No Action	Alternative 1	Alternative 2
CAPs							
VOC	ton/year	0.81	0.77	0.73	0.20	0.19	0.18
NOx	ton/year	8.51	7.65	7.96	3.18	2.82	2.92
CO	ton/year	10.66	10.26	9.81	4.90	4.62	4.43
SOx	ton/year	0.011	0.010	0.01	0.008	0.007	0.008
PM10	ton/year	0.78	0.72	0.70	0.42	0.39	0.36
PM2.5	ton/year	0.35	0.31	0.32	0.07	0.06	0.06
MSATs							
Naphthalene	ton/year	0.004697	0.004405	0.004184	0.000081	0.000077	0.000075
1,3-Butadiene	ton/year	0.001566	0.001478	0.001401	0.000000	0.000000	0.000000
Acetaldehyde	ton/year	0.021541	0.020104	0.019271	0.003749	0.003417	0.003436
Acrolein	ton/year	0.003529	0.003294	0.003147	0.000257	0.000228	0.000238
Benzene	ton/year	0.008088	0.007841	0.007348	0.001598	0.001598	0.001462
Ethyl Benzene	ton/year	0.006177	0.006009	0.005599	0.002816	0.002727	0.002561
Formaldehyde	ton/year	0.043740	0.040972	0.038992	0.003082	0.002870	0.002813
DPM	ton/year	0.307550	0.277346	0.302785	0.019724	0.017052	0.018668
PAH	ton/year	0.002167	0.002014	0.001967	0.000032	0.000031	0.000029
Total	ton/year	0.399053	0.363464	0.384693	0.031340	0.027999	0.029282

For all CAPs and MSATs, all action alternatives produce lower emissions than the No Action Alternative in 2029 and 2040. With the continued reduction in CAP and MSAT emissions over time, no significant impacts are expected.

GHG Emissions

The impacts on GHG emissions under Alternative 2 would be similar to those stated in Section 3.2.3.2. Table 3.2-18 below shows estimated GHG emissions under the 2029 and 2040 No Action Alternative compared with the 2029 and 2040 Alternative 2.

Table 3.2-18. Operations Emissions of GHGs Under the 2029 and 2040 No Action, 2029 and 2040 Alternative 2					
		2029	2029	2040	2040
		No Action	Alternative 2	No Action	Alternative 2
GHGs					
Transportation	$MTCO_2e$/year	2,706	2,586	2,123	2,033
Energy Use	$MTCO_2e$/year	22	700	22	700
Total	$MTCO_2e$/year	2,729	3,286	2,145	2,733

Note: $MTCO_2e$ = Metric tons of carbon dioxide equivalents

While transportation GHG emissions are lower for Action Alternative 2 in 2029 and 2040 than the No Action Alternative, they are offset by energy use by the new facility and result in total operational GHG emissions higher for Alternative 2 than the No Action Alternative in both 2029 and 2040. Alternative 2 includes the use of a compactor, whereas the No Action Alternative does not. The addition of a compactor has the potential to reduce the total number of transfer hauling trips nearly a third compared with existing conditions and current projections (King County 2019). The station will offer sufficient queuing space for customers, which will also help reduce idling time and contribute to reduced motor vehicle emissions. The reduction in hauling trips and idling time would result in lower GHG impacts from transportation sources over the 50-year lifespan of the project compared with the No Action Alternative. However, the addition of facility energy use over the 50-year lifespan of the project causes total GHG emissions to be greater for Alternative 2 than the No Action Alternative by approximately 29,000 MTCO2e, as shown in Table 3.2-19, below.

Table 3.2-19. Operations Emissions of GHGs Under No Action and Alternative 2 Over the Project Lifespan			
		Lifespan	Lifespan
		No Action	Alternative 2
GHGs			
Transportation	$MTCO_2e$	120,815	116,141
Energy Use	$MTCO_2e$	1,120	35,000
Total	$MTCO_2e$	121,935	151,141
	per year avg.	2,439	3,023

Per year emissions for both cases are well below Washington reporting requirements and are not considered significant.

