4.2 AIR QUALITY

This section includes a discussion of existing air quality conditions, a summary of applicable regulations, and an analysis of potential construction and operational impacts to air quality caused by the project.

Comments pertaining to air quality received in response to the Notice of Preparation (NOP) for the project included the need for the project to quantify increases in daily emissions of criteria air pollutants, especially ozone, as well as a reminder that modifications to daily throughput limits would require amendments to permits from the local air district.

4.2.1 Regulatory Setting

Air quality in the project area is regulated through the efforts of various federal, state, regional, and local government agencies. These agencies work jointly, as well as individually, to improve air quality through legislation, planning, policy making, education, and a variety of programs. The agencies responsible for improving the air quality within the air basin are discussed below.

FEDERAL

U.S. Environmental Protection Agency

The EPA has been charged with implementing national air quality programs. EPA's air quality mandates draw primarily from the federal Clean Air Act (CAA), which was enacted in 1970. The most recent major amendments were made by Congress in 1990. EPA's air quality efforts address criteria air pollutants, ozone precursors, and hazardous air pollutants (HAPs). EPA regulations concerning criteria air pollutants and precursors and HAPs are presented in greater detail below.

Criteria Air Pollutants

The CAA required EPA to establish national ambient air quality standards (NAAQS) for six common air pollutants found all over the U.S. referred to as criteria air pollutants. EPA has established primary and secondary NAAQS for the following criteria air pollutants: ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable particulate matter with aerodynamic diameter of 10 micrometers or less (PM_{10}) and fine particulate matter with aerodynamic diameter of 2.5 micrometers or less ($PM_{2.5}$), and lead. The NAAQS are shown in Table 4.2-1. The primary standards protect public health with an adequate health margin for safety and the secondary standards protect public welfare from adverse effects, including those related to effects on soils, water, crops, vegetation, human-made materials, animals, wildlife, weather, visibility, and climate. The CAA also required each state to prepare a State Implementation plan (SIP) for attaining and maintaining the NAAQS. The federal Clean Air Act Amendments of 1990 added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. California's SIP is modified periodically to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. EPA is responsible for reviewing all SIPs to determine whether they conform to the mandates of the CAA and its amendments, and whether implementation will achieve air quality goals. If EPA determines a SIP to be inadequate, EPA may prepare a federal implementation plan that imposes additional control measures. If an approvable SIP is not submitted or implemented within the mandated time frame, sanctions may be applied to transportation funding and stationary air pollution sources in the air basin.

Table 4.2-1 Ambient Air Quality Standards

Pollutant	Averaging Time	California[a,b]	National[c]	
			Primary[b,d]	Secondary[b,e]
Ozone	1-hour	0.09 ppm (180 µg/m^3)	—	Same as primary standard
	8-hour	0.070 ppm (137 µg/m^3)	0.070 ppm (147 µg/m^3)	
Carbon monoxide	1-hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	Same as primary standard
	8-hour	9 ppm[f] (10 mg/m^3)	9 ppm (10 mg/m^3)	
Nitrogen dioxide	Annual arithmetic mean	0.030 ppm (57 µg/m^3)	53 ppb (100 µg/m^3)	Same as primary standard
	1-hour	0.18 ppm (339 µg/m^3)	100 ppb (188 µg/m^3)	—
Sulfur dioxide	24-hour	0.04 ppm (105 µg/m^3)	—	—
	3-hour	—	—	0.5 ppm (1300 µg/m^3)
	1-hour	0.25 ppm (655 µg/m^3)	75 ppb (196 µg/m^3)	—
Respirable particulate matter	Annual arithmetic mean	20 µg/m^3	—	Same as primary standard
	24-hour	50 µg/m^3	150 µg/m^3	
Fine particulate matter	Annual arithmetic mean	12 µg/m^3	12.0 µg/m^3	15.0 µg/m^3
	24-hour	—	35 µg/m^3	Same as primary standard
Lead[f]	Calendar quarter	—	1.5 µg/m^3	Same as primary standard
	30-Day average	1.5 µg/m^3	—	—
	Rolling 3-Month Average	—	0.15 µg/m^3	Same as primary standard
Hydrogen sulfide	1-hour	0.03 ppm (42 µg/m^3)	No national standards	
Sulfates	24-hour	25 µg/m^3		
Vinyl chloride[f]	24-hour	0.01 ppm (26 µg/m^3)		
Visibility-reducing particulate matter	8-hour	Extinction of 0.23 per km		

Notes: µg/m^3 = micrograms per cubic meter; km = kilometers; ppb = parts per billion; ppm = parts per million.

[a] California standards for ozone, carbon monoxide, SO_2 (1- and 24-hour), NO_2, particulate matter, and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[b] Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based on a reference temperature of 25 degrees Celsius (°C) and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[c] National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic means) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over three years, is equal to or less than the standard. The PM_{10} 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m^3 is equal to or less than one. The $PM_{2.5}$ 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard.

[d] National primary standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

[e] National secondary standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[f] The California Air Resources Board has identified lead and vinyl chloride as toxic air contaminants with no threshold of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

Source: CARB 2016a

Hazardous Air Pollutants and Toxic Air Contaminants

Toxic air contaminants (TACs), or in federal parlance, HAPs, are a defined set of airborne pollutants that may pose a present or potential hazard to human health. A TAC is defined as an air pollutant that may cause or contribute to an increase in mortality or in serious illness, or that may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air; however, their high toxicity or health risk may pose a threat to public health even at low concentrations.

A wide range of sources, from industrial plants to motor vehicles, emit TACs. The health effects associated with TACs are quite diverse and generally are assessed locally, rather than regionally. TACs can cause long-term health effects such as cancer, birth defects, neurological damage, asthma, bronchitis, or genetic damage; or short-term acute affects such as eye watering, respiratory irritation (a cough), running nose, throat pain, and headaches.

For evaluation purposes, TACs are separated into carcinogens and non-carcinogens based on the nature of the physiological effects associated with exposure to the pollutant. Carcinogens are assumed to have no safe threshold below which health impacts would not occur. This contrasts with criteria air pollutants for which acceptable levels of exposure can be determined and for which the ambient standards have been established (Table 4.2-1). Cancer risk from TACs is expressed as excess cancer cases per one million exposed individuals, typically over a lifetime of exposure.

EPA regulates HAPs through its National Emission Standards for Hazardous Air Pollutants. The standards for a particular source category require the maximum degree of emission reduction that the EPA determines to be achievable, which is known as the Maximum Achievable Control Technology—MACT standards. These standards are authorized by Section 112 of the 1970 Clean Air Act and the regulations are published in 40 CFR Parts 61 and 63.

The Clean Air Act Amendments of 1977 required the EPA to identify and set forth National Emission Standards for Hazardous Air Pollutants to protect public health and welfare. The Clean Air Act Amendments of 1990 established a technology-based approach for reducing air toxics, such that designated HAPs are regulated under a two-phase strategy. The first phase involves requiring facilities to install Maximum Achievable Control Technology (MACT). MACT includes measures, methods and techniques, such as material substitutions, work practices, and operational improvements, aimed at reducing toxic air emissions. MACT standards already exist in draft or final form for over 50 percent of the 174 source categories (under the air toxics program, facilities having similar operating processes are grouped into categories) that are to be eventually regulated. In September 1999, EPA promulgated the Urban Air Toxics Strategy (UATS), which identifies pollutants and sources that have been determined to be issues in urban areas and is the second phase of the agency's two-phase process for regulation of air toxics. Landfills are included on the regulated source list for the UATS due to their emissions of vinyl chloride, benzene, and other TACs.

New landfills, as defined by the EPA, are regulated under Section 111(b) of the federal CAA; existing landfills are controlled under the guidelines of Section 111(d). Collectively, these regulations are known as New Source Performance Standards (NSPS) and Emissions Guidelines (EG) for municipal solid waste (MSW) landfills, as originally published by the EPA in 1999. The MSW Landfill NSPS and EG were promulgated by the EPA under Subpart WWW and Subpart Cc, respectively, of Title 40 of the Code of Federal Regulations (CFR), Part 60.

Under NSPS regulations, a new landfill is defined as an MSW landfill that started construction or began initial waste acceptance on or after May 30, 1991. A landfill modification (e.g., expansion) that occurred after May 30, 1991, would also subject the landfill to the NSPS under 40 CFR 60, Subpart WWW. The EG, per 40 CFR Part 60, Subpart Cc, apply to existing landfills that commenced construction or were modified before May 30, 1991, and that have accepted waste at any time since November 8, 1987. The requirements of EG are similar to those of NSPS, except that the state in which the landfill is located plays a role in establishing the actual regulations through the SIP process. MSW landfills that meet the above criteria and have a design capacity greater than 2.5 million megagrams (or 2.5 million cubic meters) of waste must evaluate NMOC emissions to determine their requirements under the NSPS or EG rules.

