WESTFIELD VALLEY FAIR MALL EXPANSION PROJECT DRAFT TAC AND GHG EMISSIONS ASSESSMENT

San José, California

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INTRODUCTION

The purpose of this report is to address community risk and greenhouse gas (GHG) emission impacts associated with the proposed Westfield Valley Fair Mall expansion project. The current approval for the 70-acre Westfield site allows for a 650,000 square foot (sf) expansion. The project proposes to demolish 101,154 sf of existing retail, as well as existing parking structure and pavement, and construct 670,111 sf of net new retail space. Toxic air contaminant (TAC) and GHG impacts would occur due to temporary construction emissions and as a result of direct and indirect emissions from new occupants and customers. This analysis was conducted following guidance provided by the Bay Area Air Quality Management District (BAAQMD).

SETTING

The project is located in the northern portion of the Santa Clara County, which is in the San Francisco Bay Area Air Basin. Particulate matter is a 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 (TAC) 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 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 CARB, and are listed as carcinogens either under the state's Proposition 65 or under the Federal Hazardous Air Pollutants programs.

CARB has adopted and implemented a number of regulations for stationary and mobile sources to reduce emissions of diesel particulate matter (DPM). Several of these regulatory programs affect medium and heavy duty diesel trucks that represent the bulk of DPM emissions from California highways. These regulations include the solid waste collection vehicle (SWCV) rule, in-use public and utility fleets, and the heavy-duty diesel truck and bus regulations. In 2008, CARB approved a new regulation to reduce emissions of DPM and nitrogen oxides from existing on-road heavy-duty diesel fueled vehicles.[1] The regulation requires affected vehicles to meet

[1] Available online: http://www.arb.ca.gov/msprog/onrdiesel/onrdiesel.htm. Accessed: June 2, 2015.

specific performance requirements between 2014 and 2023, with all affected diesel vehicles required to have 2010 model-year engines or equivalent by 2023. These requirements are phased in over the compliance period and depend on the model year of the vehicle.

The BAAQMD is the regional agency tasked with managing air quality in the region. At the State level, CARB (a part of the California Environmental Protection Agency) oversees regional air district activities and regulates air quality at the State level. The BAAQMD has published the California Environmental Quality Act (CEQA) Air Quality Guidelines that are used in this assessment to evaluate air quality impacts of projects.[2]

Greenhouse Gases

Gases that trap heat in the atmosphere, GHGs, regulate the earth's temperature. This phenomenon, known as the greenhouse effect, is responsible for maintaining a habitable climate. The most common GHGs are carbon dioxide (CO_2) and water vapor but there are also several others, most importantly methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). These are released into the earth's atmosphere through a variety of natural processes and human activities.
Sources of GHGs are generally as follows:

- CO_2 and N_2O are byproducts of fossil fuel combustion.
- N_2O is associated with agricultural operations such as fertilization of crops.
- CH_4 is commonly created by off-gassing from agricultural practices (e.g., keeping livestock) and landfill operations.
- Chlorofluorocarbons (CFCs) were widely used as refrigerants, propellants, and cleaning solvents but their production has been stopped by international treaty.
- HFCs are now used as a substitute for CFCs in refrigeration and cooling.
- PFCs and sulfur hexafluoride emissions are commonly created by industries such as aluminum production and semi-conductor manufacturing.

Each GHG has its own potency and effect upon the earth's energy balance. This is expressed in terms of a global warming potential (GWP), with CO_2 being assigned a value of 1 and sulfur hexafluoride being several orders of magnitude stronger with a GWP of 23,900. In GHG emission inventories, the weight of each gas is multiplied by its GWP and is measured in units of CO_2 equivalents (CO_2e).

An expanding body of scientific research supports the theory that global warming is currently affecting changes in weather patterns, average sea level, ocean acidification, chemical reaction rates, and precipitation rates, and that it will increasingly do so in the future. The climate and several naturally occurring resources within California could be adversely affected by the global warming trend. Increased precipitation and sea level rise could increase coastal flooding, saltwater intrusion, and degradation of wetlands. Mass migration and/or loss of plant and animal

[2] Bay Area Air Quality Management District, 2011. *BAAQMD CEQA Air Quality Guidelines*. May.

species could also occur. Potential effects of global climate change that could adversely affect human health include more extreme heat waves and heat-related stress; an increase in climate-sensitive diseases; more frequent and intense natural disasters such as flooding, hurricanes and drought; and increased levels of air pollution.

Significance Thresholds

In June 2010, BAAQMD adopted thresholds of significance to assist in the review of projects under CEQA. These Thresholds were designed to establish the level at which BAAQMD believed air pollution emissions would cause significant environmental impacts under CEQA and were posted on BAAQMD's website and included in the Air District's updated CEQA Guidelines (updated May 2011). The significance thresholds identified by BAAQMD and used in this analysis are summarized in Table 1.

BAAQMD's adoption of significance thresholds contained in the 2011 CEQA Air Quality Guidelines was called into question by an order issued March 5, 2012, in California Building Industry Association (CBIA) v. BAAQMD (Alameda Superior Court Case No. RGI0548693). The order requires BAAQMD to set aside its approval of the thresholds until it has conducted environmental review under CEQA. The ruling made in the case concerned the environmental impacts of adopting the thresholds and how the thresholds would indirectly affect land use development patterns. In August 2013, the Appellate Court struck down the lower court's order to set aside the thresholds. However, this litigation remains pending as the California Supreme Court recently accepted a portion of CBIA's petition to review the appellate court's decision to uphold BAAQMD's adoption of the thresholds. The specific portion of the argument to be considered is in regard to whether CEQA requires consideration of the effects of the environment on a project (as contrasted to the effects of a proposed project on the environment). Therefore, the significance thresholds contained in the 2011 CEQA Air Quality Guidelines are applied to this project.

