MUSLIM COMMUNITY ASSOCIATION SCHOOL EXPANSION HEALTH RISK ASSESSMENT

Santa Clara, California

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Introduction

The purpose of this report is to address community health risk impacts associated with the expansion of the Muslim Community Academy (MCA) school at 3033 Scott Boulevard in the City of Santa Clara. The expansion portion of the project site is currently developed with a one-story office building approximately 32,700 square feet and a large surface parking lot. The air quality impacts would be associated with the renovation of the existing building and operation of the expanded school. The Project would include sensitive receptors that include children attending the newly expanded school. The expansion of the school would replace existing office activity with school activities. Community risk to school attendees (i.e., children and high school students) is assessed in this report. The change in GHG emissions associated with operation of the project were also predicted. This analysis addresses those issues following the guidance provided by the Bay Area Air Quality Management District (BAAQMD).[1]

Project Description

The project applicant proposes to expand its existing school and facilities at 3003 Scott Boulevard into the adjacent 35,000 square foot office building at 3100 Alfred Street. The project site (i.e., 3003 Scott Boulevard and 3100 Alfred Street) is bordered by an industrial and commercial building to the north, Alfred Street to the east, Scott Boulevard to the south and industrial/commercial office buildings to the west. The existing 90,000 square foot building includes a pre-Kindergarten through grade 8th grade school with an allowed student capacity of 400, prayer rooms with capacity for up to 1,800 persons, and various ancillary offices and meeting rooms. The project site is designated *Low Intensity Office/R&D* under the adopted General Plan and is zoned Light Industrial.

The project would expand the existing facilities into the adjacent 32,700-sf office building, including classrooms for grades 9 through 12, gymnasiums, lounges, and game rooms. The proposed student capacity for the two buildings is 900, with approximately 350 additional students in grades pre-K through 8th and 150 high school students. The school would operate from 7:00 am to 4:00 pm. The new building would add parking spaces to serve the combined facilities.

The MCA expansion would require an amended Conditional Use Permit from the City of Santa Clara to expand the MCA school and community facilities into the new building. This project would require some construction during renovation, but this would only be interior tenant improvements to the buildings and minor exterior improvements to facilitate site access. The proposed project would renovate and reuse an existing office building. These renovations include façade improvements, including installation of new windows and decorative metal. The project would enclose the existing roof covered entrance areas into the interior floor area of the building which would increase the square footage of the MCA-3 building by 900 square feet (to a total of 35,800 square feet). The existing building elevation would be raised from 18 to 32 feet above the ground surface to accommodate the interior basketball court's raised ceiling. A new five-foot wide pedestrian sidewalk would be constructed along Alfred Street, in front of the MCA-3 building, which would connect with the existing sidewalk fronting the MCA-1 building. The proposed project would

[1] Bay Area Air Quality Management District, *CEQA Air Quality Guidelines*, May 2017.

relocate utilities along the MCA-3 project frontage on Alfred Street to accommodate the new five-foot wide sidewalk. The project would require some trenching to a depth of three to five feet below ground surface to access underground utilities.

This report analyzed the health risk impact to proposed future sensitive receptors (Students or users of the project) from nearby permitted stationary sources and local roadways that emit toxic air contaminants (TACs) and changes in GHG emissions that would occur due to the project.

Setting

The project is located in Santa Clara County, which is in the San Francisco Bay Area Air Basin. Ambient air quality standards have been established at both the State and federal level. The Bay Area meets all ambient air quality standards with the exception of ground-level ozone, respirable particulate matter (PM_{10}), and fine particulate matter ($PM_{2.5}$).

Air Pollutants of Concern

High ozone levels are caused by the cumulative emissions of reactive organic gases (ROG) and nitrogen oxides (NO_X). These precursor pollutants react under certain meteorological conditions to form high ozone levels. Controlling the emissions of these precursor pollutants is the focus of the Bay Area's attempts to reduce ozone levels. The highest ozone levels in the Bay Area occur in the eastern and southern inland valleys that are downwind of air pollutant sources. High ozone levels aggravate respiratory and cardiovascular diseases, reduced lung function, and increase coughing and chest discomfort.

Particulate matter is another problematic air pollutant of the Bay Area. Particulate matter is assessed and measured in terms of respirable particulate matter or particles that have a diameter of 10 micrometers or less (PM_{10}) and fine particulate matter where particles have a diameter of 2.5 micrometers or less ($PM_{2.5}$). Elevated concentrations of PM_{10} and $PM_{2.5}$ are the result of both region-wide (or cumulative) emissions and localized emissions. High particulate matter levels aggravate respiratory and cardiovascular diseases, reduce lung function, increase mortality (e.g., lung cancer), and result in reduced lung function growth in children.

Toxic Air Contaminants

TACs are a broad class of compounds known to cause morbidity or mortality (usually because they cause cancer) and include, but are not limited to, the criteria air pollutants. TACs are found in ambient air, especially in urban areas, and are caused by industry, agriculture, fuel combustion, and commercial operations (e.g., dry cleaners). TACs are typically found in low concentrations, even near their source (e.g., diesel particulate matter [DPM] near a freeway). Because chronic exposure can result in adverse health effects, TACs are regulated at the regional, State, and federal level.

Diesel exhaust is the predominant TAC in urban air and is estimated to represent about three-quarters of the cancer risk from TACs (based on the Bay Area average). According to the California Air Resources Board (CARB), diesel exhaust is a complex mixture of gases, vapors, and fine particles. This complexity makes the evaluation of health effects of diesel exhaust a complex scientific issue. Some of the chemicals in diesel exhaust, such as benzene and formaldehyde, have been previously identified as TACs by the CARB, and are listed as carcinogens either under the State's Proposition 65 or under the Federal Hazardous Air Pollutants programs. The most recent Office of Environmental Health Hazard Assessment (OEHHA) risk assessment guidelines were published in February of 2015.[2] See *Attachment 1* for a detailed description of the community risk modeling methodology used in this assessment.

Sensitive Receptors

There are groups of people more affected by air pollution than others. CARB has identified the following persons who are most likely to be affected by air pollution: children under 16, the elderly over 65, athletes, and people with cardiovascular and chronic respiratory diseases. These groups are classified as sensitive receptors. Locations that may contain a high concentration of these sensitive population groups include residential areas, hospitals, daycare facilities, elder care facilities, elementary schools, and parks. For cancer risk assessments, children are the most sensitive receptors, since they are more susceptible to cancer causing TACs. Residential locations are assumed to include infants and small children. The MCA project, though not a source of TAC emissions, will include sensitive receptors by attracting new school children to the project site.

