6.3 Air Quality

6.3.1 Introduction

This section discusses existing conditions and the regulatory setting regarding air quality. In addition, it describes impacts under CEQA that would result from construction and operation of the CEQA Alternatives.

Ambient air quality in the region is affected by climatological conditions, topography, and the types and amounts of pollutants emitted. The primary pollutants of concern in the area are ozone, carbon monoxide (CO), particulate matter (PM) that is 10 microns in diameter or less (PM10) and that is 2.5 microns in diameter or less (PM2.5), and toxic air contaminants (TACs). The principal characteristics surrounding these pollutants, as well as monitored pollutant trends, are discussed in Chapter 4, Section 4.2.2.1, *Environmental Setting*, which also includes background information regarding TACs as well as an overview of climate and meteorological conditions relative to the area.

Information in this section is based on *VTA's BART Silicon Valley – Phase II Extension Project Air Quality Study* (Terry A. Hayes Associates Inc. 2016), which is included with this SEIS/SEIR as a technical report, and which provides calculation details and air quality data.

6.3.1 Regulatory Setting

6.3.1.1 Regulatory Setting

Federal

As described in Chapter 4, Section 4.2.2.2, *Regulatory Setting*, the Clean Air Act (CAA) governs federal air quality management in the United States. The U.S. Environmental Protection Agency (EPA) is responsible for enforcing the CAA and establishing the National Ambient Air Quality Standards (NAAQS) (see Table 4.2-2). EPA develops and enforces regulations to protect the public from exposure to airborne contaminants that are known to be hazardous to human health. Please refer to Section 4.2.2.2 for additional information on federal air quality management.

State

California Clean Air Act

In addition to being subject to the requirements of CAA, air quality in California is governed by more stringent regulations under the California Clean Air Act (California CAA). The California CAA is administered by the California Air Resources Board (ARB) at the state level and the air quality management districts and air pollution control districts at the regional and local levels. ARB is responsible for meeting the state requirements of the CAA,

administering the California CAA, and establishing the California Ambient Air Quality Standards (CAAQS). The California CAA requires all air districts in the state to endeavor to achieve and maintain the CAAQS, which are generally more stringent than the corresponding federal standards and incorporate additional standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. ARB is responsible for setting emission standards for vehicles sold in California and other emission sources, such as consumer products and certain off-road equipment. For example, ARB established passenger vehicle fuel specifications. ARB oversees the functions of local air pollution control districts and air quality management districts, which, in turn, administer air quality activities at the regional and county levels. Table 4.2-2 summarizes state standards.

The California CAA requires ARB to designate areas within California as either attainment or nonattainment areas for each criteria pollutant, based on whether the CAAQS have been achieved. Under the California CAA, areas are designated as nonattainment areas for a criteria pollutant if air quality data show that a state standard for the pollutant was violated at least once during the previous 3 calendar years. Exceedances that are affected by highly irregular or infrequent events are not considered violations of a state standard and are not used as a basis for designating areas as nonattainment areas.

State Toxic Air Contaminant Programs

California regulates TACs primarily through the Tanner Air Toxics Act (Assembly Bill [AB] 1807) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588).

AB 1807 sets forth a formal procedure for ARB to designate substances as TACs. This includes research, public participation, and scientific peer review before ARB can designate a substance as a TAC. To date, ARB has identified more than 21 TACs, including diesel particulate matter (DPM). Once a TAC is identified, ARB then adopts airborne toxic control measures (ATCMs) for sources that emit that particular TAC.

None of the TACs identified by ARB have a safe threshold; exposure to these TACs is therefore considered in terms of the long-term elevated health risk.

AB 2588 requires existing facilities that emit toxic substances above specified levels to:

- Prepare a toxic emission inventory.
- Prepare a risk assessment if emissions are significant.
- Notify the public of significant risk levels.
- Prepare and implement risk reduction measures.

ARB has adopted diesel exhaust control measures and more stringent emission standards for various on-road mobile sources of emissions, including transit buses and certain other diesel-powered equipment.

Over time, the replacement of older vehicles will result in a vehicle fleet that produces fewer TACs compared with current conditions. Mobile-source emissions of TACs (e.g., benzene, 1,3-butadiene, DPM) have been reduced significantly over the last decade and will be reduced further in California through a progression of regulatory measures (e.g., low-emission vehicle/clean fuels, Phase II reformulated gasoline regulations) and control technologies. With implementation of ARB's Risk Reduction Plan, it is expected that DPM concentrations will be reduced by 85 percent by 2020 compared with 2000 levels (BAAQMD 2010). Adopted regulations are also expected to continue to reduce formaldehyde emissions from cars and light-duty trucks. As emissions are reduced, it is expected that risks associated with exposure to the emissions will also be reduced.

Regional

Bay Area Air Quality Management District

The Bay Area Air Quality Management District (BAAQMD) attains and maintains air quality conditions in the San Francisco Bay Area Air Basin (SFBAAB) through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. BAAQMD has jurisdiction over an approximately 5,600-square-mile area of the SFBAAB, including all of Santa Clara County.

BAAQMD established a climate protection program to reduce pollutants that contribute to global climate change and affect air quality in the SFBAAB. The climate protection program includes measures that promote energy efficiency, reduce vehicle miles traveled (VMT), and develop alternative sources of energy, all of which assist in reducing emissions of greenhouse gases (GHGs) and air pollutants that affect the health of residents. BAAQMD also seeks to support current climate protection programs in the region and stimulate additional efforts through public education and outreach, technical assistance to local governments and other interested parties, and the promotion of collaborative efforts among stakeholders.

The clean air strategy of BAAQMD includes the preparation of plans for the attainment of ambient air quality standards, adoption and enforcement of rules and regulations concerning sources of air pollution, and issuance of permits for stationary sources of air pollution. BAAQMD also inspects stationary sources of air pollution and responds to citizen complaints, monitors ambient air quality and meteorological conditions, and implements programs and regulations required by the CAA and the California CAA.

As stated above, BAAQMD prepares plans to attain ambient air quality standards in the SFBAAB. BAAQMD prepares ozone attainment plans for the national ozone standard and clean air plans (CAPs) for the California standard, both in coordination with the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments.

With respect to applicable air quality plans, BAAQMD prepared the 2010 Clean Air Plan (2010 CAP) to address nonattainment of the national 1- and 8-hour ozone standards in the SFBAAB. The purpose of the 2010 CAP is to:

- Update the Bay Area 2005 Ozone Strategy in accordance with the requirements of the California CAA and implement all feasible measures to reduce ozone.
- Consider the impacts of ozone control measures on PM, air toxics, and GHGs in a single integrated plan.
- Review progress in improving air quality in recent years.
- Establish emission control measures to be adopted or implemented in the 2009–2012 timeframe.

To achieve the core purposes of the 2010 CAP, the control strategies proposed are designed to:

- Reduce emissions of ozone precursors, PM, air toxics, and GHGs.
- Continue progress toward attainment of state ozone standards.
- Reduce the transport of ozone precursors to neighboring air basins.
- Protect public health by reducing exposure to the most harmful air pollutants.
- Protect the climate.

Similarly, BAAQMD prepared the 2010 CAP to address nonattainment of the CAAQS.

The project is subject to the following BAAQMD rules.

- **Regulation 6, Rule 1 (Particulate Matter).** This regulation restricts emissions of PM darker than No. 1 on the Ringlemann Chart to less than 3 minutes in any 1 hour.
- **Regulation 7 (Odorous Substances).** This regulation establishes general odor limitations on odorous substances and specific emission limitations on certain odorous compounds.
- **Regulation 8, Rule 3 (Architectural Coatings).** This regulation limits the quantity of reactive organic gases (ROGs) in architectural coatings supplied, sold, offered for sale, applied, solicited for application, or manufactured for use within the district.
- **Regulation 8, Rule 15 (Emulsified and Liquid Asphalts).** This regulation limits emissions of volatile organic compounds (VOCs) from paving materials.
- **Regulation 9, Rule 8 (Stationary Internal Combustion Engines).** This regulation limits emissions of nitrogen oxides (NO_X) and CO from stationary internal combustion engines of more than 50 horsepower.
- **Regulation 11, Rule 2 (Naturally Occurring Asbestos).** This regulation addresses asbestos demolition renovation, manufacturing, and standards for asbestos-containing serpentine. The purpose of Regulation 11, Rule 2, is to control emissions of asbestos to the atmosphere during demolition, renovation, milling, and manufacturing and establish appropriate waste disposal procedures (BAAQMD 1998). ARB defines naturally occurring asbestos (NOA) as a TAC. NOA is found in many parts of California and commonly associated with certain rocks in the Bay Area (California Geological Survey

2002). BAAQMD's NOA program requires that applicable notification forms be submitted by qualifying operations in accordance with the procedures detailed in the ATCM Inspection Guidelines, Policies, and Procedures, which require regulated operations that engage in road construction and maintenance activities, construction and grading operations, and quarrying and surface mining operations in areas where NOA is likely to be found to employ the best available dust mitigation measures to reduce and control dust emissions.