Table 1 Air Quality Significance Thresholds

Community Risks and Hazards	
Excess Cancer Risk	10 per one million
Chronic or Acute Hazard Index	1.0
Incremental annual average $PM_{2.5}$	0.3 µg/m^3
Community Risks and Hazards (Cumulative from all sources within 1,000 foot zone of influence)	
Excess Cancer Risk	100 per one million
Chronic Hazard Index	10.0
Annual Average $PM_{2.5}$	0.8 µg/m^3
Greenhouse Gas Emissions	
GHG Annual Emissions	Compliance with a Qualified GHG Reduction Strategy OR 1,100 metric tons or 4.6 metric tons per capita

Note: $PM_{2.5}$ = fine particulate matter or particulates with an aerodynamic diameter of 2.5μm or less, and GHG = greenhouse gas.

IMPACTS AND MITIGATION MEASURES

Impact: Expose sensitive receptors to substantial pollutant concentrations? ***Less than significant with construction-period mitigation measures***

Sensitive receptors are locations where an identifiable subset of the general population (children, asthmatics, the elderly, and the chronically ill) that is at greater risk than the general population to the effects of air pollutants are likely to be exposed. These locations include residences, schools, playgrounds, childcare centers, retirement homes, hospitals, and medical clinics. Operation of the project is not expected to cause any localized emissions that could expose sensitive receptors to unhealthy air pollutant levels. Construction activity would generate dust and equipment exhaust on a temporary basis. Impacts from project construction are addressed below.

Project Construction Activity

Construction activity is anticipated to involve demolition of existing on-site buildings, structures, and parking lot areas, and subsequent building construction. Localized emissions of dust or equipment exhaust could affect nearby sensitive land uses. During demolition and construction activities, dust would be generated. Nearby land uses could be adversely affected by dust generated during construction activities. The BAAQMD CEQA Air Quality Guidelines consider these impacts to be less than significant if best management practices are employed to reduce these emissions. *Mitigation Measure AQ-1 would implement BAAQMD-required best management practices*.

Construction equipment and associated heavy-duty truck traffic generate diesel exhaust, which is a known Toxic Air Contaminant (TAC). Diesel exhaust and $PM_{2.5}$ pose both potential health and nuisance impacts to nearby receptors. A community risk assessment of the project construction activities was conducted that evaluated potential health effects of sensitive receptors at nearby residences from construction emissions of diesel particulate matter (DPM) and $PM_{2.5}$.[3] A dispersion model was used to predict the off-site DPM concentrations resulting from project construction so that lifetime cancer risks could be predicted. The closest residences to the project site are about 330 feet south of the project construction area. The Saint Martin of Tours School (K through 8th grade) is about 900 feet east of the project site on the east side of Interstate 880. Figure 1 shows the project site and sensitive receptor locations (residences) used in the air quality dispersion modeling analysis where potential health impacts were evaluated.

<u>Construction Emissions</u>

The community risk assessment focused on modeling on-site construction activity using construction fleet information included in the project design features. Construction period emissions were modeled using the California Emissions Estimator Model 2013.2.2 (CalEEMod)

[3] DPM is identified by California as a toxic air contaminant due to the potential to cause cancer.

along with projected construction activity. The number and types of construction equipment and diesel vehicles, along with the anticipated length of their use for different phases of construction were based on site-specific construction activity schedules provided. Construction of the project is expected to occur over a 21 month period during 2016 through 2017, beginning in February 2016. The project land use types for construction and size were input to CalEEMod. The construction land uses included 771,265 sf of retail/commercial entered as "Regional Shopping Center,[4]" 716 underground garage parking spaces entered as "Enclosed Parking with Elevator," and 1,332 parking spaces entered as "Unenclosed Parking with Elevator" on an approximate 20-acre portion of the Westfield site. The anticipated 101,154 sf of buildings and 188,000 sf of pavement for demolition were entered into the model, along with an estimated 738,000 sf of parking structures for demolition. During the grading phase, 180,000 cubic yards (cy) are expected for soil hauling export. Finally, 6,000 cement truck trips and 140 asphalt truck were entered into the model.

The CalEEMod model provided total annual $PM_{2.5}$ exhaust emissions (assumed to be diesel particulate matter) for the off-road construction equipment and for exhaust emissions from on-road vehicles (haul trucks, vendor trucks, and worker vehicles), with total emissions of 0.8238 tons (1,648 pounds). The on-road emissions are a result of haul truck travel, worker travel, and vendor deliveries during building demolition, grading and construction activities. A trip length of 0.3 miles was used to represent vehicle travel while at or near the construction site. It was assumed that these emissions from on-road vehicles traveling at or near the site would occur at the construction site. Fugitive $PM_{2.5}$ dust emissions were calculated by CalEEMod as 0.4846 tons (969 pounds) for the overall construction period. The project emission calculations and construction schedule are provided in *Attachment 1*.