On August 29, 2016, the EPA published new landfill gas (LFG) rules in the Federal Register. These included a new NSPS rule under 40 CFR 60, Subpart XXX, as well as emission guidelines for existing MSW landfills under 40 CFR 60, Subpart Cf, which replace Subparts WWW and Cc, respectively. Subpart XXX applies to new landfills, including those modified on or after July 17, 2014, while existing landfills include those built or modified before this date. The intent of

the new NSPS rule and emission guidelines is to reduce emissions of LFG. The pollutants of concern contained within LFG are non-methane organic compounds (NMOC) and methane.

Compliance requirements are based on the design capacity of the landfill and its NMOC emission rate to be calculated using the EPA's Landfill Generation Emissions Model (LandGEM) and default model inputs. Under Subparts XXX and Cf, if a landfill exceeds a threshold of 34 megagrams (approximately 37.5 tons) per year of NMOC emissions, then the operator must install LFG collection and control systems to extract and destructively combust LFG (i.e., in a flare, boiler, or engine generator). Operations, monitoring, record keeping, and reporting for the collection/control system must be implemented in accordance with stated requirements. Because of its current design capacity, RHR Landfill is subject to the NSPS under Subpart XXX. The proposed expansion is not expected to alter the NSPS compliance activities.

Under the Clean Air Act Amendments of 1990, major stationary sources are required to obtain Title V operating permits. Title V is a federally enforceable, state operating permit program set forth under 40 CFR Part 70. Major sources of criteria air pollutants or TACs are required to apply for and obtain Title V operating permits. The Title V programs are developed at the state or local level, as outlined in 40 CFR Part 70. All landfills subject to NSPS or emissions guidelines are also subject to Title V, regardless of emissions or major source status. A Title V permit is an umbrella permit, which consolidates all federal, state, and local air quality regulations and requirements into one permit. Although the Title V permit is required in addition to any Authority to Construct (ATC) permits or Permits to Operate (PTO) required by any local agency, these additional permits are incorporated into the Title V permit and, thus, the Title V permit becomes the overall guiding document for air quality compliance at a site. Currently, the RHR Landfill has a Title V Operating Permit (No. F-01059-15).

STATE

CARB is the agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the California Clean Air Act (CCAA). The CCAA, which was adopted in 1988, required CARB to establish California ambient air quality standards (CAAQS) (Table 4.2-1).

Criteria Air Pollutants

CARB has established CAAQS for sulfates, hydrogen sulfide, vinyl chloride, visibility-reducing particulate matter, and the above-mentioned criteria air pollutants. In most cases the CAAQS are more stringent than the NAAQS. Differences in the standards are generally explained by the health effects studies considered during the standard-setting process and the interpretation of the studies. In addition, the CAAQS incorporate a margin of safety to protect sensitive individuals.

The CCAA requires that all local air districts in the state endeavor to attain and maintain the CAAQS by the earliest date practical. The CCAA specifies that local air districts should focus attention on reducing the emissions from transportation and area-wide emission sources. The CCAA also provides air districts with the authority to regulate indirect emission sources.

Toxic Air Contaminants

TACs in California are regulated primarily through the Tanner Air Toxics Act (Assembly Bill [AB] 1807, Chapter 1047, Statutes of 1983) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (Hot Spots Act) (AB 2588, Chapter 1252, Statutes of 1987). AB 1807 sets forth a formal procedure for CARB to designate substances as TACs. Research, public participation, and scientific peer review are required before CARB can designate a substance as a TAC. To date, CARB has identified 21 TACs and adopted EPA's list of HAPs as TACs. Particulate matter exhaust from diesel engines (diesel PM) is one of the TACs identified by CARB.

After a TAC is identified, CARB then adopts an airborne toxics control measure for sources that emit that particular TAC. If a safe threshold exists for a substance at which there is no toxic effect, the control measure must reduce exposure below that threshold. If no safe threshold exists, the measure must incorporate best available control technology for toxics to minimize emissions.

The Hot Spots Act requires that existing facilities that emit toxic substances above a specified level prepare an inventory of toxic emissions, prepare a risk assessment if emissions are significant, notify the public of significant risk levels, and prepare and implement risk reduction measures.

California Assembly Bill 617 (AB 617) of 2017 aims to help protect air quality and public health in communities around industries subject to the state's cap-and-trade program for GHG emissions. AB 617 imposes a new state-mandated local program to address non-vehicular sources (e.g., refineries, manufacturing facilities) of criteria air pollutants and TACs. The bill requires CARB to identify high-pollution areas and directs air districts to focus air quality improvement efforts through adoption of community emission reduction programs within these identified areas. Currently, air districts review individual sources and impose emissions limits on emitters based on best available control technology, pollutant type, and proximity to nearby existing land uses. This bill addresses the cumulative and additive nature of air pollutant health effects by requiring community-wide air quality assessment and emission reduction planning.

CARB has adopted diesel exhaust control measures and more stringent emissions standards for various transportation-related mobile sources of emissions, including transit buses, packer trucks, transfer trucks, and off-road diesel equipment (e.g., tractors, generators). Over time, the replacement of older vehicles will result in a vehicle fleet that produces substantially lower levels of TACs than under current conditions. Mobile-source emissions of TACs (e.g., benzene, 1-3-butadiene, diesel PM) have been reduced substantially over the last decade and will be reduced further in California through a progression of regulatory measures (e.g., Low Emission Vehicle/Clean Fuels and Phase II reformulated gasoline regulations) and control technologies. With implementation of CARB's Risk Reduction Plan, it is expected that diesel PM concentrations will be 85 percent less in 2020 than they were in 2000 (CARB 2000). Adopted regulations are also expected to continue to reduce formaldehyde emissions emitted by cars and light-duty trucks. As emissions are reduced, it is expected that risks associated with exposure to the emissions will also be reduced.

California has implemented air emissions regulations for landfills under the state's air pollution control authority. The state has established control criteria, collection and control system requirements, testing and reporting requirements, and exemption criteria for MSW landfills. Control criteria include levels of tested air contaminants, average maximum concentrations of total organics over a certain area, and maximum concentration of organic compounds as methane at any location along the landfill surface. These requirements have been incorporated into YSAQMD Rule 2.38, which is discussed further below.

Truck and Bus Regulation

The Truck and Bus Regulation is a key element of both CARB's Diesel Risk Reduction Plan for reducing diesel risk and the SIP for attaining and maintaining the NAAQS. The regulation requires all diesel vehicles with a Gross Vehicle Weight Rating greater than 14,000 pounds (lb) that operate in California to meet model year 2010 emission standards before January 1, 2023 (CARB 2019a:1). This regulation will result in trucks generating less emissions of criteria air pollutants and precursors, as well as diesel PM.

LOCAL

Yolo-Solano County Air Quality Management District

Criteria Air Pollutants

YSAQMD is the primary agency responsible for attaining and maintaining the NAAQS and CAAQS in Yolo County and the norther portion of Solano County. YSAQMD works with other local air districts in the Sacramento region to maintain the region's portion of the SIP for ozone. The SIP is a compilation of plans and regulations that govern how the region and state will comply with the federal Clean Air Act requirements to attain and maintain the NAAQS for ozone. The Sacramento Region has been designated as a "severe" 8-hour ozone nonattainment area with an extended attainment deadline of June 15, 2019.

YSAQMD attains and maintains air quality conditions in Yolo and northern Solano counties through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The clean air strategy of YSAQMD includes the adoption and enforcement of rules and regulations, and issuance of permits for stationary sources, including landfills. YSAQMD also inspects stationary sources, responds to citizen complaints, monitors ambient air quality and meteorological conditions, and implements other programs and regulations required by the CAA and its amendments and the CCAA.