Changes in land use also might affect the travel patterns in the area, potentially resulting in changes in the location or duration in vehicle emissions over current emissions in the area. However, the area is currently primarily industrial, and BMP measures will be in place to limit impacts on traffic and therefore emissions. These BMPs have been demonstrated to be effective at other existing facilities near residences.

A comparison of GHG emissions for all alternatives for 2029 and 2040 is shown in Table 3.2-20, below, and for the lifespan of the project in Table 3.2-21.

Table 3.2-20. Operations Emissions of GHGs in 2029 and 2040 Under All Alternatives

		2029	2029	2029	2040	2040	2040
		No Action	Alternative 1	Alternative 2	No Action	Alternative 1	Alternative 2
GHGs							
Transportation CO2e	$MTCO_2e$/ year	2,706	2,467	2,586	2,123	1,910	2,033
Energy Use CO2e	$MTCO_2e$ /year	22	700	700	22	700	700
Total		2,729	3,167	3,286	2,145	2,610	2,733

Note: $MTCO_2e$ = Metric tons of carbon dioxide equivalents

Table 3.2-21. Operations Emissions of GHGs Under All Alternatives Over the Project Lifespan

		Lifespan	Lifespan	Lifespan
		No Action	Alternative 1	Alternative 2
GHGs				
Transportation	$MTCO_2e$	120,815	109,999	116,141
Energy Use	$MTCO_2e$	1,120	35,000	35,000
Total	$MTCO_2e$	121,935	144,999	151,141
	per year avg.	2,439	2,900	3,023

Note: $MTCO_2e$ = Metric tons of carbon dioxide equivalents

The No Action Alternative has lower lifespan emissions than Alternative 1, which in turn has lower lifespan emissions than Alternative 2. Per year emissions for all alternatives are well below Washington reporting requirements and are not considered significant.

Fugitive Dust Emissions

With regard to operation, as discussed in Section 3.2.3.2, fugitive emissions should be minor during operation. Alternative 2 has a slightly narrower buffer between the operation and all existing neighbors compared with Alternative 1 (Alternative 1A buffer is less than Alternative 1B buffer) and would have a slightly smaller opportunity for dilution of any dust emissions before they reach the property line. The closest neighbor to Alternative 2 is a commercial business to the north, while the closest neighbors to Alternative 1 are residences. However, like Alternative 1, Alternative 2 will include construction of an enclosed facility which will mitigate dust emissions and result in less dust emissions than the No Action Alternative.

Odors

Compared with the other action alternatives, Alternative 2 would have the largest buffer between the operation and neighbors that are sensitive receptors, with an opportunity for dilution of any odor emissions

before they reach the property line. The facility would be a new odor source in the area. Odor impacts are subject to an individual's response, which is subjective, with some people being more sensitive to certain odors than others. Like Alternative 1, Alternative 2 will include construction of an enclosed facility which will mitigate odors and result in fewer odors escaping the facility than under the No Action Alternative and about the same as Alternative 1.

As discussed in Section 3.2.3.2.2, some full transfer trailers (fully enclosed) would be stored on site under Alternative 1A. KCSWD anticipates that zero to approximately seven trailers could be stored on site under Alternative 2. Fully enclosed trailers would be stored as they accumulate over the weekend and would be cleared out on a "first in, first out" basis by early- to mid-following week. Waste received on weekends is primarily received from self-haul customers and is mostly "dry," containing fewer organic materials. This reduces the risks of odors. Additional mitigation through an odor monitoring and response plan could also be considered to ensure impacts remain minor.

3.2.3.5.2.2. Indirect Impacts

Indirect impacts associated with operation of Alternative 2 are anticipated to be the same as those stated in Section 3.2.3.2.2.2.