Dispersion Modeling

The U.S. EPA AERMOD dispersion model was used to predict concentrations of DPM and $PM_{2.5}$ concentrations at existing sensitive receptors (residences) in the vicinity of the project construction area. Emission sources for the construction site were grouped into two categories: exhaust emissions of DPM and fugitive $PM_{2.5}$ dust emissions. Areas sources were used to model construction emissions. Three area sources were used to model construction equipment exhaust emissions and three area sources was used to model fugitive $PM_{2.5}$ emissions during construction. For the exhaust emissions from construction equipment, an emission release height of six meters was used for the area sources. The elevated source height reflects the height of the equipment exhaust pipes plus an additional distance for the height of the exhaust plume above the exhaust pipes to account for plume rise of the exhaust gases. For modeling fugitive $PM_{2.5}$ emissions, a near-ground level release height of two meters was used for the area sources. Emissions from vehicle travel around the project site were included in the modeled area sources. Construction emissions were modeled as occurring daily from 7 a.m. to 4 p.m., when the majority of construction activity involving equipment usage would occur.

The modeling used a five-year data set (2006 - 2010) of hourly meteorological data from the San Jose Airport prepared by the BAAQMD for use with the AERMOD model. Annual DPM and $PM_{2.5}$ concentrations from construction activities in 2016 and 2017 were calculated using the

[4] The 10 proposed movie theater screens were included in the Regional Shopping Center sf.

model. DPM and $PM_{2.5}$ concentrations were calculated at nearby residential locations at a receptor height of 1.5 meters (4.9 feet) and 4.5 meters (14.8 feet) to represent the first and second building levels of nearby multi-story apartments, townhomes, and other residences. Figure 1 shows the project site and locations of nearby residential receptors.

The maximum-modeled $PM_{2.5}$ and DPM concentration occurred at the same location in an apartment building south of the project site on South Clover Avenue at a receptor height of 1.5 meters. The location where the maximum $PM_{2.5}$ and DPM concentrations occurred is identified on Figure 1 as the location of maximum cancer risk.

Predicted Cancer Risk and Hazards

Increased cancer risks were calculated using the modeled DPM concentrations and BAAQMD recommended risk assessment methods for infant (3rd trimester through 2 years of age), child (2 years through 16 years), and adult exposures.[5] The cancer risk calculations were based on applying the BAAQMD recommended age sensitivity factors to the DPM exposures. Age-sensitivity factors reflect the greater sensitivity of infants and small children to cancer causing TACs. BAAQMD recommended exposure parameters were used for the cancer risk calculations.[6] Infant, child, and adult exposures were assumed to occur at all residences during the entire construction period. A child exposure was assumed to occur for students at the St Martin of Tour School.

Results of this assessment indicate that for project construction the maximum increased residential child cancer risk would be 25.8 in one million and the maximum increased residential adult cancer risk would be 1.3 in one million. The maximum increased cancer risk for a child at the St. Martin of Tour School would be 0.3 in one million. The increased cancer risk for a residential child exposure would be greater than the BAAQMD significance threshold of a cancer risk of 10 in one million or greater and would be considered a *significant impact*.

The maximum annual $PM_{2.5}$ concentration was 0.36 micrograms per cubic meter ($\mu g/m^3$) occurring at the same location where maximum cancer risk would occur. This $PM_{2.5}$ concentration is greater than the BAAQMD significance threshold of 0.3 $\mu g/m^3$ used to judge the significance of health impacts from $PM_{2.5}$. This would be considered a *significant impact*.

Potential non-cancer health effects due to chronic exposure to DPM were also evaluated. 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). California's Office of Environmental Health and Hazards (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 chronic inhalation REL for DPM is 5 $\mu g/m^3$. The maximum modeled annual residential DPM concentration was 0.182 $\mu g/m^3$, which is much lower than the REL. The maximum computed hazard index based

[5] *Ibid*.
[6] Bay Area Air Quality Management District (BAAQMD), 2010. *Air Toxics NSR Program Health Risk Screening Analysis Guidelines*, January.

on this DPM concentration is 0.04 which is much lower than the BAAQMD significance criterion of a hazard index greater than 1.0

Attachment 1 includes the emission calculations used for the area source modeling and the cancer risk calculations.

The project would have a *significant impact* with respect to community risk caused by construction activities.

Mitigation Measure AQ-1: Include measures to control dust emissions.

Implementation of the measures recommended by BAAQMD, and listed below, would reduce the fugitive dust-related impacts associated with grading and new construction to a less than significant impact. 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 mph.

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

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.

Mitigation Measure AQ-2: Selection of equipment during construction to minimize emissions. Such equipment selection would include the following:

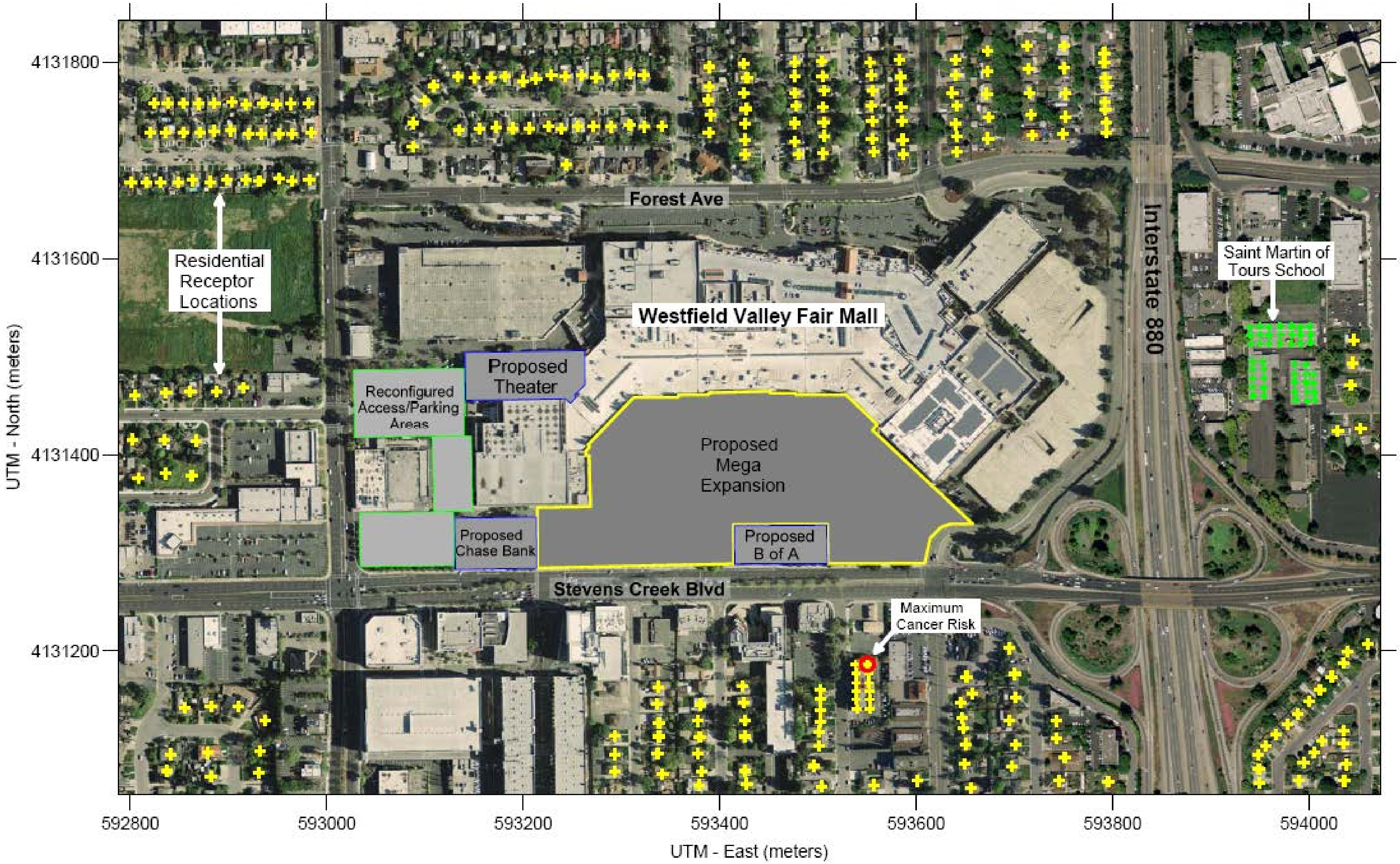
1. All diesel-powered off-road equipment larger than 50 horsepower and operating at the site for more than two days continuously shall meet U.S. EPA particulate matter emissions standards for Tier 2 engines or equivalent; and
2. All portable diesel-powered equipment (i.e., concrete saws, forklifts, and generators) shall meet U.S. EPA particulate matter emissions standards for Tier 4 engines or equivalent.

Note that the construction contractor could use other measures to minimize construction period diesel particulate matter emissions to reduce the predicted cancer risk below the thresholds. Such measures may be the use of alternative powered equipment (e.g., LPG-powered lifts), alternative fuels (e.g., biofuels), added exhaust devices, or a combination of measures, provided that these measures are approved by the City.

Effectiveness of Mitigation Measure AQ-1 and AQ-2

Implementation of Mitigation Measure AQ-2 would reduce on-site diesel exhaust emissions by approximately 72 percent. Implementation of Mitigation Measure AQ-1, which are the Best Management Practices recommended by BAAQMD, is considered to reduce exhaust emissions by an additional 5 percent. Emissions associated with implementation of Mitigation Measure AQ-2 were modeled using CalEEMod, however CalEEMod is not set up to account for any additional reductions due to implementation of Mitigation Measure AQ-1, and thus were not taken. Modeled mitigated emissions were then input back into the dispersion model to predict concentration of DPM and annual $PM_{2.5}$. The computed maximum excess residential child cancer risk with implementation of mitigation measures would be less than 6.1 per million and the $PM_{2.5}$ concentration would be 0.09 $\mu g/m^3$. Excess child cancer risk would be reduced to below 10 chances per million and annual $PM_{2.5}$ concentrations would be reduced below 0.3 $\mu g/m^3$. As a result, the project with mitigation measures would have *a less-than-significant* impact with respect to community risk caused by construction activities.

Figure 1. Project Site, Residential and School Receptor Locations, and Location of Maximum Cancer Risk



> **Impact:** Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment? ***Less than significant***

The BAAQMD May 2011 CEQA Guidelines included GHG emissions-based significance thresholds. These thresholds include a "bright-line" emissions level of 1,100 metric tons per year for land-use type projects and 10,000 metric tons per year for stationary sources. Land use projects with emissions above the 1,100 metric ton per year threshold would then be subject to a GHG efficiency threshold of 4.6 metric tons per year per capita. Projects with emissions above the thresholds would be considered to have an impact, which, cumulatively, would be significant.