All projects are subject to adopted YSAQMD rules and regulations in effect at the time of construction. Specific rules applicable to the construction and operation of the project may include but are not limited to the following:

- Rule 2.3—(Ringelmann Chart). This rule prohibits stationary diesel-powered equipment from generating visible emissions that would exceed the rule's visibility threshold.
- Rule 2.5—(Nuisance). This rule prohibits any source from generating air contaminants or other materials that would that would cause injury, detriment, nuisance, or annoyance to the public; endanger the comfort, repose, health, or safety of the public; or damage businesses or property. Under Rule 2.6, the provisions of Rule 2.5. do not apply to odors emanating from agricultural operations in the growing of crops or raising of fowl, animals, or bees.
- Rule 2.11—(Particulate Matter Concentration). This rule prohibits any source that would emit dust, fumes, or total suspended particulate matter from generated emissions that would exceed the rule's established emission concentration limit.
- Rule 2.14—(Architectural Coatings). This rule establishes volatile organic compound (VOC) content limits for all architectural coatings supplied, sold, offered for sale, applied, solicited for application, or manufactured within YSAQMD's jurisdiction.
- Rule 2.28—(Cutback and Emulsified Asphalts). This rule establishes organic compound limits for cutback and emulsified asphalts manufactured, sold, mixed, stored, used, and applied within YSAQMD's jurisdiction.
- Rule 2.38—(Standards for Municipal Solid Waste Landfills). This rule limits the emission of NMOCs from existing MSW landfills and implements the Emission Guidelines for Municipal Solid Waste Landfills as promulgated by the U.S. EPA at 40 Code of Federal Regulations Part 60 Subpart Cc.
- Rule 3.1—(General Permit Requirements). This rule establishes permitting processes (i.e., Authority to Construct and Permit to Operate) to review new and modified sources of air pollution.
- Rule 3.4—(New Source Review). This rule would require any new or modified stationary source that generates emissions that exceed established emissions limits for each pollutant (i.e., reactive organic gases [ROG], oxides of nitrogen (NO_X), sulfur oxides, PM_{10}, CO, and lead) to comply with best available control technology (BACT) requirements and emissions offset requirements.
- Rule 3.8—(Federal Operating Permits). This rule establishes the requirement for facilities to obtain permits associated with requirements under Title V of the CAA. The most common type of Title V source is one that meets YSAQMD's threshold as a "major source." Currently, YSAQMD's thresholds for a major source are:
  - 100 tons per year of any pollutant subject to regulation,
  - 25 tons per year of volatile organic compounds or nitrous oxides,
  - 10 tons per year of any single hazardous air pollutant, and
  - 25 tons per year of two or more hazardous air pollutants.

YSAQMD also issues Emission Reduction Credits (ERCs) to entities to reduce their emissions beyond limits established by YSAQMD, state, or federal requirements. YSAQMD typically only requires ERCs in permit applications with substantial new criteria pollutant emissions. Sources that are required to offset their proposed emissions with ERCs can use their own banked ERCs or purchase them from another ERC holder.

Additionally, YSAQMD has developed a set of guidelines for use by lead agencies when preparing impact analyses for California Environmental Quality Act (CEQA) documentation (YSAQMD 2007). The guidelines contain thresholds of significance for criteria pollutants and TACs, and also make recommendations for conducting air quality analyses. After YSAQMD guidelines have been consulted and the air quality impacts of a project have been assessed, the lead agency's analysis undergoes a review by YSAQMD. YSAQMD submits comments and suggestions to the lead agency for incorporation into the environmental document.

Toxic Air Contaminants

At the local level, air districts may adopt and enforce CARB's control measures. Under YSAQMD Rule 3-1 ("General Permit Requirements"), Rule 3-4 ("New Source Review"), and Rule 3-8 ("Federal Operating Permits"), all sources that possess the potential to emit TACs are required to obtain permits from YSAQMD. Permits may be granted to these operations if they are constructed and operated in accordance with applicable regulations, including the New Source Review standards outlined in Rule 3-4 and air-toxics control measures. YSAQMD limits emissions and public exposure to TACs through many programs. YSAQMD prioritizes the permitting of TAC-emitting stationary sources based on the quantity and toxicity of the TAC emissions and the proximity of the facilities to sensitive receptors. Sensitive receptors are people, or facilities that generally house people (e.g., schools, hospitals, residences), that may experience adverse effects from unhealthful concentrations of air pollutants.

Sources that require a permit are analyzed by YSAQMD (e.g., health risk assessment [HRA]) based on their potential to emit TACs and expose receptors. If it is determined that a project would emit TACs in excess of YSAQMD's applicable threshold of significance, sources would be required to implement BACT to reduce TAC emissions. If a source cannot reduce the risk below the threshold of significance even after BACT has been implemented, YSAQMD will deny the permit required by the source. This helps to prevent new problems and reduces emissions from existing older sources by requiring them to apply new technology when retrofitting with respect to TACs. Although YSAQMD regulates sources that generate TACs but does not regulate land uses that may be sited in locations exposed to TACs. The decision on whether to approve projects in TAC-exposed locations is typically the responsibility of the lead agency charged with determining whether to approve a project.

Odors

Although offensive odors rarely cause any physical harm, they can be very unpleasant, leading to considerable stress among the public and often generating citizen complaints to local governments and YSAQMD. YSAQMD Rule 2.5 (Nuisance) addresses odorous emissions.

Solano County General Plan

The Public Health and Safety Chapter of the County's General Plan (update adopted August 11, 2015) contains goals, policies, and actions that pertain to emissions of air pollutants, TACs, and odors include. Key general plan goals, policies, and implementation programs applicable to the project and air quality include the following:

GOAL HS.G-2. Improve air quality in Solano County, and by doing so; contribute to improved air quality in the region.

GOAL HS.G-4. Protect important agricultural, commercial, and industrial uses in Solano County from encroachment by land uses sensitive to noise and air quality impacts.

- **Policy HS.P-43.** Support land use, transportation management, infrastructure and environmental planning programs that reduce vehicle emissions and improve air quality.
- **Policy HS.P-44.** Minimize health impacts from sources of toxic air contaminants, both stationary (e.g., refineries, manufacturing plants) as well as mobile sources (e.g., freeways, rail yards, commercial trucking operations).
- **Policy HS.P-45.** Promote consistency and cooperation in air quality planning efforts.
    - **Implementation Program HS.I-51.** Adopt a trip reduction ordinance and encourage employers to develop practices that reduce employees' vehicle trips. Such practices include telecommuting, provision of bicycle facilities, and provision of shuttles to public transit.

- **Implementation Program HS.I-52.** Require that when development proposals introduce new significant sources of toxic air pollutants, they prepare a health risk assessment as required under the Air Toxics "Hot Spots" Act (AB 2588, 1987) and, based on the results of the assessment, establish appropriate land use buffer zones around those areas posing substantial health risks.
- **Implementation Program HS.I-54.** Require the implementation of best management practices to reduce air pollutant emissions associated with the construction of all development and infrastructure projects.
- **Implementation Program HS.I-56.** Comply with the California Air Resources Board and Bay Area or Yolo-Solano Air Quality Management District rules, regulations, and recommendations for Solano County facilities and operations. Such operations shall comply with mandated measures to reduce emissions from fuel consumption, energy consumption, surface coating operations, and solvent usage.
- **Implementation Program HS.I-57.** Encourage coordination between the Bay Area and Yolo-Solano Air Quality Management Districts for consistency in air quality planning efforts.
- **Implementation Program HS.I-59.** Assess air quality impacts using the latest version of the California Environmental Quality Act Guidelines and guidelines prepared by the applicable Air Quality Management District.

4.2.2 Environmental Setting

The RHR Landfill is located in an unincorporated area of northern Solano County, the majority of which is within the Sacramento Valley Air Basin (SVAB). The SVAB also includes all of Butte, Colusa, Glenn, Sacramento, Shasta, Sutter, Tehama, Yolo, and Yuba counties; and the eastern portion of Solano County. The portion of the RHR Landfill property starting at the borrow pit and westward is located within the San Francisco Bay Area Air Basin (SFBAAB). However, because of local climate conditions at the project site, the following environmental setting focuses on the regional conditions of the SVAB, as they are considered most representative of the project site and immediate area.

The ambient concentrations of air pollutant emissions are determined by the amount of emissions released by the sources of air pollutants and the atmosphere's ability to transport and dilute such emissions. Natural factors that affect transport and dilution include terrain, wind, atmospheric stability, and sunlight. Therefore, existing air quality conditions in the area are determined by such natural factors as topography, meteorology, and climate, in addition to the amount of emissions released by existing air pollutant sources, as discussed separately below.

CLIMATE, METEOROLOGY, AND TOPOGRAPHY

The SVAB is a relatively flat area bordered by the north Coast Ranges to the west and the northern Sierra Nevada to the east. Air flows into the SVAB through the Carquinez Strait, the only breach in the western mountain barrier, and moves across the Sacramento–San Joaquin Delta (Delta) from the San Francisco Bay area.

The Mediterranean climate type of the SVAB is characterized by hot, dry summers and cool, rainy winters. During the summer, daily temperatures range from 50 degrees Fahrenheit (°F) to more than 100°F. The inland location and surrounding mountains shelter the area from most of the ocean breezes that keep the coastal regions moderate in temperature. Most precipitation in the area results from air masses that move in from the Pacific Ocean, usually from the west or northwest, during the winter months. More than half the total annual precipitation falls during the winter rainy season (November through February); the average winter temperature is a moderate 49°F. Also, characteristic of SVAB winters are periods of dense and persistent low-level fog, which are most prevalent between storms. The prevailing winds are moderate in speed and vary from moisture-laden breezes from the south to dry land flows from the north.