Regulatory Setting

Federal Regulations

The United States Environmental Protection Agency (EPA) sets nationwide emission standards for mobile sources, which include on-road (highway) motor vehicles such trucks, buses, and automobiles, and non-road (off-road) vehicles and equipment used in construction, agricultural, industrial, and mining activities (such as bulldozers and loaders). The EPA also sets nationwide fuel standards. California also has the ability to set motor vehicle emission standards and standards for fuel used in California, as long as they are the same or more stringent than the Federal standards.

In the past decade the EPA has established a number of emission standards for on- and non-road heavy-duty diesel engines used in trucks and other equipment. This was done in part because diesel engines are a significant source of nitrogen oxides, or NO_X, and particulate matter (PM_{10} and $PM_{2.5}$) and because the EPA has identified diesel particulate matter as a probable carcinogen. Implementation of the heavy-duty diesel on-road vehicle standards and the non-road diesel engine standards are estimated to reduce PM and NO_X emissions from diesel engines up to 95 percent in 2030 when the heavy-duty vehicle fleet is completely replaced with newer heavy-duty vehicles that comply with these emission standards.[3]

[2] OEHHA, 2015. *Air Toxics Hot Spots Program Risk Assessment Guidelines, The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*. Office of Environmental Health Hazard Assessment. February.
[3] USEPA, 2000. *Regulatory Announcement, Heavy-Duty Engine and Vehicle Standards and Highway Diesel Fuel Sulfur Control Requirements*. EPA420-F-00-057. December.

In concert with the diesel engine emission standards, the EPA has also substantially reduced the amount of sulfur allowed in diesel fuels. The sulfur contained in diesel fuel is a significant contributor to the formation of particulate matter in diesel-fueled engine exhaust. The new standards reduced the amount of sulfur allowed by 97 percent for highway diesel fuel (from 500 parts per million by weight [ppmw] to 15 ppmw), and by 99 percent for off-highway diesel fuel (from about 3,000 ppmw to 15 ppmw). The low sulfur highway fuel (15 ppmw sulfur), also called ultra-low sulfur diesel (ULSD) is currently required for use by all vehicles in the U.S.

All of the above Federal diesel engine and diesel fuel requirements have been adopted by California, in some cases with modifications making the requirements more stringent or the implementation dates sooner.

State Regulations

To address the issue of diesel emissions in the state, CARB developed the Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles[4]. In addition to requiring more stringent emission standards for new on-road and off-road mobile sources and stationary diesel-fueled engines to reduce particulate matter emissions by 90 percent, a significant component of the plan involves application of emission control strategies to existing diesel vehicles and equipment. Many of the measures of the Diesel Risk Reduction Plan have been approved and adopted, including the Federal on-road and non-road diesel engine emission standards for new engines, as well as adoption of regulations for low sulfur fuel in California.

CARB has adopted and implemented a number of regulations for stationary and mobile sources to reduce emissions of DPM. Several of these regulatory programs affect medium and heavy-duty diesel trucks that represent the bulk of DPM emissions from California highways. CARB regulations require on-road diesel trucks to be retrofitted with particulate matter controls or replaced to meet 2010 or later engine standards that have much lower DPM and $PM_{2.5}$ emissions. This regulation will substantially reduce these emissions between 2013 and 2023. While new trucks and buses will meet strict federal standards, this measure is intended to accelerate the rate at which the fleet either turns over so there are more cleaner vehicles on the road, or is retrofitted to meet similar standards. With this regulation, older, more polluting trucks would be removed from the roads sooner.

CARB has also adopted and implemented regulations to reduce DPM and NO_X emissions from in-use (existing) and new off-road heavy-duty diesel vehicles (e.g., loaders, tractors, bulldozers, backhoes, off-highway trucks, etc.). The regulations apply to diesel-powered off-road vehicles with engines 25 horsepower (hp) or greater. The regulations are intended to reduce particulate matter and NO_X exhaust emissions by requiring owners to turn over their fleet (replace older equipment with newer equipment) or retrofit existing equipment in order to achieve specified fleet-averaged emission rates. Implementation of this regulation, in conjunction with stringent Federal

[4] California Air Resources Board, 2000. *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles*. October.

off-road equipment engine emission limits for new vehicles, will significantly reduce emissions of DPM and NO_X.

Bay Area Air Quality Management District (BAAQMD)

BAAQMD has jurisdiction over an approximately 5,600-square mile area, commonly referred to as the San Francisco Bay Area (Bay Area). The District's boundary encompasses the nine San Francisco Bay Area counties, including Alameda County, Contra Costa County, Marin County, San Francisco County, San Mateo County, Santa Clara County, Napa County, southwestern Solano County and southern Sonoma County.

BAAQMD is the lead agency in developing plans to address attainment and maintenance of the National Ambient Air Quality Standards and California Ambient Air Quality Standards. The District also has permit authority over most types of stationary equipment utilized for the proposed project. The BAAQMD is responsible for permitting and inspection of stationary sources; enforcement of regulations, including setting fees, levying fines, and enforcement actions; and ensuring that public nuisances are minimized.

BAAQMD's Community Air Risk Evaluation (CARE) program was initiated in 2004 to evaluate and reduce health risks associated with exposures to outdoor TACs in the Bay Area.[5] The program examines TAC emissions from point sources, area sources, and on-road and off-road mobile sources with an emphasis on diesel exhaust, which is a major contributor to airborne health risk in California. The CARE program is an on-going program that encourages community involvement and input. The technical analysis portion of the CARE program is being implemented in three phases that includes an assessment of the sources of TAC emissions, modeling and measurement programs to estimate concentrations of TAC, and an assessment of exposures and health risks. Throughout the program, information derived from the technical analyses will be used to focus emission reduction measures in areas with high TAC exposures and high density of sensitive populations. Risk reduction activities associated with the CARE program are focused on the most at-risk communities in the Bay Area. Overburdened communities are areas located (i) within a census tract identified by the California Communities Environmental Health Screening Tool (CalEnviroScreen), Version 4.0 implemented by OEHHA, as having an overall CalEnviroScreen score at or above the 70th percentile, or (ii) within 1,000 feet of any such census tract.[6] The BAAQMD has identified six communities as impacted: Concord, Richmond/San Pablo, Western Alameda County, San José, Redwood City/East Palo Alto, and Eastern San Francisco. The project site is not within a CARE area nor within a BAAQMD overburdened area as identified by CalEnviroScreen. The CalEnviroScreen v4.0 score at the Project site is 60.