CalEEMod was also used to predict GHG emissions from operation of the site assuming full build-out of the project. The project land use types and size along with other project-specific information were input to the model. The use of this model for evaluating emissions from land use projects is recommended by the BAAQMD. Unless otherwise noted below, the CalEEMod model defaults for Santa Clara County were used. CalEEMod provides emissions for transportation, areas sources, electricity consumption, natural gas combustion, electricity usage associated with water usage and wastewater discharge, and solid waste land filling and transport. CalEEMod output worksheets are included in *Attachment 1*. Adjustments to the model are described below.

Model Year

The model uses mobile emission factors from the California Air Resources Board's EMFAC2011 model. This model is sensitive to the year selected, since vehicle emissions have and continue to be reduced due to fuel efficiency standards and low carbon fuels. The Year 2018 was analyzed since it is the first full year that the project could conceivably be occupied.

An Existing run was conducted for 2015. In order to estimate emissions from both the Proposed and Approved development scenarios, Existing Portion and Proposed Portion runs were conducted for each project scenario. This was due to the fact that the demolition and subsequent construction of Westfield buildings and structures would leave Existing and Proposed portions with different energy-efficiency factors explained in more detail under the *Energy* section. Then, for example, GHG emissions from the Existing Portion of the proposed project and the Proposed Portion were added together to get emissions from the proposed full build-out. Finally, net project emissions were then determined by subtracting Existing emissions. The same methodology was used for the Approved condition.

Land Use Descriptions

The Existing land use types and size were input to a CalEEMod run, with the following land uses: 2,035,358 sf of "Regional Shopping Center," 1,826 spaces entered as "Parking Lot," and 6,863 spaces entered as "Unenclosed Parking with Elevator."

The Existing Portion of Proposed run consisted of 1,934,204 sf of “Regional Shopping Center,” 1,336 spaces entered as “Parking Lot,” and 5,016 spaces entered as “Unenclosed Parking with Elevator.”

The Proposed Portion of Proposed run consisted of 771,265 sf of “Regional Shopping Center,” 716 spaces entered as “Enclosed Parking with Elevator,” and 1,332 spaces entered as “Unenclosed Parking with Elevator.”

The Existing Portion of Approved run consisted of 1,953,858 sf of “Regional Shopping Center,” 1,826 spaces entered as “Parking Lot,” and 4,855 spaces entered as “Unenclosed Parking with Elevator.”

The Proposed Portion of Approved run consisted of 730,480 sf of “Regional Shopping Center,” and 3,221 spaces entered as “Unenclosed Parking with Elevator.”

Trip Generation Rates

Trip generation rates were adjusted based on the project traffic report. Default trip lengths and trip types specified by CalEEMod for Santa Clara County were used.

Energy

Emissions rates associated with electricity consumption were adjusted to account for Pacific Gas & Electric utility’s (PG&E) projected 2018 CO_2 intensity rate. This 2018 rate is based, in part, on the requirement of a renewable energy portfolio standard of 33 percent by the year 2020. CalEEMod uses a default rate of 641.35 pounds of CO_2 per megawatt of electricity produced that is based on year 2008 emissions. The derived 2018 rate for PG&E was estimated at 327.74 pounds of CO_2 per megawatt of electricity delivered and is based on the California Public Utilities Commission (CPUC) GHG Calculator.[7] The derived 2015 rate for PG&E was estimated at 391.16 pounds of CO_2 per megawatt of electricity delivered

The 2013 Title 24 Building Standards became effective July 1, 2014 and are predicted to result in 30 percent less energy use for lighting, heating, cooling, ventilation, and water heating for commercial uses than the 2008 standards that CalEEMod is based on.[8] Therefore, the Proposed Portion of Proposed and Proposed Portion of Approved runs were adjusted to account for the greater energy efficiency of future zoned or proposed buildings.

Other Inputs

Default model assumptions for GHG emissions associated with area sources, solid waste

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[7] California Public Utilities Comissions GHG Calculator version 3c, October 7, 2010. Available on-line at: http://ethree.com/public_projects/cpuc2.php. Accessed: February 20, 2015.

[8] California Energy Commission, 2014. *New Title 24 Standards Will Cut Residential Energy Use by 25 Percent, Save Water, and Reduce Greenhouse Gas Emissions*. July. Available: http://www.energy.ca.gov/releases/2014_releases/2014-07-01_new_title24_standards_nr.html. Accessed: June 4, 2015.

generation and water/wastewater use were applied to the project.

Service Population

Project service population is the sum of future full-time employees. The project service population was based on the estimate net increase in employees through implementation of the project, which was based on an assumption of approximately 2.5 employees per 1,000 sf of commercial/retail. The proposed project would add a net increase of 670,111 sf for a service population of 1,675.

Construction Emissions

GHG emissions associated with construction were computed to be 4,289 MT CO_2e, anticipated to occur over two separate calendar years. These are the emissions from on-site operation of construction equipment, hauling truck trips, vendor truck trips, and worker trips. The BAAQMD does not have an adopted Threshold of Significance for construction-related GHG emissions, though the District recommends quantifying emissions and disclosing that GHG emissions would occur during construction. BAAQMD also encourages the incorporation of best management practices to reduce GHG emissions during construction where feasible and applicable. Best management practices assumed to be incorporated into construction of the proposed project include, but are not limited to: using local building materials of at least 10 percent and recycling or reusing at least 50 percent of construction waste or demolition materials.