The mountains surrounding the SVAB create a barrier to airflow, which entraps air pollutants when meteorological conditions are unfavorable for transport and dilution. Poor air movement is most frequent in the fall and winter when high-pressure cells are present over the SVAB. The lack of surface wind during these periods, combined with the reduced vertical flow caused by a decline in surface heating, reduces the influx of air and leads to the concentration of air pollutants under stable meteorological conditions. Surface concentrations of air pollutant emissions are highest when these conditions occur in combination with agricultural burning activities or with temperature inversions, which hamper dispersion by creating a ceiling over the area and trapping air pollutants near the ground.

Elevated levels of ozone typically occur May through October in the SVAB. This period is characterized by poor air movement in the mornings until the arrival of the Delta sea breeze from the southwest in the afternoons. In addition, longer daylight hours provide a plentiful amount of sunlight to fuel photochemical reactions between ROG and NO_X, which result in ozone formation. Typically, the Delta breeze transports air pollutants northward out of the SVAB; however, a phenomenon known as the Schultz Eddy prevents this from occurring during approximately half of the time from July to September. The Schultz Eddy phenomenon causes the wind to shift southward and blow air pollutants back into the SVAB. This phenomenon exacerbates the concentration of air pollutant emissions in the area and contributes to the area violating the ambient air quality standards.

The local meteorology of the project site and surrounding area is represented by measurements recorded at the Solano County "Vacaville" weather station located in Vacaville, California. The normal annual precipitation is approximately 24.6 inches. January temperatures range from a normal minimum of 36.7°F to a normal maximum of 55.4°F. July temperatures range from a normal minimum of 56.1°F to a normal maximum of 95.2°F (WRCC 2019a). The predominant wind direction and speed, measured at the Vacaville Airport (KVCB), is from the south-southwest (SSW) at 6 miles per hour (WRCC 2019b & 2019c).

CRITERIA AIR POLLUTANTS

Concentrations of ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, PM_{10}, $PM_{2.5}$, and lead are used as indicators of ambient air quality conditions and are referred to as criteria air pollutants. Criteria air pollutants are air pollutants for which acceptable levels of exposure can be determined and for which an ambient air quality standard has been set by EPA and CARB. Additional information, including future trends and monitoring data at those monitoring stations located closest to the project site, is summarized in Table 4.2-2.

Table 4.2-2 Sources and Health Effects of Criteria Air Pollutants

Pollutant	Sources	Acute[1] Health Effects	Chronic[2] Health Effects
Ozone	Secondary pollutant resulting from reaction of ROG and NO_X in presence of sunlight. ROG emissions result from incomplete combustion and evaporation of chemical solvents and fuels; NO_X results from the combustion of fuels	increased respiration and pulmonary resistance; cough, pain, shortness of breath, lung inflammation	permeability of respiratory epithelia, possibility of permanent lung impairment
Carbon monoxide	Incomplete combustion of fuels; motor vehicle exhaust	headache, dizziness, fatigue, nausea, vomiting, death	permanent heart and brain damage
Nitrogen dioxide	combustion devices; e.g., boilers, gas turbines, and mobile and stationary reciprocating internal combustion engines	coughing, difficulty breathing, vomiting, headache, eye irritation, chemical pneumonitis or pulmonary edema; breathing abnormalities, cough, cyanosis, chest pain, rapid heartbeat, death	chronic bronchitis, decreased lung function
Sulfur dioxide	coal and oil combustion, steel mills, refineries, and pulp and paper mills	Irritation of upper respiratory tract, increased asthma symptoms	Insufficient evidence linking sulfur dioxide exposure to chronic health impacts

Pollutant	Sources	Acute[1] Health Effects	Chronic[2] Health Effects
Respirable particulate matter and Fine particulate matter	fugitive dust, soot, smoke, mobile and stationary sources, construction, fires and natural windblown dust, and formation in the atmosphere by condensation and/or transformation of sulfur dioxide and ROG	breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular diseases, premature death	alterations to the immune system, carcinogenesis
Lead	metal processing	reproductive/developmental effects (fetuses and children)	numerous effects including neurological, endocrine, and cardiovascular effects

Notes: NO_X = oxides of nitrogen; ROG = reactive organic gases.

1. "Acute" refers to effects of short-term exposures to criteria air pollutants, usually at relatively high concentrations.

2. "Chronic" refers to effects of long-term exposures to criteria air pollutants, usually at lower, ambient concentrations.

Sources: EPA 2018; Godish 2004:169–70

Attainment Designations

The air quality of the SVAB is determined by routinely monitoring changes in the quantities of criteria pollutants in the ambient environment. Air quality in the area is a function of the criteria pollutants emitted locally, the existing regional ambient air quality, and the meteorological and topographic factors, which influence the intrusion of pollutants into the area from sources outside the immediate vicinity.

CARB, YSAQMD, and other air districts in the Sacramento region maintain ambient air quality monitoring stations at numerous locations throughout the SVAB. The stations provide information on average concentrations of criteria air pollutants. These data are measured against the NAAQS and CAAAQS established by EPA and CARB to protect human health and welfare. Geographic areas are designated "attainment" if these standards are met and "nonattainment" if they are not met. "Unclassified" is used in an area that cannot be classified based on available information as meeting or not meeting the standards.

Solano County is designated as nonattainment with respect to the NAAQS and CAAQS for ozone (CARB 2017a) and the northern portion of Solano County, including the project site, is part of the Sacramento Federal Nonattainment Area (SMAQMD n.d.). Solano County is also designated as nonattainment with respect to the NAAQS for $PM_{2.5}$ and nonattainment with respect to the CAAQS for PM_{10}. Solano is designated as attainment or unclassified with respect to the NAAQS and CAAQS for all other criteria air pollutants (CARB 2017a).

Criteria air pollutants and precursors emitted by existing operations at the landfill include ROG, NO_X, PM_{10}, $PM_{2.5}$, and SO_X (SCS Engineers 2019:42, 48).

TOXIC AIR CONTAMINANTS

The majority of the estimated health risks from TACs can be attributed to relatively few compounds, the most important being diesel PM (CARB 2005:12; CARB 2000:15). Diesel PM differs from other TACs in that it is not a single substance, but rather a complex mixture of hundreds of substances (CARB 2013:2-4). Although diesel PM is emitted by diesel-fueled internal combustion engines, the composition of the emissions varies depending on engine type, operating conditions, fuel composition, lubricating oil, and whether an emissions control system is being used. Unlike the other TACs, no ambient monitoring data are available for diesel PM because no routine measurement method currently exists. However, CARB has made preliminary concentration estimates based on a PM exposure method. This method uses the CARB emissions inventory's PM_{10} database, ambient PM_{10} monitoring data, and the results from several studies to estimate concentrations of diesel PM. In addition to diesel PM, the TACs for which data are available that pose the greatest existing ambient risk in California are benzene, 1,3-butadiene, acetaldehyde, carbon tetrachloride, hexavalent chromium, para-dichlorobenzene, formaldehyde, methylene chloride, and perchloroethylene. Diesel PM poses the greatest health risk among these 10 TACs mentioned (CARB 2000:16).

Based upon data from other landfills, TAC constituents in LFG typically consist of benzene, chloroform, methylene chloride, perchloroethylene (PCE), trichloroethylene (TCE), vinyl chloride (VC), and others. At the existing landfill, TACs are associated with current equipment operations, as well as LFG facilities, including flaring. A health risk assessment prepared for the landfill in 2012 indicates that it emits 25 different TACs (Douglas Environmental 2012: Table 3-3). Diesel trucks traveling to and from the landfill are sources of diesel PM, as are heavy equipment used at the landfill.

ODORS

The existing landfill and composting operation are the subject of multiple odor complaints received by the Solano County Department of Resource Management. County staff investigate as many complaints as possible to determine whether an adverse odor is present and the source of the odor. According to the most recent Odor Management and Compliance Reports, since 2015 the Solano County Department of Resource Management has verified one odor complaint resulting in a Notice of Violation (NOV), and three complaints resulting in an Area of Concern (AOC) determination. All verified odor complaints have been attributed to operations at the Jepson Prairie Organics (JPO) composting facility. Condition 12C of Land Use Permit No. U-11-09 for Recology and JPO requires submission of an annual Odor Management Compliance Report that details odor sources and sensitive receptors, a list of complaints and violations including descriptions of their resolutions, and a description of odor control strategies that have been implemented or proposed. These reports are reviewed every two years by the Solano County Department of Resource Management (Solano County 2017, 2019).