The BAAQMD *California Environmental Quality Act (CEQA) Air Quality Guidelines*[7] were prepared to assist in the evaluation of air quality impacts of projects and plans proposed within the

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[5] See BAAQMD: https://www.baaqmd.gov/community-health/community-health-protection-program/community-air-risk-evaluation-care-program , accessed 2/18/2021.

[6] See BAAQMD: https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-2-permits/2021-amendments/documents/20210722_01_appendixd_mapsofoverburdenedcommunities-pdf.pdf?la=en , accessed 11/23/2021.

[7] Bay Area Air Quality Management District, 2011. *CEQA Air Quality Guidelines*. May. (Updated May 2017)

Bay Area. The guidelines provide recommended procedures for evaluating potential air impacts during the environmental review process consistent with CEQA requirements including thresholds of significance, mitigation measures, and background air quality information. They also include assessment methodologies for air toxics, odors, and greenhouse gas emissions. In June 2010, the BAAQMD's Board of Directors adopted CEQA thresholds of significance and an update of their *CEQA Guidelines*. In May 2011, the updated BAAQMD *CEQA Air Quality Guidelines* were amended to include a risk and hazards threshold for new receptors and modify procedures for assessing impacts related to risk and hazard impacts.

City of Santa Clara 2010 – 2035 General Plan.

On November 16, 2010, the City of Santa Clara adopted the *City of Santa Clara 2010 – 2035 General Plan.*[8] The general plan includes goals, policies, and actions to reduce air pollutants and exposure to toxic air containments. The following goals, policies, and actions are applicable to the proposed project and this assessment:

5.10.2 Air Quality Goals

5.10.2-G1 Improved air quality in Santa Clara and the region.

5.10.2-G2 Reduced greenhouse gas emissions that meet the State and regional goals and requirements to combat climate change.

5.10.2 Air Quality Policies

5.10.2-P3 Encourage implementation of technological advances that minimize public health hazards and reduce the generation of air pollutants.

5.10.2-P4 Encourage measures to reduce greenhouse gas emissions to reach 30 percent below 1990 levels by 2020.

5.10.2-P6 Require "Best Management Practices" for construction dust abatement.

Significance Thresholds

In June 2010, BAAQMD adopted thresholds of significance to assist in the review of projects under CEQA and these significance thresholds were contained in the District's 2011 *CEQA Air Quality Guidelines*. These thresholds were designed to establish the level at which BAAQMD believed air pollution emissions would cause significant environmental impacts under CEQA. The thresholds were challenged through a series of court challenges and were mostly upheld. BAAQMD updated the *CEQA Air Quality Guidelines* in 2017 to include the latest significance thresholds that were used in this analysis are summarized in Table 1. Community risks are considered significant if they exceed these levels.

[8] City of Santa Clara, 2010. *City of Santa Clara 2010 – 2035 General Plan*. November. Web: https://www.santaclaraca.gov/home/showdocument?id=56139

Table 1. BAAQMD CEQA Significance Thresholds

Criteria Air Pollutant	Construction Thresholds	Operational Thresholds	
	Average Daily Emissions (lbs./day)	**Average Daily Emissions (lbs./day)**	**Annual Average Emissions (tons/year)**
ROG	54	54	10
NO_x	54	54	10
PM_{10}	82 (Exhaust)	82	15
$PM_{2.5}$	54 (Exhaust)	54	10
CO	Not Applicable	9.0 ppm (8-hour average) or 20.0 ppm (1-hour average)	
Fugitive Dust	Construction Dust Ordinance or other Best Management Practices	None	
Health Risks and Hazards	**Single Sources Within 1,000-foot Zone of Influence**	**Combined Sources (Cumulative from all sources within 1000-foot zone of influence)**	
Excess Cancer Risk	10 per one million	100 per one million	
Hazard Index	1.0	10.0	
Incremental annual $PM_{2.5}$	0.3 µg/m^3	0.8 µg/m^3	
Note: ROG = reactive organic gases, NOx = nitrogen oxides, PM_{10} = course particulate matter or particulates with an aerodynamic diameter of 10 micrometers (µm) or less, $PM_{2.5}$ = fine particulate matter or particulates with an aerodynamic diameter of 2.5µm or less.			

AIR QUALITY IMPACTS AND MITIGATION MEASURES

Impact AIR-1: Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?

The Bay Area is considered a non-attainment area for ground-level O_3 and $PM_{2.5}$ under both the Federal Clean Air Act and the California Clean Air Act. The area is also considered non-attainment for PM_{10} under the California Clean Air Act, but not the federal act. The area has attained both State and Federal ambient air quality standards for carbon monoxide. As part of an effort to attain and maintain ambient air quality standards for O_3, $PM_{2.5}$ and PM_{10}, the BAAQMD has established thresholds of significance for these air pollutants and their precursors. These thresholds are for O_3 precursor pollutants (ROG and NOx), PM_{10}, and $PM_{2.5}$ and apply to both construction period and operational period impacts.

The proposed project would renovate and reuse an existing office building. These renovations include façade improvements, including installation of new windows and decorative metal. The project would enclose the existing roof covered entrance areas into the interior floor area of the building which would increase the square footage of the MCA-3 building by 900 square feet (to a total of 35,800 square feet). The existing building elevation would be raised from 18 to 32 feet above the ground surface to accommodate the interior basketball court's raised ceiling. A new five-foot wide pedestrian sidewalk would be constructed along Alfred Street, in front of the MCA-3 building, which would connect with the existing sidewalk fronting the MCA-1 building. The proposed project would relocate utilities along the MCA-3 project frontage on Alfred Street to accommodate the new five-foot wide sidewalk. The project would require trenching to a depth of three to five feet below ground surface to access underground utilities. These activities are not anticipated to use substantial diesel-powered equipment over extended periods of time that could result in substantial air pollutant emissions or TAC exposure. Therefore, emissions modeling of these activities was not necessary to demonstrate that emissions would be below significance thresholds. Note that the BAAQMD CEQA Air Quality Guidelines screening size for conducting emission modeling of construction activities is 277,000 square feet of new construction or 271,000 square feet of operation[9]. The proposed Project is much smaller than those screening sizes.