- **Regulation 2, Rule 2, New Source Review.** Applies to new or modified sources and contains requirements for best available control technology and emission offsets. Rule 2 implements federal New Source Review and Prevention of Significant Deterioration requirements. According to this rule, new and modified sources with hazardous air pollutant emissions may also be subject to the maximum achievable control technology requirement.
- **Regulation 9, Rule 8, Stationary Internal Combustion Engines.** This regulation limits emissions of NO_X and CO from stationary internal combustion engines of more than 50 horsepower.

BAAQMD has regulated TACs since the 1980s. At the local level, air pollution control or management districts may adopt and enforce ARB control measures. Under BAAQMD Regulation 2-1 (General Requirements), Regulation 2-2 (New Source Review), and Regulation 2-5 (New Source Review of Toxic Air Contaminants), all nonexempt sources with the potential to emit TACs are required to obtain permits from BAAQMD. Permits may be granted if construction and operations occur in accordance with applicable regulations, including New Source Review standards and ATCMs. BAAQMD limits emissions and public exposure to TACs through a number of programs. BAAQMD prioritizes TAC-emitting stationary sources according to the quantity and toxicity of the emissions and the proximity of the facilities to sensitive receptors. In addition, BAAQMD has adopted Regulation 11, Rules 2 and 14, to address asbestos-related demolition, renovation, and manufacturing and establish standards for asbestos-containing serpentine.

Metropolitan Transportation Commission

MTC is the transportation planning agency for the Bay Area. MTC is responsible for preparing the Regional Transportation Plan (RTP) and blueprints for mass transit, highway, airport, seaport, railroad, and bicycle and pedestrian facilities. It also screens requests from local agencies for state and federal grants for transportation projects. The most recent edition of the RTP, adopted in June 2013, is the Plan Bay Area. The RTP provides a long-range framework for minimizing transportation impacts on the environment, improving regional air quality, protecting natural resources, and reducing GHG emissions.

Local

City of San Jose

The City of San Jose General Plan (2011) includes the following policies to minimize air pollutant emissions from new and existing development.

- **Air Quality Policy MS-10-1:** Assess projected air emissions from new development in conformance with the BAAQMD CEQA Guidelines and relative to state and federal standards. Identify and implement feasible air emission reduction measures.
- **Air Quality Policy MS-10-2:** Consider the cumulative air quality impacts from proposed developments for proposed land use designation changes and new development, consistent with the region's CAP and state law.
- **Air Quality Policy MS-10-3:** Promote the expansion and improvement of public transportation services and facilities, where appropriate, to both encourage energy conservation and reduce air pollution.
- **Air Quality Policy MS-10-5:** In order to reduce vehicle miles traveled and traffic congestion, require new development within 2,000 feet of an existing or planned transit station to encourage the use of public transit and minimize the dependence on the automobile through the application of site design guidelines and transit incentives.
- **Air Quality Policy MS-10-6:** Encourage mixed land use development near transit lines and provide retail and other types of service-oriented uses within walking distance to minimize automobile-dependent development.
- **Air Quality Policy MS-10-7:** Encourage regional and statewide air pollutant emission reduction through energy conservation to improve air quality.
- **Toxic Air Contaminants MS-11-7:** Consult with BAAQMD to identify stationary and mobile TAC sources and determine the need for and requirements of a health risk assessment for proposed developments.
- **Toxic Air Contaminants MS-11-8:** For new projects that generate truck traffic, require signage that reminds drivers that the state idling law limits truck idling to 5 minutes.
- **Construction Air Emissions MS-13-1:** Include dust, PM, and construction equipment exhaust control measures as conditions of approval for subdivision maps, site development and planned development permits, grading permits, and demolition permits. At a minimum, conditions shall conform to construction mitigation measures recommended in the current BAAQMD CEQA Guidelines for the relevant project size and type.
- **Construction Air Emissions MS-13-2:** Construction and/or demolition projects that have the potential to disturb asbestos (from soil or building material) shall comply with all the requirements of ARB's air toxics control measures for construction, grading, quarrying, and surface mining operations.

City of Santa Clara

The City of Santa Clara General Plan (2010) includes the following policies to improve air quality in Santa Clara and the region.

- **Air Quality Policy 5.10.2-1:** Support alternative transportation modes and efficient parking mechanisms to improve air quality.
- **Air Quality Policy 5.10.2-2:** Encourage development patterns that reduce VMT and air pollution.
- **Air Quality Policy 5.10.2-3:** Encourage implementation of technological advances that minimize public health hazards and reduce the generation of air pollutants.
- **Air Quality Policy 5.10.2-5:** Promote regional air pollution prevention plans for local industry and businesses.
- **Air Quality Policy 5.10.2-6:** Require best management practices for construction dust abatement.

6.3.2 CEQA Methods of Analysis

6.3.2.1 Construction

Criteria Pollutants

Construction activities would generate criteria pollutant emissions from the following activities: relocation of underground and overhead utilities along the corridor; site preparation/excavation for the three underground stations (i.e., Alum Rock/28th Street, Downtown San Jose, Diridon); cut-and-cover operations and excavation of tunnels with use of one or more tunnel boring machines; demolition of existing structures, buildings, pavement, and other site features; construction of ventilation facilities, system facilities, station boxes, track work including crossovers, station campuses, and the Newhall Maintenance Facility; construction workers traveling to and from construction sites; deliveries of supplies to construction sites; and hauling debris from construction sites. These construction activities would generate dust (i.e., PM), fumes, equipment exhaust, and other air contaminants.

According to the schedule, construction of the BART Extension Alternative or BART Extension with TOJD Alternative would start in 2017 and take approximately 8 years to complete. Two options have been proposed for the construction of the tunnel: the Twin-Bore Option and the Single-Bore Option.

Exhaust emissions associated with construction of the project were estimated using a spreadsheet methodology and the emission factors and rates obtained from ARB's EMFAC2014 for on-road vehicles and the *Air Quality Study* included with this SEIS/SEIR (i.e., CalEEMod, version 2013.2.2, data tables for off-road construction equipment). EMFAC is ARB's model for estimating emissions from on-road vehicles in California, and CalEEMod is a statewide land use emissions computer model that provides a uniform platform for

government agencies, land use planners, and environmental professionals. CalEEMod is used to quantify potential criteria pollutants emissions from a variety of land use projects.

Fugitive dust would be generated by demolition of existing roadways and site grading. Emissions were calculated by assuming that 20 pieces of heavy-duty construction equipment would be operating simultaneously 16 hours a day along the corridor. Offsite hauling emissions associated with the tunnel construction under the Twin-Bore and Single-Bore Options were based on the estimated total number of truck trips, as shown in Table 6.3-1. Emission factors were based on assumed EMFAC2014 vehicle categories, with all haul trucks and material delivery vehicles assumed to be EMFAC Heavy-Heavy-Duty Diesel Tractor Trucks.

Table 6.3-1: Haul Road Volumes and Number of Truck Trips for the BART Extension Alternative

Station/Structure	Haul Volume (Cubic Yards)	Number of Truck Trips	Peak-Hour Truck Volumes
Twin-Bore Option Tunnel			
Alum Rock/28th Street Station	170,000–180,000	8,500–9,000	4
Downtown San Jose Station and Crossover Structure (both options)	285,000–295,000	28,500–29,500	8
Diridon Station (South and North Options)	175,000–185,000	17,500–18,500	8
13th Street Ventilation Facility	20,000–25,000	2,000–2,500	4
Stockton Avenue Ventilation Facility	20,000–25,000	2,000–2,500	4
West Portal	90,000–95,000	4,500–4,750	7
East Portal	70,000–75,000	3,500–3,750	11
Tunnel (muck) – West Portal to Downtown San Jose Station	315,000–325,000	15,750–16,250	5
Tunnel (muck) – East Portal to Downtown San Jose Station	305,000–315,000	15,250–15,750	5
TOTALS	**1,450,000–1,520,000**	**97,500–102,500**	—
Single–Bore Option Tunnel			
Alum Rock/28th Street Station	25,000	1,250	4
Downtown San Jose Station (East and West Options)	25,000	1,250	4
Diridon Station (South and North Options)	25,000	1,250	4
13th Street Ventilation Structure	4,000	400	2
Stockton Avenue Ventilation Structure	4,000	400	2
West Portal	100,000	5,000	7
East Portal	100,000	5,000	7
Tunnel (muck) – West Portal to East Portal	1,550,000	77,500	22
TOTALS	**1,833,000**	**92,050**	—

Source: VTA 2015.