3.2.3.5.3 Cumulative Impacts

Alternative 2 would result in short-term impacts on air quality during the construction phase, contributing incrementally but not significantly to other sources of fugitive dust in the area, such as vehicle traffic and agricultural activities. Because operation of Alternative 2 would introduce new emissions into the study area, impacts related to toxic air pollutants, fugitive dust, and odor would increase cumulative impacts incrementally above existing levels, but not significantly. When combined with existing sources of stationary and mobile sources of emissions, cumulative impacts on air quality and nearby residents and workers, including agricultural workers, are not expected to be significant, as overall pollutant concentrations are expected to meet health-based NAAQS standards and continue to decrease over time.

GHG emissions from Action Alternative 2 would contribute incrementally to the combined past, present, and reasonably foreseeable GHG emissions. Because human created GHG emissions are identified as the most significant driver of global climate change, and because any increase in GHG emissions would contribute to climate change and be in contradiction to King County and Washington State targets for reduction in GHGs, this is considered a significant cumulative impact. For context, Ecology estimated that in 2019, Washington produced about 102.1 million MTCO2e (Ecology 2024). The King County SCAP estimated that geographic sources of GHG emissions in the County in 2017 totaled 20.3 million MTCO2e and that consumption-based sources of GHG emissions in the County in 2017 totaled 58.2 million MTCO2e (King County 2020). The approximately 4,750 MTCO2e per year average of construction GHGs and approximately 3,600 MTCO2e per year average of operations GHGs from Alternative 2 would represent no more than an approximately 0.002 percent increase from the King County 2017 geographic total and no more than an approximately 0.008 percent increase from the 2017 consumption total.

Refer to Section 3.2.3.2.3 for additional anticipated cumulative impacts.

3.2.4 Mitigation Measures

Operation and construction of the project would comply with federal, state, and regional regulations related to air quality. Potential impacts on air quality would be minimized or avoided through project planning, design, and the application of required BMPs.

3.2.4.1 Common to All Action Alternatives

Construction of the project would comply with federal, state, and regional regulations related to air quality. Potential impacts on air quality would be minimized or avoided through project planning, design, and the application of required BMPs.

3.2.4.1.1 During Construction

Although significant adverse air quality impacts are not anticipated from construction of Alternatives 1A, 1B, or 2, the construction contractors would be required to use BMPs to reduce impacts on air quality. BMPs for reducing the potential for air quality impacts during construction include measures for reducing emissions from the combustion of fossil fuels and fugitive dust. The largest potential indirect emissions source related to facility construction would be traffic-related emissions from disrupted or rerouted traffic in and beyond the study area.

King County would submit a Notice of Construction to PSCAA for approval if construction activities occur that require it, and to clarify any appropriate permit conditions. King County would also implement BMPs and emission-control measures specified by Ecology and PSCAA guidelines and regulations to ensure that concentrations of air pollutants are minimized during the construction phase.

Criteria and Toxic Air Pollutants

Emissions from vehicles and construction equipment can be reduced with the following BMPs:

- Use only equipment and trucks that are maintained in optimal operational condition.
- Use ultra-low sulfur fuel in equipment fueled by diesel.
- Require all non-road equipment to have emission reduction equipment (e.g., require participation in Puget Sound Region Diesel Solutions, a program designed to reduce air pollution from diesel, by project sponsors and contractors).
- Use car-pooling or other trip-reduction strategies for construction workers.
- Implement time limit restrictions on construction truck and other vehicle idling.
- Stage construction to minimize overall transportation system congestion and delays to reduce regional emissions of pollutants during construction.