Construction activities for renovation, could temporarily generate fugitive dust in the form of PM_{10} and $PM_{2.5}$. The BAAQMD CEQA Air Quality Guidelines consider these impacts to be less-than-significant if best management practices are implemented to reduce these emissions. *Mitigation Measure AQ-1 would implement BAAQMD-recommended best management practices*.

Mitigation Measure AQ-1: Include measures to control dust and exhaust during construction.

During any construction period ground disturbance, the applicant shall ensure that the project contractor implement measures to control dust and exhaust. Implementation of the measures recommended by BAAQMD and listed below would reduce the air quality impacts associated with grading and new construction to a less-than-significant level. Additional measures are identified to reduce construction equipment exhaust emissions. The contractor shall implement the following best management practices that are required of all projects:

1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.

2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.

3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.

4. All vehicle speeds on unpaved roads shall be limited to 15 miles per hour (mph).

5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.

[9] See BAAQMD CEQA Air Quality Guidelines Table 3-1, p3-2.

6. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.

7. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.

8. Post a publicly visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

Impact AIR-2: Expose sensitive receptors to substantial pollutant concentrations?

Impacts of Project

Project impacts related to increased community risk can occur by introducing a new source of TACs with the potential to adversely affect existing sensitive receptors in the project vicinity or by significantly exacerbating existing cumulative TAC impacts. This project would introduce minor sources of TACs during construction. Construction activities would include renovation of an existing building that would not result in construction activities that involve diesel equipment use that would result in substantial emissions. The risk of TAC and air pollution exposure from this activity is low, and therefore, health risks were not quantified.

Impacts to Project Sensitive Receptors

The proposed Project would expand a school in at a location that is near several sources of air pollutant and TAC emissions. A health risk assessment was completed to assess the impact existing TAC sources would have on the new proposed sensitive receptors (students attending the school) that that project would introduce.[10]

<u>Modeled Sensitive Receptors</u>

Receptors for this assessment included locations where school students would be present for extended periods of time (i.e., chronic exposures). The school site and modeled receptors are shown in Figure 1. Student exposures were assumed from kindergarten age (5 years old) through high school (17 years old), with exposure conditions assumed that are consistent with BAAQMD's application of OEHHA guidance (see Attachment 1). Where screening data from BAAQMD were

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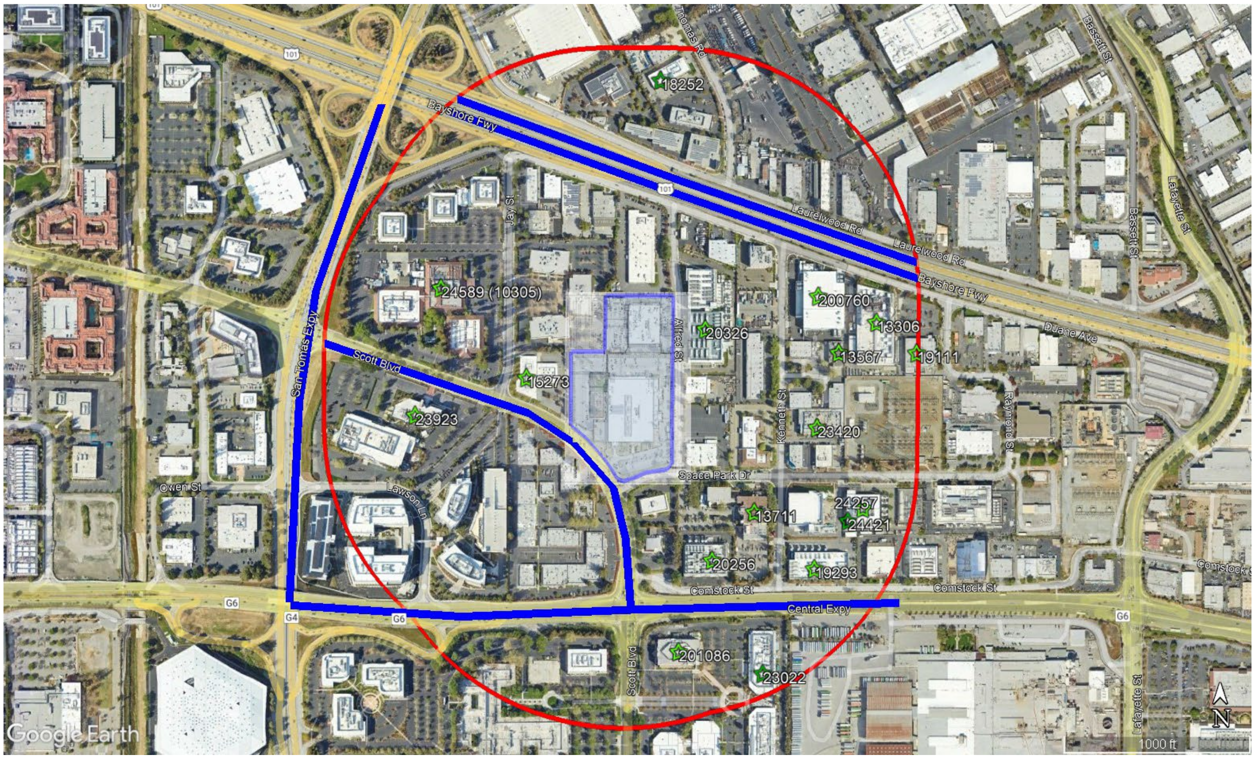
[10] We note that to the extent this analysis considers *existing* air quality issues in relation to the impact on *future residents* of the Project, it does so for informational purposes only pursuant to the judicial decisions in *CBIA v. BAAQMD* (2015) 62 Cal.4th 369, 386 and *Ballona Wetlands Land Trust v. City of Los Angeles* (2011) 201 Cal.App.4th 455, 473, which confirm that the impacts of the environment on a project are excluded from CEQA unless the project itself "exacerbates" such impacts.

applied, lifetime exposure parameters were assumed. Application of these screening levels overpredict exposures and associated cancer risk because of the greater exposure duration (lifetime vs. school period) and greater sensitivity of residential receptors that assume infant exposure.

