Appendix A: City of Pleasanton Resolution No. 12-493: Certification of the Final EIR for the Housing Element and Climate Action Plan

RESOLUTION NO. 12-493

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF PLEASANTON, CERTIFYING AS ADEQUATE AND COMPLETE THE FINAL SUPPLEMENTAL ENVIRONMENTAL IMPACT REPORT FOR THE HOUSING ELEMENT (AND ASSOCIATED LAND USE CHANGES) AND THE CLIMATE ACTION PLAN

WHEREAS, the City of Pleasanton has prepared a Draft Housing Element (and associated land use changes identified in the City Council Agenda Report for the January 4, 2012 City Council meeting) and a Climate Action Plan ("Project") and is considering their adoption; and

WHEREAS, the City, acting as lead agency under the California Environmental Quality Act ("CEQA"), determined that a Supplemental Environmental Impact Report ("SEIR") was required for the Project (to supplement the City of Pleasanton's 2005-2025 General Plan EIR, which was certified in 2009). The NOP was distributed to all affected/interested agencies, organizations, and persons for a 30-day comment period beginning on August 22, 2011; and

WHEREAS, the City retained ESA to prepare a SEIR pursuant to CEQA for the proposed Project; and

WHEREAS, the City conducted an environmental scoping meeting on September 14, 2011 for members of the public to provide comments on items to be addressed in the EIR; and

WHEREAS, the City completed the Draft SEIR on September 26, 2011 and circulated it to affected public agencies and interested members of the public for the required 45-day public comment period, from September 27, 2011 to November 14, 2011; and

WHEREAS, the Planning Commission held a noticed public hearings on October 26, 2011, during the 45-day public comment period to receive comments on the Draft SEIR; and

WHEREAS, the City has also accepted and responded to comments received during the public comment period regarding the Draft SEIR from public agencies having jurisdiction by law, persons having special expertise with respect to any environmental impacts involved, and other persons and organizations having an interest in the Project; and

WHEREAS, on December 2, 2011, the City published the Final SEIR for the Project consisting of: the Draft SEIR, responses to comments received on the Draft EIR, and the revisions to the EIR considered by the Planning Commission on December 14, 2011; and

WHEREAS, at its noticed public hearing of December 14, 2011, the Planning Commission recommended that the City Council certify the Final EIR as adequate and complete; and

WHEREAS, Section 21000, et. seq., of the Public Resources Code and Section 15000, et. seq., of Title 14 of the California Code of Regulations (the "CEQA Guidelines"), which govern the preparation, content, and processing of environmental impact reports, have been fully implemented in the preparation of the SEIR; and

WHEREAS, on January 4, 2012, the City Council held a public hearing at which time interested persons had an opportunity to testify either in support or opposition to the Final SEIR.

NOW, THEREFORE, BE IT RESOLVED THAT THE CITY COUNCIL OF THE CITY OF PLEASANTON DOES RESOLVE, DECLARE, DETERMINE, AND ORDER THE FOLLOWING:

SECTION 1. The City Council has independently reviewed, analyzed and considered the Final SEIR and all written documentation and public comments prior to making recommendations on the proposed Project, including the City's CEQA Findings and Statement of Overriding considerations, which document is incorporated by reference herein.

SECTION 2. The Final SEIR was prepared, publicized, circulated, and reviewed in compliance with the provisions of CEQA and the CEQA Guidelines.

SECTION 3. That the Final SEIR constitutes an adequate, accurate, objective, and complete EIR in compliance with all legal standards.

SECTION 4. The information and analysis contained in the Final SEIR reflects the City's independent judgment as to the environmental consequences of the proposed Project.

SECTION 5. The documents and other materials, including without limitation staff reports, memoranda, maps, letters and minutes of all relevant meetings, which constitute the administrative record of proceedings upon which the Council's resolution is based are located at the City of Pleasanton, Community Development Department, 200 Old Bernal Avenue, Pleasanton, CA 94566, and the custodian of the record documents is the Planning Manager.

SECTION 6. The City Council certifies the SEIR attached as Exhibit A, and directs the filing of a Notice of Determination.

SECTION 7. This resolution shall become effective immediately upon its passage and adoption.

PASSED, APPROVED, AND ADOPTED by the City Council of the City of Pleasanton at a regular meeting held on January 4, 2012.