Note:

The haul volumes, number of trucks, and peak hour trucks are rough estimates and could be up to 20 percent greater depending on construction methodology

Construction emissions from VTA's transit-oriented joint development (TOJD) were estimated using CalEEMod. Inputs to the model include each land use type and size in terms of building area, the number of dwelling units, and the vehicle trip generation numbers for each land use. ROG emissions from architectural coatings were adjusted to 150 grams per liter to account for BAAQMD's Regulation 8, Rule 3, which applies to the VOC content of paints and solvents sold and used in the region. When data were not available, default CalEEMod settings were used. Details regarding the emissions analysis, including calculation sheets and assumptions used for the CalEEMod model runs, are provided in the *Air Quality Study* included with this SEIS/SEIR.

Toxic Air Contaminants

The construction health risk analysis assessed exposure to PM2.5 and DPM. Due to the length of the alignment and the number of stations, one representative location was chosen to inform the risk. The Alum Rock/28th Street Station location was selected based on the intensity of the subterranean station construction activity, size of the planned development, and proximity to sensitive receptors (e.g., Five Wounds Church and Elementary School approximately 65 feet southeast of the construction zone). It is anticipated that the construction-related health risk would be comparable at other subterranean station locations based on similar construction activities.

Exposure to construction-related DPM was assessed by predicting the health risks in terms of excess cancer and non-cancer hazard impacts, and elevated PM2.5 concentrations. EPA's AERMOD dispersion model was used to predict DPM and PM2.5 hourly concentrations at sensitive land uses, based on daily PM10 and PM2.5 exhaust mass emissions, with exhaust emissions of PM10 used as a surrogate for DPM. Estimates of project-level cancer risk, non-cancer Health Index, and annual PM2.5 concentrations were based on annual concentrations from AERMOD, and anticipated construction durations.

The maximum incremental cancer risk from exposure to DPM was calculated by estimating exposure to carcinogenic chemicals and multiplying the dose times the cancer potency factor. The following equation is used to determine cancer risk.

Cancer Risk = Dose × CPF × ASF × ED / AT × FAH

where:

Cancer Risk = risk (potential chances per million)

Dose = dose through inhalation (milligrams per kilogram-day)

CPF = Inhalation Cancer Potency Factor

ASF = Age Sensitivity Factor for a specified age group (unitless)

ED = exposure duration (duration of construction)

AT = averaging time (25,550 days or 70 years)

FAH = Fraction of time spent at home (unitless)

Dose was estimated using the following equation.

Dose = Cair × {BR/BW} × A × EF × CF

where:

Dose = dose through inhalation (milligrams per kilogram-day)

Cair = annual air concentration (micrograms per cubic meter)

{BR/BW}= daily breathing rate (liter per kilogram body weight per day)

A = Inhalation absorption factor, 1.0

EF = exposure frequency (350 days per year)

CF = conversion factor (10-6 ([milligrams pre microgram] x [cubic meters per liter])

The potential for exposure to result in chronic non-cancer effects is evaluated by comparing the estimated annual average air concentrations to the chemical-specific, non-cancer chronic reference exposure levels (RELs). The chronic REL is the inhalation exposure concentration at which no adverse chronic health effects would be anticipated following exposure. When calculated for a single chemical, the comparison yields a ratio termed a *hazard quotient*. The risk level is calculated as follows.

Non-Cancer Hazard Index = Cair / REL

where:

Cair = annual concentration (micrograms per cubic meter)

REL = chronic/acute non-cancer REL (micrograms per cubic meter)

6.3.2.2 Operation

Criteria Pollutants

The operational analysis for the BART Extension considers emissions benefits associated with vehicle mode shift. It is anticipated that the BART Extension would increase ridership, thereby decreasing regional passenger VMT through mode shift from private automobiles to transit. Accounting for emissions reductions associated with mode shift is consistent with recommendations from the American Public Transportation Association (2009).

Emissions from changes in regional VMT were estimated using EMFAC2014 and daily VMT data obtained from *VTA's BART Silicon Valley – Phase II Extension Project Traffic Impact Analysis of the BART Extension Only* (Hexagon 2016a) and *VTA's BART Silicon Valley—Phase II Extension Project Transportation Impact Analysis of the BART Extension and VTA's Transit-Oriented Joint Development* (Hexagon 2016b). The VMT data were provided in 5-mile-per-hour (mph) speed bins (or ranges) for the 2015 Existing, 2025 Opening Year, and 2035 Forecast Year under the No Build Alternative, BART Extension Alternative, and BART Extension with TOJD Alternative. Re-entrained road dust was calculated by following the EPA AP-42 approach for calculating emissions of dust from paved roads.

Detailed information regarding the TOJD was not available at the time of the analysis. Emissions were estimated by using CalEEMod default assumptions, which are based on the size of development, except for mobile-source emissions. Mobile source emissions associated with the TOJDs are included in the regional VMT analysis utilized to estimate the change in regional emissions associated with the reduction in VMT due to increased ridership of BART.

Toxic Air Contaminants/Mobile-Source Air Toxics

The Federal Highway Administration's *Interim Guidance Update on Mobile-Source Air Toxic Analysis in NEPA Documents* (2012) was used to evaluate potential mobile-source air toxic emissions associated with the BART Extension Alternative, as described in Section 4.2.3.2, *Local Air District Thresholds*. The TOJDs would not represent a substantial source of DPM emissions. Accordingly, health risks associated with the TOJDs are not discussed further.

Localized CO Hot-Spots

The potential for operation of the BART Extension to result in localized CO hot-spots was evaluated based on the CO screening criteria established by BAAQMD (BAAQMD 2010). The criteria provide a conservative indication of whether a project will generate new air quality violations, worsen existing violations, or delay attainment of the NAAQS and CAAQS with regard to CO. If the screening criteria are met, a quantitative analysis of project-related CO emissions would not be necessary because the project would not result in a CO hot-spot.

6.3.3 CEQA Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, the project would have a significant impact if it would result in any of the conditions listed below.

- Conflict with or obstruct implementation of an air quality plan.
- Violate an air quality standard or contribute substantially to an existing or projected air quality violation.
- Result in a cumulatively considerable net increase in any criteria pollutant and the region being classified as a nonattainment area under a federal or state ambient air quality standard, including through a release of emissions that exceed quantitative thresholds for ozone precursors.
- Expose sensitive receptors to substantial pollutant concentrations.
- Create objectionable odors that would affect a substantial number of people.

As discussed above, BAAQMD is responsible for ensuring that state and federal ambient air quality standards are not violated within the SFBAAB. Analysis requirements for pollutant emissions from project-related construction and operations are contained in BAAQMD's 2010 Air Quality Guidelines. The guidelines also contain thresholds of significance for criteria pollutants, TACs, and odors, which are summarized in Table 6.3-2.

Table 6.3-2: BAAQMD Thresholds of Significance

Analysis	Construction	Operation
Criteria Pollutants	ROG: 54 pounds per day NO_X: 54 pounds per day PM10: 82 pounds per day (exhaust only) PM2.5: 54 pounds per day (exhaust only) Dust: Failure to implement best management practices	ROG: 54 pounds per day, 10 tons per year NO_X: 54 pounds per day, 10 tons per year PM10: 82 pounds per day, 15 tons per year PM2.5: 54 pounds per day, 10 tons per year CO: Violation of a CAAQS[a]
Toxic Air Contaminants (Individual Project)	Increased cancer risk: 10 in 1 million Increased non-cancer hazard index: > 1 Exhaust PM2.5: > 0.3 µg/m^3	Same as construction
Toxic Air Contaminants (Cumulative Thresholds)	Increased cancer risk: 100 in 1 million Increased non-cancer hazard index: > 10 Exhaust PM2.5: > 0.8 µg/m^3	Same as construction
Odors	--	Five complaints per year averaged over 3 years

Source: BAAQMD 2010.

[a] BAAQMD has adopted screening criteria to determine whether a project could lead to a violation of the CAAQS. The screening criteria are as follows.

- Consistency with an applicable congestion management program established by the county congestion management agency for designated roads or highways, a regional transportation plan, and local congestion management agency plans.
- Increased traffic volumes at affected intersections with more than 44,000 vehicles per hour.