Figure 1. Project Site and Nearby TAC and $PM_{2.5}$ Sources



<u>Roadway Impacts</u>

A refined analysis of potential health impacts from vehicle traffic was conducted for nearby roadways estimated to have average daily traffic (ADT) exceeding 10,000 vehicles. The refined analysis involved predicting emissions for the traffic volume and mix of vehicle types on both roadways near the project site and using an atmospheric dispersion model to predict exposure to TACs.

US 101

A review of the AADT information provided by California Department of Transportation (Caltrans) indicates this portion of the US-101 mainline had an average annual daily traffic (AADT) volume of 171,500 vehicles per day based on 2020 traffic census data.[11] These traffic volumes were increased by three percent (or 0.5 percent each year) to obtain year 2024 estimates. 2024 represents a conservative traffic volume for analyzing traffic emissions in the future. Caltrans census data also indicates that the segment of US-101 nearest the project site had an average truck

[11] Caltrans Traffic Census Program, Traffic Volumes: Annual Average Daily Traffic (AADT), 2020-AADT (XLSX), accessed February 2022. https://dot.ca.gov/programs/traffic-operations/census

percentage of 4.6 percent, with 2.7 percent considered heavy duty trucks and 1.9 percent considered medium duty trucks.[12]

Analysis of US-101 involved developing emissions estimates of DPM, organic TACs (as TOG), and $PM_{2.5}$. Emissions associated with vehicle travel depend on the year of analysis because emission control technology requirements are phased-in over time. Overall vehicle emissions, in particular diesel truck emissions, will decrease in the future. Therefore, estimates were developed using emissions factors for 2023 because the earlier the year analyzed, the higher the emission rates produced. Year 2023 emissions were also conservatively assumed as being representative of future conditions over the period that cancer risks are evaluated for the project (i.e., 14 years attending the school).

The fraction of traffic volume each hour on US-101 was calculated and applied to the 2024 AADTs and 2023 emissions factors to estimate hourly traffic emissions. Hourly traffic distributions specific to US-101 were obtained from Caltrans Performance Measurement System (PeMS). PeMS data are collected in real-time from nearly 40,000 individual detectors spanning the freeway system across all major metropolitan areas of California.[13]

US-101 mainline hourly speeds were also obtained from weekday 2019 speed data from PeMS. The NB mainline speeds range on average between 65 mph and 30 mph over the course of a 24-hour period, while the SB speeds range between 65 mph and 15 mph.

The latest version of CARB's EMFAC emissions model (EMFAC2021) was used to develop the emissions rates needed. EMFAC2021 includes the latest data on California's car and truck fleets and travel activity. However, because EMFAC2021 only produces emissions rates using county-wide vehicle populations and does not provide specific emissions rates for DPM, CT-EMFAC2017 was also used to aid in the development of emissions rates used in the analysis. CT-EMFAC2017 is the Caltrans version of the CARB's EMFAC2017 emissions model and provides emission factors for mobile source criteria pollutants and TACs, including DPM, based on specific truck fractions input by the user. EMFAC2017 became available for use in March 2018 and approved by the EPA in August 2019. EMFAC2021 has not yet been approved by U.S. EPA at the time this report was prepared.

CT-EMFAC2017 was used to estimate the fraction of gasoline and diesel vehicles in three vehicle categories (i.e., Non-Truck, Truck 1, and Truck 2) based on the truck percentage of 4.6 percent. These CT-EMFAC2017 fractions were then applied to the EMFAC2021 emissions rates and aggregated to provide one emissions factor for each pollutant and speed needed. The ratio of DMP to $PM_{2.5}$ produced by CT-EMFAC2017 was used to derive a DPM emissions rate using EMFAC2021 for each speed needed. Emission processes modeled for the analysis include running exhaust for DPM and TOG and running evaporative losses for TOG. Inputs to the emissions models (both EMFAC2021 and CT-EMFAC2017) include region (i.e., Santa Clara County), type of road (i.e., freeway), year of analysis (i.e., 2023), and season (i.e., annual).

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[12] Estimate provided by CT-EMFAC2017 using an overall truck percentage of 4.6. Truck percentage provided by Caltrans Traffic Census Program.

[13] https://dot.ca.gov/programs/traffic-operations/mpr/pems-source

Hourly emissions rates were developed for DPM, organic TACs, and $PM_{2.5}$ using emissions factors for 2023, applied to forecasted 2024 traffic volumes along the applicable segments of US-101. TAC and $PM_{2.5}$ concentrations at the MEI location were developed using the hourly emissions rates with an air quality dispersion model (AERMOD). Maximum increased lifetime cancer risks and annual $PM_{2.5}$ concentrations for the MEI receptor were then computed using modeled TAC and $PM_{2.5}$ concentrations and the BAAQMD methods and exposure parameters described in *Attachment 1*.

Local Roadways – San Tomas Expressway, Central Expressway, and Scott Boulevard

An analysis of the TACs and $PM_{2.5}$ impacts from the adjacent local roadways with estimated daily traffic volumes in excess of 10,000 vehicles per day was conducted to evaluate potential cancer risks and $PM_{2.5}$ concentrations associated with these nearby sources of TACs. Traffic count data for the local roadways were obtained from Santa Clara County's on-line traffic count data map.[14] Traffic count dates vary for each of the roadways. The most recent counts for San Tomas Expressway were from 2014, while the most recent counts from Central Expressway and Scott Boulevard were from 2008. Therefore, count data were grown to 2024 assuming a 1.0 percent annual traffic growth rate. This resulted in ADT estimates on San Tomas Expressway of 75,966, 18,746 on Scott Boulevard, and between 46,690 and 30,643 on Central Expressway. Truck percentages for these local roadways were estimated using the county fleet mix developed from the VMT estimates in EMFAC2021 (2.9 percent Truck 1 and 3.4 percent Truck 2). Figure 1 shows the roadway links used for the modeling and receptor locations at the project site where concentrations were calculated.