GHG

GHG emissions can be reduced by using procedures that increase energy efficiency, use renewable energy or low carbon fuels, reduce carbon emissions, divert materials from landfills, and use reduced construction materials with less embodied carbon. Many of the methods used to meet these goals are the

same methods used to reduce emissions of criteria pollutants and air toxics. Methods associated with these goals include the following:

- As directed by the SCAP, pursuing strategies to electrify King County's vehicle fleet and build out charging infrastructure; expanding the use of alternative fuels when electric vehicles are not feasible; implementing Ordinance 19052, which targets conversion of 50 percent of heavy-duty county-operations vehicles to electric vehicles by 2038 and 100 percent by 2043.
- Adhering to the County's 2022 update to the Green Building ordinance. Adhering to this ordinance ensures that the design, construction, and operation of any King County capital project is consistent with the latest green building and sustainable development practices.
- Landscaping and planting trees and bushes.
- Using energy-efficient construction equipment and limiting the equipment and vehicle idling time during construction.

Fugitive Dust

Fugitive dust emissions can be reduced using the following BMPs.

- Spray exposed soil with water or other suppressant to reduce emissions and deposition of particulate matter.
- Pave or use gravel on staging areas and roads that would be exposed for long periods.
- Cover all trucks transporting materials; wet down materials in trucks or provide adequate freeboard (space from the top of the material to the top of the truck bed) to reduce emissions and deposition of particulate matter during transport.
- Provide wheel washers to remove particulate matter that would otherwise be carried off site by vehicles in order to decrease deposition of particulate matter on area roadways.
- Cover dirt, gravel, and debris piles as needed to reduce dust and wind-blown debris.

3.2.4.2 Common to All Alternatives

Operation of the project under the No Action Alternative, Alternative 1, and Alternative 2 would comply with federal, state, and regional regulations related to air quality. Potential impacts on air quality would be minimized or avoided through project planning and the application of required BMPs.

3.2.4.2.1 During Operation

The following measures are anticipated during operations for the health and safety of customers, employees, and neighbors:

- Criteria and Toxic Air Pollutants. Establishing efficient on-site traffic flows to minimize vehicle queuing, thus reducing emissions. Mitigation for the MRW facility would include the building design standards discussed in Section 3.2.3.5.2. to ensure the capture and control of potential emissions and adherence to applicable regulations (i.e., International Fire Code [IFC], American National Standards Institute [ANSI], National Institute for Occupational Safety and Health [NIOSH],

Occupational Safety and Health Administration [OSHA], and the Uniform Building Code [UBC]). See also Section 3.4 for additional detail.

- GHG Emissions. GHG emissions during operation can be reduced by using procedures that increase energy efficiency, use renewable energy when available, consider expanded use of electric powered equipment in lieu of diesel powered, and divert recyclable materials away from landfills. Many of the methods used to reduce GHG emissions are the same methods discussed above to reduce emissions of criteria pollutants and air toxics.
- Fugitive Dust and Odor. Some of the operating procedures that will be used to reduce odors and fugitive dust include the following:
  - The transfer building will be fully enclosed, except for the entry/exit points, thus reducing off-site noise, odor, and dust.
  - A mechanical exhaust ventilation system with filtration media, and creation of negative air pressure, will be incorporated into the transfer station building for odor and dust control.
  - A misting system or equivalent technology will be installed in the transfer building for odor and dust control.
  - Fully loaded transfer trailers will be removed from the station in the order that they are filled.
  - Transfer trailers will be fully enclosed with an open end for waste compaction, and end-doors and door-seals will be maintained to reduce the potential for odor, spills, and litter.
  - Surfaces where trucks operate will be paved.
  - The station will be cleaned on a regular basis.

3.2.5 Significant Unavoidable Adverse Impacts

The No Action Alternative would result in higher operational impacts for CAPs, MSATs, odors, and fugitive dust than the proposed Alternatives 1 and 2, but lower operational impacts for GHGs. All action alternatives would contribute incrementally more to the combined past, present, and reasonably foreseeable GHG emissions than the No Action Alternative and this is considered a significant cumulative impact. There are no other significant unavoidable adverse impacts to air associated with the No Action Alternative, Alternative 1A, Alternative 1B, or Alternative 2.