Operational Emissions

The CalEEMod model, along with the project vehicle trip generation rates, was used to predict daily emissions associated with operation of the fully-developed site under the proposed project. In 2018, net annual emissions resulting from proposed full build-out are predicted to be 8,745 MT of CO_2e. These emissions would exceed the BAAQMD threshold of 1,100 MT of CO_2e/yr. As discussed above, land use projects with emissions above the 1,100 metric ton per year threshold would then be subject to a GHG efficiency threshold of 4.6 metric tons per year per capita to determine impact significance. Computed project per capita emissions are 5.2 MT of CO_2e/year/service population, which would exceed the BAAQMD threshold of 4.6 MT of CO_2e/year/service population. Table 6 shows predicted project GHG emissions.

Table 6 Annual Project GHG Emissions in Metric Tons (CO_2e)

Source Category	Existing	2018 Approved	2018 Proposed
Area	<1	<1	<1
Energy Consumption	6,017	6,042	6,040
Mobile	40,394	50,371	48,711
Solid Waste Generation	972	1,282	1,292
Water Usage	390	472	475
Total	47,774	58,168	56,519
Net Proposed Project			8,745

GHG Per Capita Emissions[1]	5.2
BAAQMD Threshold	4.6 MT CO_2e/year/S.P.

Note: [1]Based on service population of 1,675.

Impact: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases? ***No Impact.***

The project would be subject to new requirements under rule making developed at the State and local level, including the 2008 Private Sector Green Building Policy, regarding greenhouse gas emissions and be subject to local policies that may regulate emissions of greenhouse gases.

Attachment 1: CalEEMod Input and Output Worksheets, Construction Schedule, and Risk Calculations

Westfield Valley Fair Mall, San Jose, CA

DPM Construction Emissions and Modeling Emission Rates - Unmitigated

Construction Year	Activity	DPM (ton/year)	Area Source	DPM Emissions (lb/yr)	DPM Emissions (lb/hr)	DPM Emissions (g/s)	Modeled Area (m^2)	DPM Emission Rate ($g/s/m^2$)
2016	Const-Area 1	0.4609	CON1_DPM	921.8	0.28061	3.54E-02	64,573	5.48E-07
	Const-Area 2	0.0428	CON2_DPM	85.6	0.02605	3.28E-03	5,995	5.48E-07
		0.5037					70,568	
	Const-Area 3	0.0000	CON3_DPM	0.0	0.00000	0.00E+00	15,853	0.00E+00
2017	Const-Area 1	0.2824	CON1_DPM	564.7	0.17192	2.17E-02	64,573	3.35E-07
	Const-Area 2	0.0262	CON2_DPM	52.4	0.01596	2.01E-03	5,995	3.35E-07
		0.3086					70,568	
	Const-Area 3	0.0115	CON3_DPM	23.0	0.00701	8.83E-04	15,853	5.57E-08
Total		***0.8238***		***1648***	***0.5016***	***0.0632***		

hr/day =	9	(7am - 4pm)
days/yr =	365	
hours/year =	3285	

PM2.5 Fugitive Dust Construction Emissions for Modeling - Unmitigated

Construction Year	Activity	Area Source	PM2.5 Emissions (ton/year)	PM2.5 Emissions (lb/yr)	PM2.5 Emissions (lb/hr)	PM2.5 Emissions (g/s)	Modeled Area (m^2)	PM2.5 Emission Rate $g/s/m^2$
2016	Const-Area 1	CON1_FUG	0.4325	864.9	0.26329	3.32E-02	64,573	5.14E-07
	Const-Area 2	CON2_FUG	0.0401	80.3	0.02444	3.08E-03	5,995	5.14E-07
			0.4726				70,568	
	Const-Area 3	CON3_FUG	0.0000	0.0	0.00000	0.00E+00	15,853	0.00E+00
2017	Const-Area 1	CON1_FUG	0.0110	21.9	0.00667	8.40E-04	64,573	1.30E-08
	Const-Area 2	CON2_FUG	0.0010	2.0	0.00062	7.80E-05	5,995	1.30E-08
			0.0120				70,568	
	Const-Area 3	CON3_FUG	0.00003	0.1	0.00002	2.30E-06	15,853	1.45E-10
Total			***0.4846***	***969.2***	***0.2950***	***0.0372***		

hr/day =	9	(7am - 4pm)
days/yr =	365	
hours/year =	3285	

DPM Construction Emissions and Modeling Emission Rates - With Mitigation

Construction Year	Activity	DPM (ton/year)	Area Source	DPM Emissions (lb/yr)	(lb/hr)	(g/s)	Modeled Area (m^2)	DPM Emission Rate ($g/s/m^2$)
2016	Const-Area 1	0.1276	CON1_DPM	255.3	0.07772	9.79E-03	64,573	1.52E-07
	Const-Area 2	0.0119	CON2_DPM	23.7	0.00722	9.09E-04	5,995	1.52E-07
		0.1395					70,568	
	Const-Area 3	0.0000	CON3_DPM	0.0	0.00000	0.00E+00	15,853	0.00E+00
2017	Const-Area 1	0.0473	CON1_DPM	94.6	0.02880	3.63E-03	64,573	5.62E-08
	Const-Area 2	0.0044	CON2_DPM	8.8	0.00267	3.37E-04	5,995	5.62E-08
		0.0517					70,568	
	Const-Area 3	0.0072	CON3_DPM	14.4	0.00439	5.53E-04	15,853	3.49E-08
Total		***0.1984***		***397***	***0.1208***	***0.0152***		