Analysis of local roadway TAC impacts also involved developing estimates of annual DPM, organic TACs (as TOG), and $PM_{2.5}$ roadway emissions. For this analysis, annual emissions are based on 2024 traffic volume estimates and 2023 emissions rates. Emissions associated with vehicle travel depend on the year of analysis because emission control technology requirements are phased-in over time. Overall vehicle emissions, in particular diesel truck emissions, will decrease in the future. Therefore, the earlier the year analyzed, the higher the emission rates produced. Therefore, year 2023 emissions rates were conservatively assumed as being representative of future conditions over the period that cancer risks are evaluated (14 years).

Hourly traffic distributions for San Tomas Expressway, Central Expressway, and Scott Boulevard were estimated from the average distributions of traffic on NB and SB US-101 at San Tomas Expressway Interchange. Hourly traffic distributions on US-101 were obtained from Caltrans PeMS data, as previously described. The fraction of traffic volume each hour was calculated for both roadways and applied to the ADT to estimate hourly traffic emission rates for each of the roadways.

For all hours of the day an average speed of 45 mph was assumed for all vehicles on San Tomas Expressway, 40 mph for Scott Boulevard, and 50 mph for Central Expressway. These represent

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[14] On-line ArcGIS map, accessed February 2022. https://www.arcgis.com/home/webmap/viewer.html?useExisting=1&layers=709ef12897bc42aa8e3d87f4505641c0&layerId=0

the posted speed limits of the roadways. Given the limited amount of access to and from each roadway segment, it was assumed peak period speeds would not change from the off-peak speeds.

As was done for estimating emissions from US-101, the latest version of CARB's EMFAC emissions model (EMFAC2021) was used to develop the emissions rates needed. However, because EMFAC2021 only produces emissions rates using county-wide vehicle populations and does not provide specific emissions rates for DPM, CT-EMFAC2017 was also used to aid in the development of emissions rates used in the analysis.

CT-EMFAC2017 estimated the fraction of gasoline and diesel vehicles in three vehicle categories (i.e., Non-Truck, Truck 1, and Truck 2) based on the truck percentage of 6.3 percent. These fractions were then applied to the EMFAC2021 emissions rates and aggregated to provide one emissions factor for each pollutant and speed needed. Inputs to the emissions models (both EMFAC2021 and CT-EMFAC2017) include region (i.e., Santa Clara County), type of road (i.e., major/collector), year of analysis (i.e., 2023), and season (i.e., annual).

Hourly emissions rates for 2023 were developed for DPM, organic TACs, and $PM_{2.5}$ and applied to 2024 daily traffic estimates along each applicable roadway segment (see Figure 1). TAC and $PM_{2.5}$ concentrations were developed using the hourly emissions rates described above and an air quality dispersion model (AERMOD). Increased lifetime cancer risks and annual $PM_{2.5}$ concentrations for the project MEI were then computed using modeled TAC and $PM_{2.5}$ concentrations and the BAAQMD methods and exposure parameters described in *Attachment 1*. San Tomas Expressway, Central Expressway, and Scott Boulevard emissions calculations are included in *Attachment 2*.

Dispersion Modeling

Dispersion modeling of TAC and $PM_{2.5}$ emissions was conducted using the U.S. EPA AERMOD dispersion model, which is recommended by the BAAQMD for this type of analysis. NB and SB traffic on US-101 near the project site were modeled in AERMOD using a series of volume sources along a line (line volume sources), with line segments used to represent each direction of travel on the US-101 mainline. Dispersion modeling of traffic on San Tomas Expressway, Central Expressway, and Scott Boulevard near the project site was evaluated using a series of area sources along a line (line area sources), with line segments used to represent all lanes of each roadway. Figure 1 shows the roadway segments used for the modeling. The modeling used a five-year data set (2013-2017) of hourly meteorological data from the San José International Airport prepared for use with the AERMOD model by the BAAQMD. Other inputs to the model included road geometry, hourly traffic emissions, and receptor locations and heights. Receptor heights of 5 feet (1.5 meters) were used to represent the breathing height on of school students.[15]

Computed Cancer and Non-Cancer Health Impacts from Roadways

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[15] Bay Area Air Quality Management District, 2012, Recommended Methods for Screening and Modeling Local Risks and Hazards, Version 3.0. May. Web: https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/risk-modeling-approach-may-2012.pdf?la=en

The maximum impact from each roadway upon the Project site was identified and reported in Table 2. The calculation of cancer risk impacts from roadways were developed for an individual that attends the school starting in pre-kindergarten through their senior year of high school (i.e., a 14-year period). Therefore, age-appropriate sensitivity factors were used as applicable.

Note the maximum impacts for cancer risk and non-cancer health risks is located at the northeast corner of project site, closest to US-101, while the maximum $PM_{2.5}$ concentrations are highest at the southwest corner of the site, nearest Scott Boulevard.

Stationary Source Impacts

The BAAQMD was contacted to provide a list of air pollutant sources within 1,000 feet of the project. The District responded by providing a list of all hazardous air pollutant sources located within ½ mile and identified 14 of the sources as within ¼ mile.[16] This list was reviewed and all sources within 1,300 feet (1/4 mile) of the project site were identified. The identified stationary sources are shown in Figure 1. These sources were compiled into a *Stationary Source Identification Form (SSIF)* that was submitted to the District planning staff. The District provided confirmation of the facilities that were currently in operation and provided screening risk levels and emission information.[17] The District also provided screening community risk levels that were not distance-adjusted.

Emissions from generators were adjusted using the District's *Distance Adjustment Multiplier Tool for Diesel Internal Combustion Engines*. The District's screening risk levels along with the distance between the source and the receptor were entered to provide the screening risk levels at the specified distance. For other sources, the emissions data reported by the District were entered into the District's *Risk and Hazards Screening Emission Calculator (Beta Version)*. This tool provided the risk for various sources. This allowed the identification of the diesel engine emissions sources, where the impacts from those could then be entered to the *Distance Adjustment Multiplier Tool for Diesel Internal Combustion Engines*. Almost all sources affecting the site were diesel generators.

One Stationary Source, Plant 13711 at 1700 Space Park Drive, had screening levels that exceeded BAAQMD thresholds. Therefore, refined modeling was conducted using emissions data provided by BAAQMD. The refined analysis included dispersion modeling with AERMOD to estimate on-site exposure and cancer risk calculations to predict the increased lifetime cancer risk for students attending the school.