Note: *California Building Industry Association v. Bay Area Air Quality Management District* (December 17, 2015) challenged BAAQMD's thresholds for determining whether a project's exposure to existing levels of TACs would result in a significant impact. The Supreme Court agreed with the California Building Industry Association and concluded that "CEQA generally does not require an analysis of how existing environmental conditions will impact a project's future users or residents." However, the court identified several exceptions to this "general rule," including when a project exacerbates existing environmental hazards.

µg/m^3 = micrograms per cubic meter.

The BART Extension would result in a significant impact if any of the thresholds in Table 6.3-2 were to be exceeded.

6.3.4 Environmental Consequences and Mitigation Measures

This section identifies impacts on air quality under CEQA and mitigation measures to reduce the level of potentially significant impacts.

6.3.4.1 No Build Alternative

The No Build Alternative consists of the existing transit and roadway networks and planned and programmed transportation improvements (see Chapter 2, Section 2.2.1, *NEPA No Build Alternative*, for a list of these projects) and other land development projects planned by the Cities of San Jose and Santa Clara.

The No Build Alternative projects could result in effects on air quality typically associated with transit, highway, bicycle, and pedestrian facilities, and roadway projects, as well as land development projects. Given the mix of projects, some projects may reduce air quality and GHG emissions by providing transit, bicycle, and pedestrian improvements and reducing congestion. Other projects may result in short-term exceedances of air quality standards during construction. Several of these projects have already been programmed in the RTPs.

All individual projects planned under the No Build Alternative would undergo separate environmental review to identify effects on air quality. Review would include an analysis of impacts and identification of mitigation measures to reduce potential impacts.

6.3.4.2 BART Extension Alternative

Impact BART Extension AQ-1: Conflict with an air quality plan

Santa Clara County is currently designated as a nonattainment area for the federal 8-hour ozone and PM2.5 standards and as a maintenance area for the federal CO standard (see Table 4.2-2). BAAQMD has developed air quality attainment plans (i.e., the 2001 Ozone Attainment Plan and the 1994 CO Redesignation Request and Maintenance Plan) and adopted the 2010 CAP, which provides an integrated strategy to control ozone, PM, TACs, and GHG emissions. BAAQMD plans estimate future emissions and determine strategies to reduce emissions through regulatory controls. Emissions projections are based on population, vehicle, and land use trends. These are typically developed by BAAQMD, MTC, and the Association of Bay Area Governments.

The BART Extension would improve regional connectivity and encourage transit ridership. As shown in Tables 4.2-3 and 4.2-4, the BART Extension would reduce VMT and associated regional emissions.

Based on the above analysis, the BART Extension would not conflict with the current BAAQMD air quality plans. The BART Extension would contribute to regional goals that support alternative modes of transportation. Accordingly, the BART Extension would not conflict with or obstruct implementation of any air quality plan. Therefore, the impact would be *less than significant*, and no mitigation is required.

Impact BART Extension AQ-2: Violate an air quality standard or contribute to an air quality violation

Construction

Construction emissions can vary substantially from day to day, depending on the level of activity, the specific type of operation, and, for dust, prevailing weather conditions. Construction of the BART Extension has the potential to create air quality impacts from the use of heavy-duty construction equipment and haul trucks as well as vehicle trips generated by construction workers while traveling to and from the various construction sites along the

alignment. NO_X emissions would result primarily from the use of construction equipment and haul trucks.

Table 6.3-3 shows equipment (onsite) and truck exhaust (offsite) emissions associated with construction of the BART Extension. Maximum emissions would exceed the BAAQMD significance threshold for NO_X under the Twin-Bore and Single-Bore Options. This is a potentially significant impact.

Table 6.3-3: Construction Emissions Related to the BART Extension Alternative

Criteria Pollutant or Ozone Precursor	Pounds per Day				
	ROGs	**NO_X**	**CO**	**PM10**	**PM2.5**
Onsite Emissions (Equipment Exhaust) – Twin-Bore and Single-Bore Options					
Unmitigated	18	180	129	9	8
Mitigated (Tier 4 Exhaust Standards)	3	2	128	<1	<1
Offsite Emissions (Haul Truck Exhaust) – Twin-Bore Option					
Alum Rock/28th Street Station	1	20	4	< 1	< 1
Downtown San Jose Station and Crossover Structure	1	41	8	1	1
Diridon Station (South and North Options)	1	41	8	1	1
13th Street Ventilation Facility	1	20	4	< 1	< 1
Stockton Avenue Ventilation Facility	1	20	4	< 1	< 1
West Portal	1	36	7	1	< 1
East Portal	2	56	11	1	1
Tunnel (muck) – West Portal to Downtown San Jose Station	1	26	5	1	< 1
Tunnel (muck) – East Portal to Downtown San Jose Station	1	26	5	1	< 1
Offsite Emissions (Haul Truck Exhaust) – Single-Bore Option					
Alum Rock/28th Street Station	1	20	4	< 1	< 1
Downtown San Jose Station (East and West Options)	1	20	4	< 1	< 1
Diridon Station (South and North Options)	1	20	4	< 1	< 1
13th Street Ventilation Structure	< 1	10	2	< 1	< 1
Stockton Avenue Ventilation Structure	< 1	10	2	< 1	< 1
West Portal	1	36	7	1	< 1
East Portal	1	36	7	1	< 1
Tunnel (muck) – West Portal to East Portal	4	112	22	3	1
Offsite Emissions (Concrete Truck exhaust) – Twin-Bore and Single-Bore Options					
Various Locations	1	16	3	< 1	< 1
Total Twin-Bore Option					
Maximum Daily Emissions – Unmitigated	21	252	143	10	9
Maximum Daily Emissions – Mitigated	5	74	142	2	1
BAAQMD Construction Significance Thresholds	54	54	—	82	54
Exceed Threshold?	No	Yes	—	No	No
Total Single-Bore Option					
Maximum Daily Emissions – Unmitigated	23	308	154	12	9
Maximum Daily Emissions – Mitigated	2	130	153	3	2
BAAQMD Construction Significance Thresholds	54	54	—	82	54
Exceed Threshold?	No	Yes	—	No	No
Source: ARB, EMFAC2014, CalEEMod version 2013.					

Mitigation Measure AQ-CNST-A (see Chapter 5, Section 5.5.3, *Air Quality*) is required to control fugitive dust, pursuant to BAAQMD requirements. Mitigation Measures AQ-CNST-B through AQ-CNST-H, which are required to reduce NO_X emissions, include Tier 4 engine exhaust standards and idling limitations. Implementation of Tier 4 engine exhaust controls would reduce equipment-related NO_X emissions from 252 to approximately 74 pounds per day under the Twin-Bore Option and from 308 to 149 pounds per day under the Single-Bore Option. However, NO_X emissions would still be greater than the BAAQMD significance threshold of 54 pounds per day. Therefore, construction of the BART Extension Alternative would result in a *significant and unavoidable impact* by violating this BAAQMD air quality standard under both Twin-Bore and Single-Bore Options.

Operation

The operational analysis for the BART Extension considers emissions benefits associated with vehicle mode shift. It is anticipated that the BART Extension would increase ridership, thereby decreasing regional passenger VMT through mode shift from private automobiles to transit. Accounting for emissions reductions associated with mode shift is consistent with recommendations from the American Public Transportation Association (2009).

Tables 4.2-3 and 4.2-4 summarize regional VMT and estimated criteria pollutant emissions associated with operation of the BART Extension. As shown in Table 4.2-4, the BART Extension would reduce regional criteria pollutant emissions. Therefore, implementation of the BART Extension would result in a regional air quality benefit by encouraging a modal shift from single-occupancy vehicles toward transit. Emissions would be below BAAQMD's operational thresholds of significance. This impact would be *less than significant*, and no mitigation is required.

Impact BART Extension AQ-3: Cause a cumulatively considerable net increase in a criteria pollutant

BAAQMD has identified project-level thresholds to evaluate criteria pollutant impacts (see Table 6.3-2). In developing these thresholds, BAAQMD considered levels at which a project's emissions would be cumulatively considerable. As noted in the BAAQMD CEQA Guidelines (2011):

> In developing thresholds of significance for air pollutants, BAAQMD considered the emission levels for which a project's individual emissions would be cumulatively considerable. If a project exceeds the identified significance thresholds, its emissions would be cumulatively considerable, resulting in significant adverse air quality impacts to the region's existing air quality conditions. Therefore, additional analysis to assess cumulative impacts is unnecessary.

The criteria pollutant thresholds presented in Table 6.3-2 represent the maximum level of emissions the BART Extension may generate before contributing to a cumulative impact on regional air quality. Consequently, exceedances of the project-level thresholds would be cumulatively considerable.