hr/day =	9	(7am - 4pm)
days/yr =	365	
hours/year =	3285	

PM2.5 Fugitive Dust Construction Emissions for Modeling - With Mitigation

Construction Year	Activity	Area Source	PM2.5 Emissions (ton/year)	(lb/yr)	(lb/hr)	(g/s)	Modeled Area (m^2)	PM2.5 Emission Rate $g/s/m^2$
2016	Const-Area 1	CON1_FUG	0.1040	208.1	0.06334	7.98E-03	64,573	1.24E-07
	Const-Area 2	CON2_FUG	0.0097	19.3	0.00588	7.41E-04	5,995	1.24E-07
			0.1137				70,568	
	Const-Area 3	CON3_FUG	0.0000	0.0	0.00000	0.00E+00	15,853	0.00E+00
2017	Const-Area 1	CON1_FUG	0.0110	21.9	0.00667	8.40E-04	64,573	1.30E-08
	Const-Area 2	CON2_FUG	0.0010	2.0	0.00062	7.80E-05	5,995	1.30E-08
			0.0120				70,568	
	Const-Area 3	CON3_FUG	0.00003	0.1	0.00002	2.30E-06	15,853	1.45E-10
Total			***0.1257***	***251.4***	***0.0765***	***0.0096***		

hr/day =	9	(7am - 4pm)
days/yr =	365	
hours/year =	3285	

Westfield Valley Fair Mall, San Jose, CA

Construction Health Impact Summary - Without Mitigation

Construction Year	Maximum Concentrations Exhaust PM2.5/DPM ($\mu g/m^3$)	Maximum Concentrations Fugitive PM2.5 ($\mu g/m^3$)	Cancer Risk (per million) Child	Cancer Risk (per million) Adult	Hazard Index (-)	Maximum Annual PM2.5 Concentration ($\mu g/m^3$)
2016	0.1825	0.1749	16.0	0.8	0.036	0.357
2017	0.1122	0.0044	9.8	0.5	0.022	0.117
Total	-	-	**25.8**	**1.3**	-	-
Maximum Annual	0.1825	0.1749	-	-	**0.036**	**0.357**

Construction Health Impact Summary - With Mitigation

Construction Year	Maximum Concentrations Exhaust PM2.5/DPM ($\mu g/m^3$)	Maximum Concentrations Fugitive PM2.5 ($\mu g/m^3$)	Cancer Risk (per million) Child	Cancer Risk (per million) Adult	Hazard Index (-)	Maximum Annual PM2.5 Concentration ($\mu g/m^3$)
2016	0.0506	0.0422	4.4	0.2	0.010	0.093
2017	0.0191	0.0044	1.7	0.1	0.004	0.024
Total	-	-	**6.1**	**0.3**	-	-
Maximum Annual	0.0506	0.0422	-	-	**0.010**	**0.093**

Maximum Impacts at St. Martin of Tours School - Student Receptors Without Mitigation

Construction Year	Maximum Concentrations Exhaust PM2.5/DPM ($\mu g/m^3$)	Maximum Concentrations Fugitive PM2.5 ($\mu g/m^3$)	Cancer Risk (per million) Child	Cancer Risk (per million) Adult	Hazard Index (-)	Maximum Annual PM2.5 Concentration ($\mu g/m^3$)
2015	0.0071	0.0066	0.2	-	0.001	0.014
2016	0.0044	0.0002	0.1	-	0.001	0.005
2017	0.0000	0.0000	0.0	-	0.000	0.000
Total	-	-	**0.3**	**-**	-	-
Maximum Annual	0.0071	0.0066			**0.001**	**0.014**

Westfield Valley Fair Mall, San Jose, CA - Construction Impacts - Unmitigated Emissions
Maximum DPM Cancer Risk Calculations From Construction
Off-Site Residential Receptor Locations - 1.5 meters

Cancer Risk (per million) = CPF x Inhalation Dose x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

Values

Parameter	Child	Adult
CPF =	1.10E+00	1.10E+00
DBR =	581	302
A =	1	1
EF =	350	350
AT =	25,550	25,550

Construction Cancer Risk by Year - Maximum Impact Receptor Location

		Child - Exposure Information			Child	Adult - Exposure Information			Adult		
	Exposure			Exposure	Cancer	Modeled		Exposure	Cancer		
Exposure	Duration	DPM Conc (ug/m3)		Adjust	Risk	DPM Conc (ug/m3)		Adjust	Risk	Fugitive	Total
Year	(years)	Year	Annual	Factor	(per million)	Year	Annual	Factor	(per million)	PM2.5	PM2.5
1	1	2016	0.1825	10	15.97	2016	0.1825	1	0.83	0.1749	0.357
2	1	2017	0.1122	10	9.82	2017	0.1122	1	0.51	0.0044	0.117
3	1		0.0000	4.75	0.00		0.0000	1	0.00		
4	1		0.0000	3	0.00		0.0000	1	0.00		
5	1		0.0000	3	0.00		0.0000	1	0.00		
6	1		0.0000	3	0.00		0.0000	1	0.00		
7	1		0.0000	3	0.00		0.0000	1	0.00		
8	1		0.0000	3	0.00		0.0000	1	0.00		
9	1		0.0000	3	0.00		0.0000	1	0.00		
10	1		0.0000	3	0.00		0.0000	1	0.00		
11	1		0.0000	3	0.00		0.0000	1	0.00		
12	1		0.0000	3	0.00		0.0000	1	0.00		
13	1		0.0000	3	0.00		0.0000	1	0.00		
14	1		0.0000	3	0.00		0.0000	1	0.00		
15	1		0.0000	3	0.00		0.0000	1	0.00		
16	1		0.0000	3	0.00		0.0000	1	0.00		
17	1		0.0000	1.5	0.00		0.0000	1	0.00		
18	1		0.0000	1	0.00		0.0000	1	0.00		
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65	1		0.0000	1	0.00		0.0000	1	0.00		
66	1		0.0000	1	0.00		0.0000	1	0.00		
67	1		0.0000	1	0.00		0.0000	1	0.00		
68	1		0.0000	1	0.00		0.0000	1	0.00		
69	1		0.0000	1	0.00		0.0000	1	0.00		
70	1		0.0000	1	0.00		0.0000	1	0.00		
Total Increased Cancer Risk					**25.80**				**1.34**		