Table 2 summarizes modeled or screening level cancer risk and $PM_{2.5}$ concentration from each identified nearby stationary source. As indicated in Table 2, none of the identified stationary sources exceed the BAAQMD thresholds of greater than 10 in 1 million for cancer risk, greater than 0.3 $\mu g/m^3$ for $PM_{2.5}$ concentration, or HI threshold of greater than 1.0. The stationary sources calculations are contained in *Attachment 2.*

[16] BAAQMD. 2022. Email from Eric Chan to : Public Record Request No. 2021-12-0132 Casey Divine (Illingworth & Rodkin, Inc.), dated January 20, 2022.

Cumulative Community Health Risk at Project Site

Community risk impacts from the combined sources upon the project site are reported in Table 2. The TAC sources are compared against the BAAQMD single-source threshold and then combined and compared against the BAAQMD cumulative-source threshold. As shown, the maximum cancer risk, and annual $PM_{2.5}$ concentrations, and HI from the nearby sources do not exceed their single-source or cumulative-source thresholds.

Supporting Documentation

Attachment 1 is the methodology used to compute community risk impacts, including the methods to compute lifetime cancer risk from exposure to project emissions.

Attachment 2 is the on-site health risk assessment. AERMOD dispersion modeling files for this assessment, which are quite voluminous, are available upon request and would be provided in digital format. This attachment includes the cumulative community risk calculations, modeling results, and health risk calculations from sources affecting the project site.

Table 2. Impacts from Sources Affecting Project Site Receptors

Source	Cancer Risk (per million)	Annual $PM_{2.5}$ ($\mu g/m^3$)	Hazard Index
Roadways			
U.S. 101 at 600 feet. Approximately 171,500 ADT	2.47	0.03	<0.01
San Tomas Expressway at 1,300 feet. Approximately 75,966 ADT	0.30	0.06	<0.01
Central Expressway at 1,300 feet. Approximately 46,690 ADT	0.13	0.04	<0.01
Scott Boulevard at 550 feet. Approximately 18,746 ADT	0.26	0.03	<0.01
Stationary Sources			
Plant #13306 Equinox LLC at 1350 Duane Ave, Generators, 940 feet	3.78	<0.01	<0.01
Plant #13567 Verizon Wireless Santa Clara Switch at 1503 Arbuckle Court, Generators, 815 feet	1.47	<0.01	<0.01
Plant #13711 Pacific Bell Corp dba AT&T CA at 1700 Space Park Drive, Generators, 400 feet	4.66	0.03	0.01
Plant #15273 Luxtron Corporation at 3033 Scott Boulevard, Exempt wipe cleaning, 65 feet	-	-	-
Plant #18252 Silicon Valley Animal Control Authority at 3370 Thomas Road, Generators, 1,100 feet	0.09	-	-
Plant #19293 1525 Comstock C/O Digital Realty Trust at 1525 Comstock Drive, Diesel Backup Generator, 810 feet	0.53	<0.01	<0.01
Plant #20256 Digital Realty Trust at 1725 Comstock Drive, Generators, 410 feet	0.45	-	<0.01
Plant #20326 Digital Alfred, LLC at 3105 Alfred Avenue, Generators, 85 feet	1.83	-	0.01
Plant #21465 FutureWei Technologies at 2890 Scott Boulevard, Generators, 900 feet	0.21	<0.01	<0.01
Plant #23022 Genia Technologies at 2841 Scott Boulevard, Diesel Backup Generator, 980 feet	0.03	<0.01	<0.01
Plant #23420 Harbor Electronics, Inc at 3021 Kenneth Street. Generators, 675 feet	0.32	-	<0.01
Plant #23923 SIHC Silicon Valley, LLC at 3120 Scott Boulevard, Diesel Backup Generator, 690 feet	-	-	-
Plant #24257 Digital 1500 Space Park Borrower, LLC at 1500 Space Park Boulevard, Generators, 960 feet	0.11	-	<0.01
Plant #24421 Cyxtera Communications LLC at 1500 Space Park Drive, Generators, 960 feet	0.11	-	<0.01
Plant #24589(10305) Applied Materials at 3101 Scott Boulevard, Semiconductor Fab, Diesel Backup Generator, Wipe Cleaning, 460 feet	0.61	<0.01	<0.01
Plant #200760 Golden Cajun, LLC at 1500 Duane Ave, Diesel Backup Generator, 660 feet	7.12	0.01	<0.01
Plant #201086 Roche Sequencing Solutions at 2861 Scott Boulevard, Generators, 980 feet	0.34	<0.01	-
BAAQMD Single-Source Threshold	***>10.0***	***>0.3***	***>1.0***
Exceed Threshold?	*No*	*No*	*No*
Cumulative Total	24.81	0.19	0.05
BAAQMD Cumulative Source Threshold	***>100***	***>0.8***	***>10.0***
Exceed Threshold?	*No*	*No*	*No*

Attachment 1: Health Risk Calculation Methodology

A health risk assessment (HRA) for exposure to Toxic Air Contaminants (TACs) requires the application of a risk characterization model to the results from the air dispersion model to estimate potential health risk at each sensitive receptor location. The State of California Office of Environmental Health Hazard Assessment (OEHHA) and California Air Resources Board (CARB) develop recommended methods for conducting health risk assessments. The most recent OEHHA risk assessment guidelines were published in February of 2015.[18] These guidelines incorporate substantial changes designed to provide for enhanced protection of children, as required by State law, compared to previous published risk assessment guidelines. CARB has provided additional guidance on implementing OEHHA's recommended methods.[19] This HRA used the 2015 OEHHA risk assessment guidelines and CARB guidance. The BAAQMD has adopted recommended procedures for applying the newest OEHHA guidelines as part of Regulation 2, Rule 5: New Source Review of Toxic Air Contaminants.[20] Exposure parameters from the OEHHA guidelines and the recent BAAQMD HRA Guidelines were used in this evaluation.

Cancer Risk

Potential increased cancer risk from inhalation of TACs is calculated based on the TAC concentration over the period of exposure, inhalation dose, the TAC cancer potency factor, and an age sensitivity factor to reflect the greater sensitivity of infants and children to cancer causing TACs. The inhalation dose depends on a person's breathing rate, exposure time and frequency and duration of exposure. These parameters vary depending on the age, or age range, of the persons being exposed and whether the exposure is considered to occur at a residential location or other sensitive receptor location.