Construction

As discussed under Impact BART Extension AQ-2, construction-related NO_X emissions would exceed BAAQMD thresholds for the Twin-Bore and Single-Bore Options, even after implementation of mitigation. Although NO_X emissions would be temporary, they would exceed emissions standards and may contribute to air quality degradation and impede the region's ability to attain air quality standards. Therefore, the BART Extension would result in significant cumulative air quality impacts during construction. Under the Twin-Bore and Single-Bore Options, the impacts would be *significant and unavoidable*.

Operation

As discussed under Impact BART Extension AQ-2, operation of the BART Extension would reduce regional VMT and associated emissions. Therefore, the BART Extension Alternative would not result in significant cumulative air quality impacts during operation. The impact would be *less than significant,* and no mitigation is required.

Impact BART Extension AQ-4: Expose sensitive receptors to substantial pollutant concentrations

Diesel Particulate Matter

Construction

BAAQMD guidance states that construction activities do not lend themselves to analysis of long-term health risks because of their temporary and variable nature. Due to the variable nature of construction activity, the generation of TAC emissions in most cases would be temporary, especially considering the short amount of time such equipment is typically within an influential distance that would result in the exposure of sensitive receptors to substantial concentrations. Concentrations of mobile-source DPM emissions are typically reduced by 70 percent at a distance of approximately 500 feet. In addition, current models and methodologies for conducting health risk assessments are associated with longer-term exposure periods of 9, 40, and 70 years, which do not correlate well with the temporary and highly variable nature of construction activities. This results in difficulties with producing accurate estimates of health risk. Project-level analyses of construction activities have a tendency to produce overestimated assessments of long-term health risks. However, dispersion modeling was completed to assess construction-related health risks based on available guidance.

As previously discussed in the methodology, emissions exposure was estimated for construction of the Alum Rock/28th Street Station. The analysis assumed that station construction would be similar under the Twin-Bore and Single-Bore Options. The results of the risk assessment for an offsite maximally exposed receptor (i.e., Five Wounds Church and Elementary School approximately 65 feet to the southeast) are presented in Table 6.3-4. The annual increase in PM2.5 concentrations and cancer risk would exceed the BAAQMD significance thresholds. Mitigation Measure AQ-CNST-B would require Tier 4 exhaust

controls, and would reduce PM2.5 concentrations and the cancer risk to below the threshold. Therefore, the BART Extension would result in *less-than-significant impacts* related to construction health risk, and no mitigation is required.

Table 6.3-4: Construction Health Risk Assessment: BART Extension

Risk	Unit	Threshold	Unmitigated Risk	Mitigated Risk
Excess Cancer Risk	Probability per One Million Population	10	24.7	0.93
Chronic Health Non-Cancer Risk	Health Index	1.0	0.24	0.02
Increase in PM2.5 Concentration	Average Annual (µg/m³)	0.3	1.17	0.12
Source: Terry A. Hayes Associates Inc. 2016.				

Operation

New bus transfer points would be located at the Alum Rock/28th Street Station and Santa Clara Station. In addition, the Diridon Station (South and North Options) includes an existing bus transit facility. The No Build Alternative bus fleet includes services to shuttle passengers between the Berryessa Station and downtown destinations. This shuttle service would be eliminated with the BART Extension, resulting in a decrease in bus activity. Based on a bus demand study completed by VTA, the Santa Clara Station would experience a decrease of 96 buses in late 2025/2026 and 160 buses in 2035. The Alum Rock/28th Street Station would experience no change in daily late 2025/2026 or 2035 bus volumes. Similar to the Santa Clara Station, the Diridon Station would experience a decrease of 96 buses in late 2025/2026 and 192 buses in 2035. In addition, VTA operates diesel hybrid buses that generate fewer diesel emissions than standard buses. Although bus idling would increase localized emissions, idling time is typically limited to less than 1 minute per vehicle. Based on the above qualitative analysis, diesel hybrid bus activity would not be a significant source of TACs.

The Newhall Maintenance Facility, including vehicle storage capacity at the facility, would not be a significant source of combustion-related TACs (e.g., heavy-duty diesel trucks or active power generators). The maintenance facility would use chemicals related to repair and cleaning activities, which would result in evaporative emissions. Chemicals would be stored in accordance with BAAQMD permitting requirements and state safety guidelines, and the majority of related activities would occur within maintenance facilities. In addition, although unspecified at this time, there would likely be operations involved that would require air permits from the BAAQMD. Permits will ensure compliance with BAAQMD rules and regulations. This would reduce the potential for exposure to substantial TAC concentrations. Based on the above qualitative analysis, the maintenance facility would not be a significant source of TACs. The impact would be *less than significant*, and no mitigation is required.

Carbon Monoxide Hot Spots

As discussed in Section 4.2.3.2, *Local Air District Thresholds*, BAAQMD has published a screening methodology for determining the possibility for a CO hot spot. According to *VTA's BART Silicon Valley – Phase II Extension Project Traffic Impact Analysis of the BART Extension Only* (Hexagon 2016a), the BART Extension would not increase traffic volumes at any intersection in the traffic study area to more than 24,000 vehicles per hour. Accordingly, the BART Extension would not conflict with BAAQMD's screening criteria or expose receptors to localized CO hot spots. This impact would be *less than significant*, and no mitigation is required.

Impact BART Extension AQ-5: Create objectionable odors that would affect a substantial number of people

Construction

Potential odor sources during construction activities include diesel exhaust from heavy-duty equipment. The BART Extension would utilize typical construction techniques for the Twin-Bore and Single-Bore Options; therefore, any odors would be typical for construction sites. Construction near existing receptors would be temporary in nature, and construction activities would not be likely to result in nuisance odors that would violate BAAQMD Regulation 7 (Odorous Substances). Therefore, the BART Extension Alternative would result in a *less-than-significant impact* related to construction odors, and no mitigation is required.

Operation

Although offensive odors rarely cause any physical harm, they can be unpleasant and lead to considerable distress for the public. This distress may generate citizen complaints to local governments and air districts.

The land uses and industrial operations that are typically associated with odor complaints include wastewater treatment plants, landfills, confined animal facilities, composting stations, food manufacturing plants, refineries, and chemical plants. The BART Extension operations would not include activities that typically generate adverse odors. However, there would likely be Newhall Maintenance Facility activities (e.g., car cleaning) that would generate odors and require air permits from the BAAQMD. While fuel combustion by generators and other sources may also create odors, permitting conditions will ensure compliance with BAAQMD rules and regulations related to public nuisances (including odors). Diesel hybrid buses at the transit stations may also emit detectable odors. However, these odors would be transient and would quickly disperse under typical meteorological conditions. Therefore, the BART Extension Alternative would have a *less-than-significant impact* related to odors, and no mitigation is required.

6.3.4.3 BART Extension with TOJD Alternative

Impact BART Extension + TOJD AQ-1: Conflict with an air quality plan

The BART Extension with TOJD Alternative would improve regional connectivity and encourage transit ridership. It would also include TOJD at four stations, along with two ventilation facilities. The TOJD would be constructed at the station locations to promote ridership. Zoning changes would be required at the Alum Rock/28th Street, Diridon (South and North Options), and Santa Clara Stations to permit the residential, retail and office uses. Once the zoning amendments are approved, the BART Extension with TOJD Alternative would be consistent with applicable city zoning regulations. However, even if the zoning changes do not occur, the sites would still be developed at some time consistent with the current zoning.

The BART Extension with TOJD Alternative would improve service and increase ridership locally and in the region. However, this increased service would not materially increase overall growth pressure on communities. Rather, implementation of the BART Extension with TOJD Alternative would support expected growth and development that is already underway along the alignment. The planned residential developments in the cities of San Jose and Santa Clara would increase the population by 880 and 583 residents, respectively. This growth would not exceed regional planning forecasts.

Given the above analysis, the BART Extension with TOJD Alternative would not conflict with current BAAQMD air quality plans. The BART Extension with TOJD Alternative would contribute to regional goals that support alternative modes of transportation and transit-orientated development. Accordingly, the BART Extension with TOJD Alternative would not conflict with or obstruct implementation of any air quality plan. Therefore, the impact would be *less than significant*, and no mitigation is required.

Impact BART Extension + TOJD AQ-2: Violate an air quality standard or contribute to an air quality violation

Construction

As mentioned earlier, construction of the BART Extension with TOJD Alternative has the potential to create air quality impacts resulting from the use of heavy-duty construction equipment and haul trucks as well as vehicle trips generated by construction workers while traveling to and from the various construction sites along the alignment.

The TOJD would be constructed at four sites near the Alum Rock/28th Street, Downtown San Jose (East and West Options), Diridon (South and North Options), and Santa Clara Stations and two sites near the 13th Street and Stockton Avenue ventilation facilities. Construction emissions were estimated using CalEEMod default assumptions, which are based on the size of a development. The specific construction timing for the TOJD could shortly follow the BART Extension. Therefore, it was assumed that construction of the BART Extension would be overlapped by construction of two TOJDs. The analysis used the two TOJDs that would

generate the maximum level of emissions to provide a conservative estimate of overlapping emissions.