Westfield Valley Fair Mall, San Jose, CA - Construction Impacts - Mitigated Emissions
Maximum DPM Cancer Risk Calculations From Construction
Off-Site Residential Receptor Locations - 1.5 meters

Cancer Risk (per million) = CPF x Inhalation Dose x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

Values

Parameter	Child	Adult
CPF =	1.10E+00	1.10E+00
DBR =	581	302
A =	1	1
EF =	350	350
AT =	25,550	25,550

Construction Cancer Risk by Year - Maximum Impact Receptor Location

		Child - Exposure Information			Child	Adult - Exposure Information			Adult		
	Exposure			Exposure	Cancer	Modeled		Exposure	Cancer	Mitigated	
Exposure	Duration	DPM Conc (ug/m3)		Adjust	Risk	DPM Conc (ug/m3)		Adjust	Risk	Fugitive	Total
Year	(years)	Year	Annual	Factor	(per million)	Year	Annual	Factor	(per million)	PM2.5	PM2.5
1	1	2016	0.0506	10	4.43	2016	0.0506	1	0.23	0.0422	0.093
2	1	2017	0.0191	10	1.67	2017	0.0191	1	0.09	0.0044	0.024
3	1		0.0000	4.75	0.00		0.0000	1	0.00		
4	1		0.0000	3	0.00		0.0000	1	0.00		
5	1		0.0000	3	0.00		0.0000	1	0.00		
6	1		0.0000	3	0.00		0.0000	1	0.00		
7	1		0.0000	3	0.00		0.0000	1	0.00		
8	1		0.0000	3	0.00		0.0000	1	0.00		
9	1		0.0000	3	0.00		0.0000	1	0.00		
10	1		0.0000	3	0.00		0.0000	1	0.00		
11	1		0.0000	3	0.00		0.0000	1	0.00		
12	1		0.0000	3	0.00		0.0000	1	0.00		
13	1		0.0000	3	0.00		0.0000	1	0.00		
14	1		0.0000	3	0.00		0.0000	1	0.00		
15	1		0.0000	3	0.00		0.0000	1	0.00		
16	1		0.0000	3	0.00		0.0000	1	0.00		
17	1		0.0000	1.5	0.00		0.0000	1	0.00		
18	1		0.0000	1	0.00		0.0000	1	0.00		
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮		
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮		
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮		
65	1		0.0000	1	0.00		0.0000	1	0.00		
66	1		0.0000	1	0.00		0.0000	1	0.00		
67	1		0.0000	1	0.00		0.0000	1	0.00		
68	1		0.0000	1	0.00		0.0000	1	0.00		
69	1		0.0000	1	0.00		0.0000	1	0.00		
70	1		0.0000	1	0.00		0.0000	1	0.00		
Total Increased Cancer Risk					**6.11**				**0.32**		

Westfield Valley Fair Mall, San Jose, CA - Construction Impacts - Unmitigated Emissions
Maximum DPM Cancer Risk Calculations From Construction
School Child Receptor Locations

Cancer Risk (per million) = CPF x Inhalation Dose x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

Values

Parameter	Child	Adult
CPF =	1.10E+00	1.10E+00
DBR =	581	302
A =	1	1
EF =	350	350
AT =	25,550	25,550

Construction Cancer Risk by Year - Student Exposure

Year	Exposure Exposure Duration (years)	Student - Exposure Information: DPM Conc (ug/m3) Year	Conc	Exposure Adjust Factor*	Student Cancer Risk (per million)	Fugitive PM2.5	Total PM2.5
1	1	2016	0.0071	3	0.19	0.0066	0.014
2	1	2017	0.0044	3	0.12	0.0002	0.005
3	1		0.0000	3	0.00		
4	1		0.000	3	0.00		
5	1		0.000	3	0.00		
6	1		0.000	3	0.00		
7	1		0.000	1	0.00		
8	1		0.000	1	0.00		
9	1		0.000	1	0.00		
10	1		0.000	1	0.00		
11	1		0.000	1	0.00		
12	1		0.000	1	0.00		
13	1		0.000	1	0.00		
14	1		0.000	1	0.00		
15	1		0.000	1	0.00		
16	1		0.000	1	0.00		
17	1		0.000	1	0.00		
18	1		0.000	1	0.00		
.	.	.	.	.	.		
.	.	.	.	.	.		
.	.	.	.	.	.		
65	1		0.000	1	0.00		
66	1		0.000	1	0.00		
67	1		0.000	1	0.00		
68	1		0.000	1	0.00		
69	1		0.000	1	0.00		
70	1		0.000	1	0.00		
Total Increased Cancer Risk					**0.3**		

* Assumes that students at school are between 2 and 16 years of age for entire construction period