The current OEHHA guidance recommends that cancer risk be calculated by age groups to account for different breathing rates and sensitivity to TACs. Specifically, they recommend evaluating risks for the third trimester of pregnancy to age zero, ages zero to less than two (infant exposure), ages two to less than 16 (child exposure), and ages 16 to 70 (adult exposure). However, CARB and the BAAQMD recommend the use of a residential exposure duration of 30 years for sources with long-term emissions (e.g., roadways). For workers, assumed to be adults, a 25-year exposure period is recommended by the BAAQMD. For school children a 9-year exposure period is recommended by the BAAQMD.

Age sensitivity factors (ASFs) associated with the different types of exposure are an ASF of 10 for the third trimester and infant exposures, an ASF of 3 for a child exposure, and an ASF of 1 for an adult exposure. Also associated with each exposure type are different breathing rates, expressed as liters per kilogram of body weight per day (L/kg-day) or liters per kilogram of body weight per

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[18] OEHHA, 2015. *Air Toxics Hot Spots Program Risk Assessment Guidelines, The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*. Office of Environmental Health Hazard Assessment. February.
[19] CARB, 2015. *Risk Management Guidance for Stationary Sources of Air Toxics*. July 23.
[20] BAAQMD, 2016. *BAAQMD Air Toxics NSR Program Health Risk Assessment (HRA) Guidelines*. December 2016.

8-hour period for the case of worker or school child exposures. As recommended by the BAAQMD for residential exposures, 95th percentile breathing rates are used for the third trimester and infant exposures, and 80th percentile breathing rates for child and adult exposures. For children at schools and daycare facilities, BAAQMD recommends using the 95th percentile 8-hour breathing rates for moderate intensity.

Under previous OEHHA and BAAQMD HRA guidance, residential receptors are assumed to be at their home 24 hours a day, or 100 percent of the time. In the 2015 Risk Assessment Guidance, OEHHA includes adjustments to exposure duration to account for the fraction of time at home (FAH), which can be less than 100 percent of the time, based on updated population and activity statistics. The FAH factors are age-specific and are: 0.85 for third trimester of pregnancy to less than 2 years old, 0.72 for ages 2 to less than 16 years, and 0.73 for ages 16 to 70 years. Use of the FAH factors is allowed by the BAAQMD if there are no schools in the project vicinity have a cancer risk of one in a million or greater assuming 100 percent exposure (FAH = 1.0).

Functionally, cancer risk is calculated using the following parameters and formulas:

Cancer Risk (per million) = $CPF \times Inhalation\ Dose \times ASF \times ED/AT \times FAH \times 10^{6}$

Where:

- CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
- ASF = Age sensitivity factor for specified age group
- ED = Exposure duration (years)
- AT = Averaging time for lifetime cancer risk (years)
- FAH = Fraction of time spent at home (unitless)

Inhalation Dose = $C_{air} \times DBR^{*} \times A \times (EF/365) \times 10^{-6}$

Where:

- C_{air} = concentration in air ($\mu g/m^3$)
- DBR = daily breathing rate (L/kg body weight-day)
- 8HrBR = 8-hour breathing rate (L/kg body weight-8 hours)
- A = Inhalation absorption factor
- EF = Exposure frequency (days/year)
- 10^{-6} = Conversion factor

* An 8-hour breathing rate (8HrBR) is used for worker and school child exposures.

The health risk parameters used in this evaluation are summarized as follows:

Parameter	*Exposure Type →* / *Age Range →*	Infant		Child	Adult
		3rd Trimester	0<2	2 < 16	16 - 30
DPM Cancer Potency Factor $(mg/kg\text{-}day)^{-1}$		1.10E+00	1.10E+00	1.10E+00	1.10E+00
Daily Breathing Rate (L/kg-day) 80th Percentile Rate		273	758	572	261
Daily Breathing Rate (L/kg-day) 95th Percentile Rate		361	1,090	745	335
8-hour Breathing Rate (L/kg-8 hours) 95th Percentile Rate		-	1,200	520	240
Inhalation Absorption Factor		1	1	1	1
Averaging Time (years)		70	70	70	70
Exposure Duration (years)		0.25	2	14	14**
Exposure Frequency (days/year)*		350	350	350	350**
Age Sensitivity Factor		10	10	3	1
Fraction of Time at Home (FAH)		0.85-1.0	0.85-1.0	0.72-1.0	0.73*

* Exposure Frequency can change dependent on the type of receptors (i.e. residential, worker, school, daycare). For worker exposures (adult), the exposure duration and frequency are 25 years 250 days/year and FAH is not applicable.

Non-Cancer Hazards

Non-cancer health risk is usually determined by comparing the predicted level of exposure to a chemical to the level of exposure that is not expected to cause any adverse effects (reference exposure level), even to the most susceptible people. Potential non-cancer health hazards from TAC exposure are expressed in terms of a hazard index (HI), which is the ratio of the TAC concentration to a reference exposure level (REL). OEHHA has defined acceptable concentration levels for contaminants that pose non-cancer health hazards. TAC concentrations below the REL are not expected to cause adverse health impacts, even for sensitive individuals. The total HI is calculated as the sum of the HIs for each TAC evaluated and the total HI is compared to the BAAQMD significance thresholds to determine whether a significant non-cancer health impact from a project would occur.

Typically, for residential projects located near roadways with substantial TAC emissions, the primary TAC of concern with non-cancer health effects is diesel particulate matter (DPM). For DPM, the chronic inhalation REL is 5 micrograms per cubic meter ($\mu g/m^3$).

Annual $PM_{2.5}$ Concentrations

While not a TAC, fine particulate matter ($PM_{2.5}$) has been identified by the BAAQMD as a pollutant with potential non-cancer health effects that should be included when evaluating potential community health impacts under the California Environmental Quality Act (CEQA). The thresholds of significance for $PM_{2.5}$ (project level and cumulative) are in terms of an increase in the annual average concentration. When considering $PM_{2.5}$ impacts, the contribution from all sources of $PM_{2.5}$ emissions should be included. For projects with potential impacts from nearby local roadways, the $PM_{2.5}$ impacts should include those from vehicle exhaust emissions, $PM_{2.5}$ generated from vehicle tire and brake wear, and fugitive emissions from re-suspended dust on the roads.

Attachment 2: Health Risk Calculations