Estimated construction emissions are shown in Table 6.3-5.

Table 6.3-5: Construction Emissions Related to the BART Extension with TOJD Alternative: Unmitigated Emissions

Component	Pounds per Day			
	ROGs	**NO_X**	**PM10**	**PM2.5**
Alum Rock/28th Street Station				
Demolition	4	46	2	2
Site Preparation	5	55	3	3
Grading	7	75	4	3
Building Construction	10	59	2	2
Paving	2	20	1	1
Architectural Coating	366	3	< 1	< 1
Maximum Daily Emissions	**366**	**75**	**4**	**3**
13th Street Ventilation Facility				
Demolition	1	11	1	1
Site Preparation	1	13	1	1
Grading	1	11	1	1
Building Construction	1	13	1	1
Paving	1	10	1	1
Architectural Coating	14	2	< 1	< 1
Maximum Daily Emissions	**14**	**13**	**1**	**1**
Downtown San Jose Station East Option				
Demolition	4	43	2	2
Site Preparation	5	52	3	3
Grading	4	36	2	2
Building Construction	7	49	2	2
Paving	1	14	1	1
Architectural Coating	280	2	< 1	< 1
Maximum Daily Emissions	**280**	**52**	**3**	**3**
Downtown San Jose Station West Option				
Demolition	1	11	1	1
Site Preparation	1	14	1	1
Grading	1	11	1	1
Building Construction	2	16	1	1
Paving	1	11	1	1
Architectural Coating	51	2	< 1	< 1
Maximum Daily Emissions	**51**	**16**	**1**	**1**

Component	Pounds per Day			
	ROGs	**NO_X**	**PM10**	**PM2.5**
Diridon Station (South and North Options)				
Demolition	4	43	2	2
Site Preparation	5	52	3	3
Grading	4	36	2	2
Building Construction	6	41	2	2
Paving	1	14	1	1
Architectural Coating	228	2	< 1	< 1
Maximum Daily Emissions	**228**	**52**	**3**	**3**
Stockton Avenue Ventilation Facility				
Demolition	1	11	1	1
Site Preparation	1	14	1	1
Grading	1	11	1	1
Building Construction	1	14	1	1
Paving	1	11	1	1
Architectural Coating	32	2	< 1	< 1
Maximum Daily Emissions	**32**	**14**	**1**	**1**
Santa Clara Station				
Demolition	4	43	2	2
Site Preparation	5	52	3	3
Grading	4	36	2	2
Building Construction	9	53	2	2
Paving	2	17	1	1
Architectural Coating	357	3	< 1	< 1
Maximum Daily Emissions	**357**	**53**	**3**	**3**
Estimated Total Overlapping Emissions from Construction of Two TOJD Sites[a]	723	128	7	6
Estimated Emissions from Construction of BART Extension (Single-Bore Option)[b]	23	308	12	9
Estimated Emissions from Construction of BART Extension (Twin-Bore Option)[b]	21	252	10	9
Estimated Total (BART Extension + TOJD) Emissions (Single-Bore Option)	746	436	19	15
Estimated Total (BART Extension + TOJD) Emissions (Twin-Bore Option)	744	380	17	15
BAAQMD Construction Significance Thresholds	54	54	82	54
Exceed Threshold?	Yes	Yes	No	No

Source: ARB, CalEEMod version 2013.

[a] The maximum overlapping emissions during construction of the TOJD sites are estimated by assuming that the two construction activities with the highest criteria pollutant emissions would occur simultaneously. For example, construction of the TOJDs at the Alum Rock/28th Street Station and Santa Clara Station North Option would result in the highest daily NO_X emission rates (75 and 53 pounds per day, respectively). Therefore, the highest NO_X emission is estimated to be 128 pounds per day.

[b] The emission calculations account for emissions generated by onsite and offsite construction equipment, emissions from hauling trips, and vendor trips.

As shown in Table 6.3-5, combined construction emissions from the BART Extension with TOJD Alternative (Twin-Bore and Single-Bore Options) would exceed BAAQMD regional significance thresholds for NO_X and ROG. Mitigation Measure AQ-CNST-A is required to control fugitive dust, pursuant to BAAQMD requirements. Mitigation Measures AQ-CNST-B through AQ-CNST-H, which are required to reduce NO_X emissions, include Tier 4 engine exhaust standards and idling limitations. Mitigation Measure AQ-CNST-I would reduce ROG emissions through the use of architectural coatings with a low VOC content. Despite application of these measures, ROG and NO_X emissions would still be greater than the BAAQMD significance threshold of 54 pounds per day (see Table 6.3-6). Therefore, construction of the BART Extension with TOJD Alternative (Twin-Bore and Single-Bore Options) would result in a *significant and unavoidable impact* by violating the BAAQMD ROG and NO_X air quality emission standards.

Table 6.3-6: Construction Emissions Related to the BART Extension with TOJD Alternative: Mitigated Emissions

Component	Pounds per Day			
	ROGs	**NO_X**	**PM10**	**PM2.5**
Alum Rock/28th Street Station				
Demolition	1	2	<1	<1
Site Preparation	1	2	<1	<1
Grading	1	3	<1	<1
Building Construction	6	29	<1	<1
Paving	<1	1	<1	<1
Architectural Coating	366	1	<1	<1
Maximum Daily Emissions	**366**	**29**	**<1**	**<1**
13th Street Ventilation Facility				
Demolition	<1	1	<1	<1
Site Preparation	<1	1	<1	<1
Grading	<1	1	<1	<1
Building Construction	<1	1	<1	<1
Paving	<1	1	<1	<1
Architectural Coating	14	<1	<1	<1
Maximum Daily Emissions	**14**	**1**	**<1**	**<1**
Downtown San Jose Station East Option				
Demolition	1	2	<1	<1
Site Preparation	1	2	<1	<1
Grading	<1	2	<1	<1
Building Construction	5	25	<1	<1
Paving	<1	1	<1	<1
Architectural Coating	279	1	<1	<1
Maximum Daily Emissions	**279**	**25**	**<1**	**<1**

Component	Pounds per Day			
	ROGs	**NO_X**	**PM10**	**PM2.5**
Downtown San Jose Station West Option				
Demolition	<1	1	<1	<1
Site Preparation	<1	1	<1	<1
Grading	<1	1	<1	<1
Building Construction	<1	2	<1	<1
Paving	<1	1	<1	<1
Architectural Coating	50	<1	<1	<1
Maximum Daily Emissions	**50**	**2**	**<1**	**<1**
Diridon Station (South and North Options)				
Demolition	1	2	<1	<1
Site Preparation	1	2	<1	<1
Grading	<1	2	<1	<1
Building Construction	3	18	<1	<1
Paving	<1	1	<1	<1
Architectural Coating	228	<1	<1	<1
Maximum Daily Emissions	**228**	**18**	**<1**	**<1**
Stockton Avenue Ventilation Facility				
Demolition	<1	1	<1	<1
Site Preparation	<1	1	<1	<1
Grading	<1	1	<1	<1
Building Construction	<1	1	<1	<1
Paving	<1	1	<1	<1
Architectural Coating	31	<1	<1	<1
Maximum Daily Emissions	**31**	**1**	**<1**	**<1**
Santa Clara Station				
Demolition	1	2	<1	<1
Site Preparation	1	2	<1	<1
Grading	<1	2	<1	<1
Building Construction	6	29	<1	<1
Paving	<1	1	<1	<1
Architectural Coating	357	1	<1	<1
Maximum Daily Emissions	**357**	**29**	**<1**	**<1**
Estimated Total Overlapping Emissions from Construction of the TOJD Sites[a]	723	58	<1	<1
Estimated Emissions from Construction of BART Extension (Single-Bore Option)[b]	7	130	3	2
Estimated Emissions From Construction of BART Extension (Twin-Bore Option)[b]	5	74	2	1
Estimated Total (BART Extension + TOJD) Emissions (Single-Bore Option)	730	132	2	1
Estimated Total (BART Extension + TOJD) Emissions (Twin-Bore Option)	728	262	5	3

Component	Pounds per Day			
	ROGs	NO_X	PM10	PM2.5
BAAQMD Construction Significance Thresholds	54	54	82	54
Exceed Threshold?	Yes	Yes	No	No

[a] The maximum overlapping emissions during construction of the TOJDs are estimated assuming that two construction activities with the highest criteria pollutant emissions would occur simultaneously. For example, constructions of the TOJDs at the Alum Rock/28th Street Station and Santa Clara Station North Option would result in the highest daily NO_X emission rates of 29 and 29 pounds per day, respectively. Therefore, the highest NO_X emission is estimated to be 58 pounds per day.