In 2014, the design of the engineered compost system at JPO was modified to help reduce odors. HDPE perforated collection pipes were installed in the compost vaults, the tarps previously used to cover the compost piles were replaced with a biocover, and an additional biofilter and blower were installed. These modifications increased air flow through the compost zones, reducing the intensity of onsite odors.

The Solano County Department of Resource Management Local Enforcement Agency (LEA) investigates all odor complaints in coordination with JPO. LEA and JPO investigators meet with the complainant at their residence to determine whether the odor complaint and the reported odors can be confirmed. If no odors are detectable, the complaint is deemed unverified. If an odor is present, the investigators will quantify the odor intensity utilizing an olfactory meter. Of the 135 complaints received between September 2015 and May 2017, one Notice of Violation (NOV) and three Area of Concern (AOC) designations were issued. From October 2017 to May 2019, there were 32 odor complaints received, and no NOVs or AOCs were issued. None of the complaints were verified, and thus no LEA action was required.

SENSITIVE LAND USES

Sensitive receptors are generally considered to include those land uses where exposure to pollutants could result in health-related risks to sensitive individuals. Land uses such as primary and secondary schools, hospitals, and convalescent homes are considered to be relatively sensitive to poor air quality because the very young, the old, and the infirm are more susceptible to respiratory infections and other air quality-related health problems than the general public.

Three rural residences are located within a 2-mile radius of the landfill. Two of the residences are located approximately 1.5 miles west of the landfill. One residence is located approximately 1.25 miles south of the landfill and one residence is located approximately 1.0 mile north of the landfill. There are no schools, childcare centers, hospitals, or senior centers located within 2.0 miles of the landfill.

The routes used by haul trucks traveling to and from the landfill, which are shown in Figure 3-1, pass by multiple residential dwellings. Also, there is a childcare center located on the east side of the segment of Lewis Road north of Hay Road, which is one of the routes used by trucks traveling to and from the landfill.

4.2.3 Environmental Impacts and Mitigation Measures

SIGNIFICANCE CRITERIA

For the purposes of this Subsequent Environmental Impact Report (SEIR), impacts related to air quality emissions are considered significant if the proposed project would:

- conflict with or obstruct implementation of the applicable air quality plan;
- result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable NAAQS or CAAQS;
- expose sensitive receptors to substantial pollutant concentrations; or
- result in other emissions (such as those leading to odors adversely affecting a substantial number of people).

As stated in Appendix G of the CEQA Guidelines, the significance criteria established by the applicable air quality district may be relied upon to make the above determinations. Thus, according to guidance from YSAQMD, the project would result in a significant impact to air quality if it would result in the following during either short-term construction or long-term operation:

- result in emissions of criteria air pollutants or precursors to exceed 10 tons per year (tons/year) for ROG, 10 tons/year for NO_X, 80 pounds per day (lb./day) of PM_{10}, or substantially contribute to CO concentrations that exceed the CAAQS (YSAQMD 2007:6).

However, these mass emission thresholds for criteria air pollutants and precursors do not apply to emissions directly generated by stationary sources, including the increase in emissions in landfill gas and emissions generated by the Construction and Demolition Sorting Operation. In its CEQA guidance, YSAQMD states that "stationary sources complying with applicable [YSAQMD] regulations pertaining to Best Available Control Technologies (BACT) and offset requirements usually will not be considered a significant air quality impact. This qualification does not exempt projects with any special circumstances such as emitting objectionable odors that cause a nuisance to nearby receptors, having significant cumulative effects, or emissions associated with construction of the stationary source" (YSAQMD 2007:20).

Also, some of the project-generated vehicle trips would travel in the San Francisco Bay Area Air Basin (SFBAAB), which is under the jurisdiction of BAAQMD and the emissions-generating activity in the SFBAAB would be subject to BAAQMD's CEQA guidance. According to guidance from BAAQMD, operation of the project, including project-related vehicle trips, would result in a significant impact to air quality if it would:

- result in average daily operational emissions of ROG, NO_X, or $PM_{2.5}$ that exceeds 54 lb./day; average daily emissions of PM_{10} that exceeds 82 lb./day; annual emissions of ROG, NO_X, or $PM_{2.5}$ that exceeds 10 tons/year; or annual emissions of PM_{10} that exceeds 15 tons/year (BAAQMD 2017:2-2).

For the evaluation of TAC emissions, YSAQMD considers proposed projects that have the potential to expose the public to TACs from stationary sources in excess of the following thresholds to have a significant impact. These thresholds are based on YSAQMD's Risk Management Policy (YSAQMD 2007:7).

- Probability of contracting cancer for the Maximally Exposed Individual (MEI) equals to 10 in one million or more; and/or
- Ground-level concentrations of non-carcinogenic TACs would result in a hazard index equal to or greater than 1 for the MEI.

Because YSAQMD has not developed thresholds of significance for evaluating the exposure of sensitive receptors to mobile-source TACs, Solano County and its consultants are choosing, for this SEIR, to apply these same incremental increase thresholds to evaluate the impact of diesel PM generated by truck trips associated with the project and the exposure of diesel PM to residential land uses located along the roadway on which these trips would travel. This

approach aligns with General Plan Goal HS.P-44, which calls for the minimization of health impacts from both stationary and mobile sources of TACs. It also aligns with goal HS.I-52, which requires that when development proposals introduce new significant sources of TACs, they prepare a health risk assessment. BAAQMD recommends the same incremental increase thresholds and does so for both stationary sources and mobile sources (BAAQMD 2017:2-2).

For the evaluation of odorous emissions, YSAQMD considers there to be a significant impact of a project causes odorous emissions in such quantities as to cause detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which may endanger the comfort, repose, health, or safety of any such person or the public, or which may cause, or have a natural tendency to cause, injury or damage to business or property (YSAQMD 2007:8).

On a cumulative basis, YSAQMD finds that any exceedance of project-level thresholds would also result in a significant cumulative impact. In addition, YSAQMD considers combined CO impacts from the project and other existing projects (i.e., background concentration) that exceed air quality standards as cumulatively considerable.

METHODOLOGY

Evaluation of the project's impacts to air quality were based on an Air Quality Impact Assessment prepared by SCS Engineers (SCS Engineers 2019), supplemental calculations, and a health risk analysis. The Air Quality Impact Assessment is provided in Appendix D. The supplemental emissions calculations are provided in Appendix E. And the health risk calculations are provided in Appendix F. The methods of analysis are consistent with recommendations of the Yolo-Solano Air Quality Management District (YSAQMD), Bay Area Air Quality Management District (BAAQMD), California Air Resources Board (CARB), and U.S. Environmental Protection Agency (EPA).

Regional and local criteria air pollutant emissions and associated impacts, as well as impacts from TACs, CO concentrations, and odors were assessed in accordance with YSAQMD-recommended methodologies, where available.

Construction-Related Emissions Criteria Pollutant Emissions

Short-term construction-related emissions of criteria air pollutants and precursors were calculated using the California Emissions Estimator Model (CalEEMod) Version 2016.3.2 computer program (CAPCOA 2016). CalEEMod was used to calculate emissions generated during the construction phase of the project. Modeling was based on project-specific information (e.g., schedule, are of disturbance), where available, and default values in CalEEMod that are based on the project's location, land use type, and type of construction activity. Specific CalEEMod modeling inputs and assumptions can be found the Air Quality Impact Assessment in Appendix D.

Operational Emissions of Criteria Air Pollutants and Precursors

Stationary-source emissions from the landfill are not analyzed further in this SEIR because they would be subject to YSAQMD's permitting requirements. Per YSAQMD's CEQA guidance, stationary sources complying with applicable District regulations pertaining to BACT and offset requirements are not considered a significant air quality impact (YSAQMD 2007:20).

Operational mobile-source emissions of criteria air pollutants and precursors were estimated using project-specific information, where available, and default values in CARB's Emission Factor Web Database, version 1.0.2 (EMFAC2017) (CARB 2017b) based on the project's location and land use characteristics. Mobile-source emissions were estimated using the number of project-generated vehicle trips provided by the traffic analysis used to support Section 4.11, "Transportation and Circulation" (KD Anderson 2018:14), which is provided in Appendix G of this Draft SEIR. Operational emissions from all sources were estimated, and detailed model assumptions and inputs for these calculations can be found in Appendix E.

Toxic Air Contaminants and Related Health Risk

Construction-generated TACs were qualitatively analyzed based on the types of diesel-powered construction equipment and the number of each type that would be used, the duration in which construction activity would produce diesel PM exhaust in the same location, the size of the area in which construction activity would occur, and the proximity of construction activity to offsite sensitive receptors.