[b] The emission calculations account for emissions generated by onsite and offsite construction equipment, emissions from hauling trips, and vendor trips.

SOURCE: ARB, CalEEMod version 2013.

Mitigation Measures AQ-CNST-A through AQ-CNST-I (see Chapter 5) would also apply to the BART Extension with TOJD Alternative.

Operation

The operational analysis for the BART Extension with TOJD Alternative includes emissions associated with the BART Extension and occupation of the TOJDs, as well as emissions benefits associated with vehicle mode shift. It is anticipated that the BART Extension would increase ridership, thereby decreasing regional passenger VMT through mode shift from private automobiles to transit. Accounting for emissions reductions associated with mode shift is consistent with recommendations from the American Public Transportation Association (2009).

Estimates of mobile-source emissions were based on regional VMT data, as shown in Table 6.3-7. The regional VMT accounted for future developments in the County, including the TOJD. It is assumed that the Downtown San Jose Station East and West Options would result in the same regional VMT reduction. The VMT is presented for the 2015 Existing, 2025 Opening Year, and 2035 Forecast Year. Given this methodology, mobile-source emissions were not presented separately for individual TOJDs.

The TOJDs would also generate emissions from area sources (e.g., consumer products) and natural gas consumption. These emissions were estimated using CalEEMod.

Table 6.3-7: Regional Vehicle Miles Traveled: BART Extension with TOJD Alternative

Analysis Year	Vehicle Miles Traveled (miles per day)		% VMT Change from No Build Alternative	% VMT Change from Existing
	No Build Alternative	BART Extension with TOJD Alternative		
2015 Existing	51,893,183	51,795,427	(-0.19%)	—
2025 Opening Year	54,981,379	54,905,065	(-0.14%)	6%
2035 Forecast Year	59,777,409	59,703,751	(-0.12%)	15%

Source: Hexagon 2016b.

Tables 6.3-8 and 6.3-9 show annual and daily emissions, respectively. The emissions for the TOJD are presented first, followed by emissions for the BART Extension. The direct emissions from the TOJD would not change significantly over time. The required CalEEMod assumptions (e.g., energy use) remain constant over the course of many years. Therefore, the TOJDs were modeled in one year (i.e., 2025), and the emissions were added to the emissions scenarios for the BART Extension during the 2015 Existing plus BART Extension with TOJD Alternative, 2025 Opening Year, and 2035 Forecast Year. The results show that emissions would be less than the BAAQMD significance thresholds, except for ROG emissions. Significant emissions would be related to residential consumer product use (e.g., aerosol sprays) at the Alum Rock/28th Street Stations, Downtown San Jose (East and West Options), Diridon (South and North Options), and Santa Clara Stations. There is no feasible mitigation to reduce or control the use of consumer products within private residences. Therefore, ROG emissions associated with TOJDs would result in a *significant and unavoidable impact*.

Table 6.3-8: Net Annual Operational Emissions for the BART Extension with TOJD Alternative

	Tons per Year				
TOJD	**ROGs**	**NO_X**	**CO**	**PM10**	**PM2.5**
Alum Rock/28th Street Station					
Area	7	< 1	2	< 1	< 1
Energy	< 1	1	< 1	< 1	< 1
Waste	< 1	< 1	< 1	< 1	< 1
Water	< 1	< 1	< 1	< 1	< 1
Total	**7**	**1**	**2**	**< 1**	**< 1**
13th Street Ventilation Facility					
Area	< 1	< 1	< 1	< 1	< 1
Energy	< 1	< 1	< 1	< 1	< 1
Waste	< 1	< 1	< 1	< 1	< 1
Water	< 1	< 1	< 1	< 1	< 1
Total	**< 1**	**< 1**	**< 1**	**< 1**	**< 1**
Downtown San Jose Station East Option					
Area	6	< 1	< 1	< 1	< 1
Energy	< 1	1	< 1	< 1	< 1
Waste	< 1	< 1	< 1	< 1	< 1
Water	< 1	< 1	< 1	< 1	< 1
Total	**6**	**1**	**< 1**	**< 1**	**< 1**
Downtown San Jose Station West Option					
Area	< 1	< 1	< 1	< 1	< 1
Energy	< 1	< 1	< 1	< 1	< 1
Waste	< 1	< 1	< 1	< 1	< 1
Water	< 1	< 1	< 1	< 1	< 1
Total	**< 1**	**< 1**	**< 1**	**< 1**	**< 1**

TOJD	Tons per Year				
	ROGs	**NO_X**	**CO**	**PM10**	**PM2.5**
Diridon Station (South and North Options)					
Area	4	< 1	< 1	< 1	< 1
Energy	< 1	1	< 1	< 1	< 1
Waste	< 1	< 1	< 1	< 1	< 1
Water	< 1	< 1	< 1	< 1	< 1
Total	**4**	**1**	**< 1**	**< 1**	**< 1**
Stockton Avenue Ventilation Facility					
Area	< 1	< 1	< 1	< 1	< 1
Energy	< 1	< 1	< 1	< 1	< 1
Waste	< 1	< 1	< 1	< 1	< 1
Water	< 1	< 1	< 1	< 1	< 1
Total	**< 1**	**< 1**	**< 1**	**< 1**	**< 1**
Total TOJD Emissions	**24**	**4**	**4**	**< 1**	**< 1**
2015 Existing plus BART Extension with TOJD Alternative Condition					
BART Extension with TOJD (Mobile Source Emissions)	(1)	3	(54)	(2)	(1)
TOJD – Area Sources	24	4	4	< 1	< 1
Total	**23**	**7**	**(50)**	**(2)**	**(1)**
BAAQMD Operational Significance Thresholds	10	10	—	15	10
Exceed Threshold?	*Yes*	*No*	—	*No*	*No*
2025 Opening Year					
BART Extension plus TOJD (Mobile-Source Emissions)	(1)	0	(19)	(1)	(1)
TOJD (Area Sources)	24	4	4	< 1	< 1
Total	**23**	**4**	**(`5)**	**(1)**	**(1)**
BAAQMD Operational Significance Thresholds	10	10	—	15	10
Exceed Threshold?	*Yes*	*No*	—	*No*	*No*
2035 Forecast Year					
BART Extension plus TOJD (Mobile Source Emissions)	0	1	(12)	(1)	(0)
TOJD (Area Sources)	24	4	4	< 1	< 1
Total	**24**	**5**	**(8)**	**(1)**	**< 1**
BAAQMD Operational Significance Thresholds	10	10	—	15	10
Exceed Threshold?	*Yes*	*No*	—	*No*	*No*

Source: ARB, CalEEMod version 2013.

Table 6.3-9: Net Daily Operational Emissions for the BART Extension with TOJD Alternative

TOJD	Pounds per Day				
	ROGs	**NO_X**	**CO**	**PM10**	**PM2.5**
Alum Rock/28th Street Station					
Area	41	< 1	23	< 1	< 1
Energy	< 1	3	2	< 1	< 1
Waste	< 1	< 1	< 1	< 1	< 1
Water	< 1	< 1	< 1	< 1	< 1
Total	**41**	**3**	**25**	**< 1**	**< 1**
13th Street Ventilation Facility					
Area	< 1	< 1	< 1	< 1	< 1
Energy	< 1	< 1	< 1	< 1	< 1
Waste	< 1	< 1	< 1	< 1	< 1
Water	< 1	< 1	< 1	< 1	< 1
Total	**< 1**	**< 1**	**< 1**	**< 1**	**< 1**
Downtown San Jose Station East Option					
Area	32	< 1	< 1	< 1	< 1
Energy	< 1	3	2	< 1	< 1
Waste	< 1	< 1	< 1	< 1	< 1
Water	< 1	< 1	< 1	< 1	< 1
Total	**32**	**3**	**2**	**< 1**	**< 1**
Downtown San Jose Station West Option					
Area	2	< 1	< 1	< 1	< 1
Energy	< 1	< 1	< 1	< 1	< 1
Waste	< 1	< 1	< 1	< 1	< 1
Water	< 1	< 1	< 1	< 1	< 1
Total	**2**	**< 1**	**< 1**	**< 1**	**< 1**
Diridon Station (South and North Options)					
Area	21	< 1	< 1	< 1	< 1
Energy	< 1	3	3	< 1	< 1
Waste	< 1	< 1	< 1	< 1	< 1
Water	< 1	< 1	< 1	< 1	< 1
Total	**21**	**3**	**3**	**< 1**	**< 1**
Stockton Avenue Ventilation Facility					
Area	< 1	< 1	< 1	< 1	< 1
Energy	< 1	< 1	< 1	< 1	< 1
Waste	< 1	< 1	< 1	< 1	< 1
Water	< 1	< 1	< 1	< 1	< 1
Total	**< 1**	**< 1**	**< 1**	**< 1**	**< 1**