TACs emitted by long-term operations at the landfill were also evaluated qualitatively based on the types of TAC-emitting activities that would take place at the landfill. This analysis accounts for the daily use of diesel PM–emitting heavy equipment and TACs generated by the landfill itself relative to existing conditions, as well as the applicable permitting requirements of YSAQMD, and the distance to the nearest offsite sensitive receptors.

A quantitative analysis was conducted to address the potential health risk that would result from the increase in project-related diesel truck trips on local roadways that would pass by existing residential land uses. A health risk assessment (HRA) was conducted using the CARB-approved American Meteorological Society/Environmental Protection Agency Regulatory Model Improvement Committee modeling system (AERMOD), Version 18081 (EPA 2018) with the graphical user interface, AERMOD View, Version 9.7.0 (Lakes Environmental 2019). Cancer risk levels at offsite receptors were estimated using the risk module of CARB's Hotspots Analysis Reporting Program, Version 2 (HARP2) (CARB 2019b). AERMOD is a steady-state plume model that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources and terrain. All modeling was conducted according to guidance published by the Office of Environmental Health Hazard Assessment (OEHHA) (OEHHA 2015) and guidance published by the San Joaquin Valley Air Pollution Control District (SJVAPCD 2006) in consultation with YSAQMD staff. The AERMOD modeling estimated diesel PM concentrations at residential land uses located along the haul routes. Source inputs included the local routes used by project-related truck trips, which were modeled as line sources. The volume of truck trips using each haul route is based on the same data used to prepare the traffic impact analysis for the project (KD Anderson 2018), which is provided in Appendix G. Emissions rates for truck-generated diesel PM were estimated using emission factors in the EMFAC2017 model (CARB 2017b) and account for the expected decrease in emissions over a 30-year exposure period (i.e., 2020–2049) due to ongoing compliance with CARB's Truck and Bus Regulation. Computation of the emission rates is provided in Appendix E. The cancer risk associated with exposure to these concentrations and the duration of exposure were determined using YSAQMD-approved methods. Refer to Appendix F for detailed model input assumptions and output results. Cancer risk is the primary concern for exposure to diesel PM because it is substantially greater than non-cancer chronic and acute risks.

Odors

Odors are generally regarded as an annoyance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache). The ability to detect odors varies considerably among the population and overall is quite subjective. Some individuals can smell very minute quantities of specific substances; others may not have the same sensitivity to odors in general; and still others may not be sensitive to a specific substance but may have sensitivities to odors of other substances. In addition, people may have different reactions to the same odor; an odor that is offensive to one person may be perfectly acceptable to another (e.g., fast food restaurant or coffee roaster). It is important to also note that an unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. This is because of the phenomenon known as odor fatigue, in which a person can become desensitized to almost any odor and recognition only occurs with an alteration in the intensity.

The assessment of odor-related impacts was based on the types of odor sources associated with the project, the degree of change compared to existing conditions, and the project's location relative to existing offsite sensitive receptors.

ISSUES NOT DISCUSSED FURTHER

The proposed project would increase the number of transfer trucks, packer trucks, and self-haul vehicles travelling to and from the project site. However, the traffic impact analysis (Appendix G of this Draft SEIR) determined that, under existing-plus-project conditions, the peak-hour level of service at affected intersections would operate at an acceptable level of service (i.e., Level of Service C or better) (KD Anderson 2018:19–20). According to screening criteria recommended by YSAQMD, mobile sources do not have the potential to generate CO concentrations that exceed the NAAQS or CAAQS for CO at intersections with an unacceptable level of service (i.e., level of service E or F) (YSAQMD 2007:10–11). Therefore, localized CO impacts would not occur at an of the study intersections and CO concentrations are not discussed further.

PROJECT IMPACTS AND MITIGATION MEASURES

Impact 4.2-1: Construction-Related Emissions of Criteria Air Pollutants and Precursors

Project construction would generate emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$. from grading, excavation, and installation of the geomembrane. Emissions would be generated by heavy-duty, off-road equipment and by worker commute trips and trucks hauling materials and equipment to the site. However, construction activities would not generate emissions of ROG, NO_X, and PM_{10} that would exceed YSAQMD-recommended mass emission thresholds. Therefore, construction-generated emissions of criteria air pollutants and precursors would not conflict with the air quality planning efforts in the region or contribute substantially to the nonattainment status of SVAB with respect to the NAAQS and CAAQS for ozone, the CAAQS for PM_{10}, or the NAAQS for $PM_{2.5}$. Thus, emissions generated during the project's construction would not contribute to air quality–related health complications experienced by people living in the SVAB. This impact would be **less than significant**.

Construction-related activities would generate emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ from off-road equipment used for grading, excavation, and installation of the geomembrane; on-road trucks used for material delivery and equipment hauling; and worker commute trips. Fugitive dust PM_{10} and $PM_{2.5}$ emissions would be associated primarily with ground disturbance and vary as a function of soil silt content, soil moisture, wind speed, and acreage of disturbance. PM_{10} and $PM_{2.5}$ would also be contained in exhaust from off-road equipment and on-road vehicles. Emissions of ozone precursors, ROG and NO_X, would be associated primarily with the exhaust generated by off-road equipment and on-road vehicles.

Emissions were estimated using the construction module of CalEEMod (CAPCOA 2016) and are summarized in Table 4.2-3. Construction is anticipated to begin in 2020 and last approximately 2 years. The modeling of construction emissions conservatively assumed that all of the construction would be completed in 2020. Detailed modeling assumptions and input parameters are provided in Appendix D.

Table 4.2-3 Summary of Construction-Related Emissions of Criteria Air Pollutants and Precursors

	ROG	NO_X	PM_{10}	$PM_{2.5}$
units	tons/year	tons/year	lb./day	lb./day
Construction-Generated Emissions	0.7	7.8	54.4	11.3
YSAMQD Threshold of Significance	10	10	80	—[1]

Notes: ROG=reactive organic gases; NO_X=oxides of nitrogen; PM_{10}=respirable particulate matter with an aerodynamic diameter of 10 micrometers or less; $PM_{2.5}$=respirable particulate matter with an aerodynamic diameter of 2.5 micrometers or less; tons/year=tons per year; lb./day=pounds per day; YSAQMD=Yolo County Air Quality Management District

See Appendix D for detailed inputs and modeling results.

1. YSAQMD does not recommend mass emission-based significance criteria for $PM_{2.5}$. $PM_{2.5}$ is shown for informational purposes.

Source: Modeling conducted by Trinity Consultants and compiled by SCS Engineers 2019.

As shown in Table 4.2-3, construction activities would not generate emissions of ROG, NO_X, and PM_{10} that would exceed YSAQMD-recommended mass emission thresholds. Therefore, construction-generated emissions of criteria air pollutants and precursors would not conflict with the air quality planning efforts in the region or contribute substantially to the nonattainment status of SVAB with respect to the NAAQS and CAAQS for ozone, the CAAQS for PM_{10}, or the NAAQS for $PM_{2.5}$. Thus, emissions generated during the project's construction would not contribute to air quality–related health complications experienced by people living in the SVAB. This impact would be **less than significant**.

Mitigation Measures

No mitigation is required.

Impact 4.2-2: Long-Term Operational Emissions of Criteria Air Pollutants and Precursors

The increase in project-related truck travel would generate levels of NO_X in the SFBAAB that exceed BAAQMD-recommended daily mass emission thresholds. Therefore, operational emissions could conflict with the air quality planning efforts in the SFBAAB or contribute substantially to the nonattainment status of SFBAAB with respect to the NAAQS and CAAQS for ozone and the project's operational emissions could contribute to air quality–related health complications experienced by people living in the SFBAAB. This would be a **significant** impact.

Stationary-source emissions from the landfill are not analyzed further in this SEIR because they would be subject to YSAQMD's permitting requirements and, per YSAQMD's CEQA guidance, stationary sources complying with applicable District regulations pertaining to BACT and offset requirements are not considered a significant impact to air quality (YSAQMD 2007:20).

Nonetheless, expansion of the landfill and the increase in the rate of waste brought to the land fill would result in an increase in operational emissions of criteria air pollutants and precursors contained in landfill gas emitted by the landfill. Emissions of criteria air pollutants and precursors would also increase due to modification of the Construction and Demolition Sorting Operation, which would involve the use of diesel generator and other stationary equipment. Emission levels from these stationary sources were estimated in the Air Quality Impact Assessment prepared by SCS Engineers (SCS Engineers 2019) and included in Appendix D. Because these new stationary sources would comply with applicable YSAQMD regulations pertaining to BACT and offset requirements they would not be considered to be in conflict with air quality planning efforts in the SVAB or to contribute substantially to the existing nonattainment status of the SVAAB with respect to the NAAQS and CAAQS for ozone, the NAAQS for $PM_{2.5}$, or the CAAQS for PM_{10}.

However, the 780-ton-per-day increase in average daily throughput associated with the project would also result in approximately 195 additional round trips per day by haul trucks, as explained in the traffic impact analysis prepared for the project (KD Anderson 2018:13), and emissions from this truck activity would not be subject to permitting requirements of YSAQMD or BAAQMD. Table 4.2-4 summarizes the average daily and annual emissions of criteria air pollutants and precursors that would be generated by this increase in truck travel in 2020, which is the earliest year in which the project could become fully operational. Emissions were calculated using EMFAC2017 and detailed modeling parameter are included in Appendix E.

Table 4.2-4 Operational Mobile-Source Emissions of Criteria Air Pollutants and Precursors in 2020

	Tons per Year				Pounds per Day			
	ROG	NO_X	PM_{10}	$PM_{2.5}$	ROG	NO_X	PM_{10}	$PM_{2.5}$
Emissions in SVAB	<0.1	1.7	<0.1	<0.1	0.1	9.3	0.2	0.1
YSAMQD Threshold of Significance	10	10	—	—[1]	—	—	80	—[1]
Emissions in SFBAAB	0.7	20.3	0.9	0.6	3.9	111	5.0	3.1
BAAQMD Threshold of Significance	10	10	15	10	54	54	82	54

Notes: SVAB = Sacramento Valley Air Basin; SFBAAB = San Francisco Bay Area Air Basin; ROG=reactive organic gases; NO_X=oxides of nitrogen; PM_{10}=respirable particulate matter with an aerodynamic diameter of 10 micrometers or less; $PM_{2.5}$=respirable particulate matter with an aerodynamic diameter of 2.5 micrometers or less; YSAQMD=Yolo County Air Quality Management District

See Appendix E for detailed inputs and modeling results.

1. YSAQMD does not recommend mass emission-based significance criteria for $PM_{2.5}$. $PM_{2.5}$ is shown for informational purposes.

Source: Ascent Environmental 2019.

As shown in Table 4.2-4, in 2020, operational emissions of NO_X in the SFBAAB would exceed the BAAQMD-recommended mass emission thresholds of 54 lb./day for average daily emissions and 10 tons/year for annual emissions. However, emissions from trucks are anticipated to decrease due to the requirements of the Truck and Bus Regulation. As described in Section 4.2.2, "Environmental Setting," this regulation requires all diesel vehicles with a Gross Vehicle Weight Rating greater than 14,000 pounds to meet model year 2010 emission standards before January 1, 2023, resulting in less emissions of criteria air pollutants and precursors (CARB 2019a:1). Table 4.2-5 summarizes the

average daily and annual emissions of criteria air pollutants and precursors that would be generated by this increase in truck travel in 2023, which is the earliest year when full compliance with CARB's Truck and Bus Regulation would be achieved. Emissions were calculated using EMFAC2017 and detailed modeling parameter are included in Appendix E. EMFAC2017 estimates emission rates for all vehicle types in future calendar years and accounts for full compliance with the Truck and Bus Regulation by January 1, 2023 (CARB 2018:17–18, 54–58, 64–65, 67).

Table 4.2-5 Operational Mobile-Source Emissions of Criteria Air Pollutants and Precursors in 2023

	Tons per Year				Pounds per Day			
	ROG	NO_X	PM_{10}	$PM_{2.5}$	ROG	NO_X	PM_{10}	$PM_{2.5}$
Emissions in SVAB	<0.1	1.4	<0.1	<0.1	0.1	7.7	0.2	0.1
YSAMQD Threshold of Significance	10	10	—	—[1]	—	—	80	—[1]
Emissions in SFBAAB	0.1	8.9	0.6	0.3	0.5	49.0	5.0	1.5
BAAQMD Threshold of Significance	10	10	15	10	54	54	82	54

Notes: SVAB = Sacramento Valley Air Basin; SFBAAB = San Francisco Bay Area Air Basin; ROG=reactive organic gases; NO_X=oxides of nitrogen; PM_{10}=respirable particulate matter with an aerodynamic diameter of 10 micrometers or less; $PM_{2.5}$=respirable particulate matter with an aerodynamic diameter of 2.5 micrometers or less; YSAQMD=Yolo County Air Quality Management District

See Appendix E for detailed inputs and modeling results.

1. YSAQMD does not recommend mass emission-based significance criteria for $PM_{2.5}$. $PM_{2.5}$ is shown for informational purposes.

Source: Ascent Environmental 2019.

As shown in Table 4.2-5, project-related truck travel would not generate levels of NO_X, or other criteria air pollutants or precursors that exceed air district thresholds.

Nonetheless, because project-related truck travel in the SFBAAB would generate levels of NO_X that exceed BAAQMD's mass emission threshold, and because NO_X is a precursor to ozone, this increase could conflict with the air quality planning efforts in the region or contribute substantially to the nonattainment status of SFBAAB with respect to the NAAQS and CAAQS for ozone until 2023 when trucks all trucks achieve compliance with CARB's Truck and Bus Regulation. Before 2023, the project's operational emissions of NO_X could contribute to air quality–related health complications experienced by people living in the SFBAAB. This would be a **significant** impact.

Mitigation Measures

Mitigation Measure 4.2-2: Ensure Truck-Generated Emissions of NO_X in the San Francisco Bay Area Air Basin Will Not Exceed BAAQMD-recommended Mass Emission Criteria

The applicant shall demonstrate compliance with one or a combination of the following mitigation options to ensure that the level of NO_X emissions in the SFBAAB associated with project-related truck trips does not exceed BAAQMD's recommended significance criteria of 54 lb/day and 10 tons/year. Within 60 days of use permit approval, the applicant shall submit to the Planning Services Division of the Department of Resource Management, a detailed action plan that demonstrates implementation of this measure.

- **Option A. Achieve Early Compliance with the Truck and Bus Regulation.**, the applicant shall retrofit and/or upgrade its fleet of trucks to fully comply with CARB's Truck and Bus Regulation prior to increasing average daily throughput at RHR landfill and before January 1, 2023, which is the date by which all trucks are required to comply with the emissions standards imposed by the Truck and Bus Regulation. The action plan submitted for this mitigation measure shall include an inventory of the vehicles to be retrofitted or upgraded and may include a phased approach. After January 1, 2023, Recology shall contract with haulers that are compliant and certified with CARB's Truck and Bus Regulations.

- **Option B. Pay an Offset Fee to a Third-Party to Fund NO_X Emissions Offsets.** The applicant shall purchase and retire NO_X offset credits sufficient to offset NO_X emissions in the SFBAAB at a rate of 57 lb/day and 10.3 tons/year from to a third-party non-profit (e.g., Bay Area Clean Air Foundation) or governmental entity prior to the receiving an increase in truck trips greater than the limits identified in Option B. The NO_X emission offset credits must be used to fund a NO_X reduction project in the SFBAAB. The cost of the credits, as well as any related administrative costs, shall be paid by the applicant. The applicant shall provide to the county the agreement that specifies the payment fee, timing of payment, and offset mechanism. This agreement must be signed by the applicant and the third-party entity. The specific emissions reduction project must result in emission reductions within the SFBAAB that are real, surplus, quantifiable, and enforceable and would not otherwise be achieved through compliance with existing regulatory requirements or any other legal requirement. The cost of implementing the selected measures shall be fully funded by the applicant. The NO_X project or program that would be implemented to offset NO_X must be approved by BAAQMD. The applicant shall provide proof to the county that the offsets are approved by BAAQMD and have been fully funded by the applicant. This option can only be implemented if NO_X offset credits are available at the time they are needed.
- **Option C: Use Renewable Diesel Fuel in All Diesel Trucks Operated by the Applicant.** The applicant shall use only renewable diesel (RD) fuels in all diesel-powered trucks uses to haul materials to the landfill and the Construction and Demolition Sorting Operation. This measure applies to diesel trucks operated or contracted by the applicant. RD fuel must meet the following criteria:
  - meet California's Low Carbon Fuel Standards and be certified by CARB Executive Officer;
  - be hydrogenation-derived (reaction with hydrogen at high temperatures) from 100 percent biomass material (i.e., non-petroleum sources), such as animal fats and vegetables;
  - contain no fatty acids or functionalized fatty acid esters; and
  - have a chemical structure that is identical to petroleum-based diesel and complies with American Society for Testing and Materials D975 requirements for diesel fuels to ensure compatibility with all existing diesel engines.