TOJD	Pounds per Day				
	ROGs	**NO_X**	**CO**	**PM10**	**PM2.5**
Santa Clara Station					
Area	40	< 1	18	< 1	< 1
Energy	< 1	3	2	< 1	< 1
Waste	< 1	< 1	< 1	< 1	< 1
Water	< 1	< 1	< 1	< 1	< 1
Total	**40**	**3**	**20**	**< 1**	**< 1**
Total TOJD Emissions	136	12	50	< 1	< 1
2015 Existing plus BART Extension with TOJD Alternative Condition					
BART Extension plus TOJD (Mobile-Source Emissions)	(5)	19	(296)	(8)	(3)
TOJDs (Area Sources)	136	12	50	< 1	< 1
Total	**131**	**31**	**246**	**(8)**	**(3)**
BAAQMD Operational Significance Thresholds	54	54	—	82	54
Exceed Threshold?	*Yes*	*No*	—	*No*	*No*
2025 Opening Year					
BART Extension plus TOJD (Mobile-Source Emissions)	(1)	2	(105)	(7)	(3)
TOJD (Area Sources)	136	12	50	< 1	< 1
Total	**135**	**17**	**(55)**	**(7)**	**(3)**
BAAQMD Operational Significance Thresholds	54	54	—	82	54
Exceed Threshold?	*Yes*	*No*	—	*No*	*No*
2035 Forecast Year (2035)					
BART Extension plus TOJD (Mobile-Source Emissions)	0	4	(65)	(6)	(3)
TOJD (Area Sources)	136	12	50	< 1	< 1
Total	**136**	**16**	**(15)**	**(6)**	**(3)**
BAAQMD Operational Significance Thresholds	54	54	—	82	54
Exceed Threshold?	*Yes*	*No*	—	*No*	*No*

SOURCE: ARB, CalEEMod version 2013.

Impact BART Extension + TOJD AQ-3: Cause a cumulatively considerable net increase in a criteria pollutant

The criteria pollutant thresholds presented in Table 6.3-2 represent the maximum emissions the BART Extension with TOJD Alternative may generate before contributing to a cumulative impact on regional air quality. Consequently, exceedances of the project-level thresholds would be cumulatively considerable.

Construction

As discussed under Impact BART Extension + TOJD AQ-2, ROG and NO_X emissions under the Twin-Bore and Single-Bore Options would exceed BAAQMD thresholds, even after implementation of mitigation. Although emissions would be temporary, they would exceed

emissions standards and may contribute to air quality degradation and impede the region's ability to attain air quality standards. Therefore, the BART Extension with TOJD Alternative (Twin-Bore and Single-Bore Options) would result in significant cumulative air quality impacts during construction. This impact would be *significant and unavoidable*.

Operation

As discussed under Impact BART Extension + TOJD AQ-2, operation of the BART Extension would reduce regional VMT and associated emissions. The TOJD would be consistent with regional air quality plans and local (i.e., Santa Clara and San Jose) general plans, which seek to locate infill residential and office development near transit lines. However, when combined with emissions from the new residences within the TOJDs, ROG emissions from the use of consumer products would exceed the BAAQMD significance thresholds. Therefore, the BART Extension with TOJD Alternative would result in significant cumulative air quality impacts during operations. This impact would be *significant and unavoidable*.

Impact BART Extension + TOJD AQ-4: Expose sensitive receptors to substantial pollutant concentrations

Construction

Toxic Air Contaminants

As previously discussed in the methodology, emissions exposure was estimated for construction of the Alum Rock/28th Street Station and TOJD. The analysis assumed that station construction would be similar under the Twin-Bore and Single-Bore Options. The results of the risk assessment for an offsite maximally exposed receptor (i.e., Five Wounds Church and Elementary School approximately 65 feet to the southeast) are presented in Table 6.3-10. The annual increase in PM2.5 concentrations and cancer risk would exceed the BAAQMD significance thresholds. Mitigation Measure AQ-CNST-B would require Tier 4 exhaust controls and would reduce PM2.5 concentrations and cancer risk to below the threshold. Therefore, the BART Extension with TOJD Alternative would result in a *less-than-significant impact* related to construction health risk following implementation of mitigation.

Table 6.3-10: Construction Health Risk Assessment: BART Extension with TOJD Alternative

Risk	Unit	Threshold	Unmitigated Risk	Mitigated Risk
Excess Cancer Risk	Probability per One Million Population	10	27.2	1.56
Chronic Health Non-Cancer Risk	Health Index	1.0	0.24	0.02
Increase in PM2.5 Concentration	Average Annual ($\mu g/m^3$)	0.3	1.17	0.12
Source: Terry A. Hayes Associates Inc. 2016.				

Operation

Toxic Air Contaminants

Operational impacts associated with the BART Extension, including the Newhall Maintenance Facility, have been discussed above. The BART Extension with TOJD Alternative would reduce regional mobile-source air toxic emissions, and VTA also operates diesel-hybrid buses. There is no potential for a long-term PM hot-spot. The TOJD sites include residential and retail/office land uses. These land uses would not include significant sources of TAC emissions requiring specific BAAQMD permits, such as chrome plating facilities. Activities at the TOJDs would be typical to in-fill housing and commercial land uses that support residents, retail facilities, and office personnel. The TOJDs would likely include loading docks. Based on the types of anticipated land uses, less than five trucks per day would deliver to each TOJD. In addition, trucks would be prohibited for idling in excess of 5 minutes, in accordance with state law. The TOJDs would not expose offsite receptors to significant TAC emissions. Therefore, the BART Extension with TOJD Alternative would not result in a *less-than-significant* impact related to operations, and no mitigation is required.

Carbon Monoxide Hot-Spots

As discussed in Section 4.2.3.2, *Local Air District Thresholds*, BAAQMD has published a screening methodology for determining the possibility of a CO hot spot. According to *VTA's BART Silicon Valley – Phase II Extension Project Traffic Impact Analysis of the BART Extension and VTA's Transit-Oriented Joint Development* (Hexagon 2016b), the BART Extension with TOJD Alternative would not increase traffic volumes at any intersection in the traffic study area to more than 24,000 vehicles per hour. Accordingly, the BART Extension with TOJD Alternative would not conflict with BAAQMD's screening criteria or expose receptors to localized CO hot spots. This impact would be *less than significant*, and no mitigation is required.

Impact BART Extension + TOJD AQ-5: Create objectionable odors that would affect a substantial number of people

Construction

Potential odor sources during construction activities include diesel exhaust from heavy-duty equipment. The BART Extension with TOJD Alternative would utilize typical construction techniques for the Twin-Bore and Single-Bore Options; therefore, any odors would be typical for construction sites. Construction near existing receptors would be temporary in nature, and construction activities would not be likely to result in nuisance odors that would violate BAAQMD Regulation 7 (Odorous Substances). Therefore, the BART Extension with TOJD Alternative would result in a *less-than-significant impact* related to construction odors, and no mitigation is required.

Operation

The land uses and industrial operations that are typically associated with odor complaints include wastewater treatment plants, landfills, confined animal facilities, composting stations, food manufacturing plants, refineries, and chemical plants. The BART Extension operations would not include activities that typically generate adverse odors. However, there would likely be Newhall Maintenance Facility activities (e.g., car cleaning) operation as that would generate odors and require air permits from the BAAQMD. While fuel combustion by generators and other sources may also create odors, permitting conditions will ensure compliance with BAAQMD rules and regulations related to public nuisances (including odors). The BART Extension with TOJD Alternative would not include any other land uses or activities that typically generate adverse odors. Diesel hybrid buses at the transit stations may emit detectable odors. However, these odors would be transient and would quickly disperse under typical meteorological conditions. Therefore, operation of the BART Extension with TOJD Alternative would have a *less-than-significant impact* related to odors, and no mitigation is required.

6.3.5 CEQA Conclusion

The BART Extension Alternative would have a *significant and unavoidable impact* under CEQA given the violation of BAAQMD air quality standards for NO_X during construction (Twin-Bore and Single-Bore Options).

The BART Extension with TOJD Alternative would have a *significant and unavoidable impact* under CEQA given the violation of BAAQMD air quality standards for ROG and NO_X during construction. Operation of the BART Extension with TOJD Alternative would also exceed the ROG threshold.

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