  The use of RD in trucks is estimated to reduce NO_X emissions by approximately 14 percent compared to conventional diesel fuel (SMAQMD 2015:3).

Significance after Mitigation

Implementation of Mitigation Measure 4.2-2 would ensure that the project-related increase in truck-generated emissions of NO_X in the SFBAAB would not exceed BAAQMD's recommended threshold of 54 lb/day or 10 tons/year. This could be achieved through implementation of one or more of the options (i.e., Option A, B, and/or C) listed under Mitigation Measure 4.2-2. With implementation of the mitigation measure, this impact would be reduced to a less-than-significant level.

Impact 4.2-3: Exposure of Offsite Sensitive Receptors to Toxic Air Contaminants

Emissions of TACs associated with implementation of the project, including diesel PM emitted by heavy construction equipment, TACs contained in LFG, and diesel PM generated by haul trucks traveling on area roadways, would not result in an incremental increase in cancer risk greater than 10 in one million or a hazard index of 1.0 or greater at any offsite sensitive receptors. Therefore, this impact would be **less than significant**.

The exposure of offsite sensitive receptors to health risk associated with TACs generated during project construction, TACs contained in landfill gas, and diesel PM emitted by haul trucks traveling to and from the project site are discussed separately below.

Construction-Generated Emissions of Toxic Air Contaminants

Construction-related activities would result in temporary, intermittent emissions of diesel PM from the exhaust of heavy-duty off-road diesel equipment used for grading, excavation, and installation of the geomembrane and on-road trucks used for material delivery and equipment hauling. On-road, diesel-powered haul trucks traveling to and

from the construction area to deliver materials and equipment are less of a concern because they do not operate at a single location for extended periods and therefore would not expose a single receptor to excessive diesel PM emissions.

The potential cancer risk from inhaling diesel PM outweighs the potential for all other diesel PM–related health impacts (i.e., non-cancer chronic risk, short-term acute risk) (CARB 2003:K-1). As indicated by the CalEEMod run for project construction in Appendix D (i.e., Appendix A to the Air Quality Impact Assessment), maximum daily exhaust emissions of PM_{10}, which is considered a surrogate for diesel PM, could reach up to 6 lb./day during construction.

The dose of a TAC to which receptors are exposed is the primary factor used to determine health risk (i.e., potential exposure to TAC levels that exceed applicable standards). Dose is a function of the concentration of a substance in the environment and the duration of exposure to the substance. It is positively correlated with time, meaning that a longer exposure period would result in a higher risk exposure level for any exposed receptor. Thus, the risks estimated for an exposed individual are higher if the exposure occurs over a longer period. According to OEHHA, health risk assessments, which determine the exposure of sensitive receptors to TACs, should be based on a 70- or 30-year exposure period; however, such assessments should be limited to the period/duration of activities associated with the project (OEHHA 2015:5-23, 5-24). For this reason, it is important to consider that the use of heavy-duty off-road diesel equipment would be limited to the summers of 2020 and 2021, when the expansion area would be constructed.

In addition, studies show that diesel PM is highly dispersive and that concentrations of diesel PM decline with distance from the source (e.g., 500 feet from a freeway, the concentration of diesel PM decreases by 70 percent) (Roorda-Knape et al. 1999; Zhu et al. 2002, cited in CARB 2005:9). As noted above, the nearest offsite sensitive receptor, a single-family residence, is located approximately 1.0 mile north of the landfill.

Therefore, considering the highly dispersive properties of diesel PM, the relatively low mass of diesel PM emissions that would be generated during project construction, and the relatively short period during which diesel PM–emitting construction activity would take place, construction-related TACs would not expose sensitive receptors to an incremental increase in cancer risk that exceeds 10 in one million or a hazard index of 1.0 or greater.

Landfill-Generated Emissions of Toxic Air Contaminants

TACs contained in LFG emitted by the landfill and LFG control devices include benzene, vinyl chloride, and heavy metals (such as mercury). With the expansion of the landfill and the increase in average daily throughput, the quantity of LFG emitted by the landfill may increase (SCS Engineers 2019:5). The increase in project-related TACs that would be contained in LFG is addressed in the Air Quality Impact Assessment prepared for the project (SCS Engineers 2019) and provided in Appendix D (See Appendices C and D of the Air Quality Impact Assessment located in Appendix D of this Draft SEIR) Under YSAQMD Rule 3.1, "General Permit Requirements," Rule 3.4, "New Source Review," and Rule 3.8, "Federal Operating Permit," all sources with the potential to emit TACs are required to obtain permits from YSAQMD. Permits may be granted to these operations if they are constructed and operated in accordance with applicable regulations, including New Source Review standards and air toxics control measures. YSAQMD will not permit the project, or construction of any stationary source or modification to an existing stationary source, if it would result in an incremental increase in cancer greater than 10 in one million or the or a hazard index equal to or greater than 1 at an offsite receptor.

Truck-Generated Emissions of Toxic Air Contaminants

The projected increase in average daily throughput associated with the project would result in approximately 195 additional round trips per day by haul trucks, as explained in the traffic impact analysis prepared for the project (KD Anderson 2018:13). YSAQMD has no permitting or other regulatory authority over on-road motor vehicle activity. The routes used by haul trucks traveling to and from the landfill are shown in Figure 3-5 of this Draft SEIR. These haul trips would be conducted by transfer trucks, packer trucks, and self-haul vehicles. All the transfer trucks and packer trucks would be powered by diesel engines and therefore emit diesel PM. It is assumed that all of the self-haul vehicles would also emit diesel PM. Cancer risk is the primary concern for exposure to diesel PM because it is substantially greater than non-cancer chronic and acute risk. Refer to Appendix F for detailed input assumptions used in AERMOD and HARP2 and output results.

The health risk analysis determined that the highest incremental increase in cancer risk at receptors along the landfill's haul routes resulting from project-related truck travel would be 7.8 in one million. This incremental increase in cancer risk exposure would occur approximately 70 feet north of the intersection of Midway Road and Lewis Road. Therefore, diesel PM emitted by project-related truck travel would not result in an incremental increase greater in cancer risk at any residences or other sensitive receptors greater than 10 in one million.

Summary

In summary, emissions of TACs associated with implementation of the project, including diesel PM emitted by heavy construction equipment, TACs contained in LFG, and diesel PM generated by haul trucks traveling on area roadways, would not result in an incremental increase in cancer risk greater than 10 in one million or a hazard index of 1.0 or greater at any offsite sensitive receptors. Therefore, this impact would be **less than significant**.

Mitigation Measures

No mitigation is required.

Impact 4.2-4: Exposure of Sensitive Receptors to Odors

The increase in municipal solid waste processed and landfilled at the project site as expansion occurs is not expected to result in additional sources or objectionable odors nor increased intensity of odors. Additionally, the area of landfill expansion is further away from the nearest offsite sensitive receptors than the portions of the landfill that are the currently being filled. Any odors associated with proposed storage of baled recyclables would be addressed with implementation of the nuisance and odor control measures described in the RHR Recyclable Material Bale Management Operations Plan that was approved by the County in April 2018. Therefore, it is not anticipated that the project would result in odors adversely affecting a substantial number of people. This impact would be **less than significant**.

The occurrence and severity of odor impacts depend on numerous factors, including: the nature, frequency, and intensity of the source; wind speed and direction; and the sensitivity of the receptors. While offensive odors rarely cause any physical harm, they still can be very unpleasant, leading to considerable distress among the public and often generating citizen complaints to local governments and regulatory agencies. Projects with the potential to frequently expose a substantial number of people to objectionable odors would be deemed to have a significant impact.

Odor complaints associated with the existing RHR Landfill are infrequent and often unverified. As explained in Section 4.2.2, "Environmental Setting," the only verified complaints since 2015 have been attributed to operations at the JPO composting operation (Jepson Prairie Organics 2016).

As demonstrated by the project components listed in Chapter 3, "Project Description," the project would not affect operations at the JPO composting operation. Odors related to proposed baled recyclable storage at the site would be mitigated through the nuisance and odor control measures incorporated into the project (see Section 3.7.4 in Chapter 3, Project Description, of this SEIR) and described in the RHR Recyclable Material Bale Management Operations Plan (Appendix B of this SEIR). The project would include expansion of the existing landfill and allow for an increase in the rate at which the landfill receives municipal solid waste. Additionally, the area of landfill expansion, the Triangle, is further away from the nearest offsite sensitive receptors than the portions of the landfill that are currently being filled. Therefore, the project would not result in odors adversely affecting a substantial number of people. For these reasons, this impact would be **less than significant**.

Mitigation Measures

No mitigation is required.