I, Karen Diaz, City Clerk of the City of Pleasanton, California, certify that the foregoing resolution was adopted by the City Council at a regular meeting held on the 4th day of January 2012 by the following vote:

Ayes: Councilmembers Cook-Kallio, McGovern, Sullivan, Thorne, Mayor Hosterman
Noes: None
Absent: None
Abstain: None

Karen Diaz, City Clerk

APPROVED AS TO FORM:

Jonathan P. Lowell, City Attorney

Appendix B:
Air Quality and Greenhouse Gas Information

B.1 - Health Risk Assessment

Health Risk Assessment
The Commons at Gateway Project
Pleasanton, California

Prepared for:
Pleasanton Gateway LLC
Campbell, California

Prepared by:
ENVIRON International Corporation
San Francisco, California

Date:
June 2013

Project Number:
03-27891A

ENVIRON

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Acronyms and Abbreviations

ACS	American Cancer Society
AAQ	Ambient Air Quality
ASF	Age Sensitivity Factor
ASHRAE	American Society of Heating, Refrigeration, and Air-Conditioning Engineers
BAAQMD	Bay Area Air Quality Management District
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
Cal/EPA	California Environmental Protection Agency
CBSC	California Building Standards Commission
CEQA	California Environmental Quality Act
CF	Conversion Factor
CPF	Cancer Potency Factor
CRAF	Cancer Risk Adjustment Factor
cREL	Chronic Non-Cancer Reference Exposure Level
DPM	Diesel Particulate Matter
EIR	Environmental Impact Report
ENVIRON	ENVIRON International Corporation
ESA	Environmental Science Associates
GDF	Gasoline Dispensing Facility
HI	Hazard Index
HQ	Hazard Quotient
HRA	Health Risk Assessment
HRSA	Health Risk Screening Analysis
I-680	Interstate 680
IARC	International Agency for Research on Cancer
IF_{inh}	Intake Factor for Inhalation
ISCST3	Industrial Source Complex-Short Term
MERV	Minimum Efficiency Reporting Value
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NRC	National Research Council
NSR	New Source Review
OEHHA	Office of Environmental Health Hazard Assessment
PM	Particulate Matter
$PM_{2.5}$	Fine Particulate Matter
RAAC	Risk Assessment Advisory Committee
REL	Reference Exposure Levels
TAC	Toxic Air Contaminant
TOG	Total Organic Gas
TSD	Technical Support Document
USEPA	United States Environmental Protection Agency
WHO	World Health Organization

List of Units

kg	Kilogram
m	Meter
m^3	Cubic Meter
mg	Milligram
s	Second
μg	Microgram

1 Introduction

At the request of Pleasanton Gateway LLC, ENVIRON International Corporation (ENVIRON) conducted a health risk assessment (HRA) at a proposed residential development called The Commons at Gateway, in Pleasanton, California (herein referred to as the "Project" or the "Site"). Scheduled for occupancy as early as 2015, the Project will comprise approximately 14 acres with single-family detached homes; 7 acres with multifamily homes (approximately 30 units per acre) and 5.4-acres of common open space.

The purpose of this report is to present the results of the ambient air quality (AAQ) HRA of projected emissions from nearby sources, which is a requirement of the City of Pleasanton Final Supplemental Environmental Impact Report, Housing Element and Climate Action Plan (ESA 2012). ENVIRON followed methods recommended by the Bay Area Air Quality Management District (BAAQMD or District) in the May 2012 California Environmental Quality Act (CEQA) Guidelines (BAAQMD 2012a) to determine whether the Project would be below thresholds of significance as determined by the City of Pleasanton. A project's impact on air quality is considered significant if it exceeds the significance thresholds.

1.1 Objectives and Methodology

The purpose of this health risk evaluation is to estimate the potential health impacts that may result from exposure to all local off-site sources, including (1) nearby BAAQMD permitted stationary sources; and (2) nearby high-volume roadways. The methodology for estimating cancer and non-cancer health effects is based on guidelines for assessing risks from the January 2010 Air Toxics New Source Review (NSR) Program HRSA Guidelines, prepared by the BAAQMD (2010).

Cancer risks, chronic non-cancer hazard indices (HIs) and fine particulate matter, also known as $PM_{2.5}$, are evaluated at the new receptor locations using residential exposure assumptions that are consistent with the District's HRSA Guidelines. The chemical concentrations at these receptor locations from the nearby stationary sources are estimated using a BAAQMD-recommended model, the US Environmental Protection Agency's (USEPA) Industrial Source Complex Short Term (ISCST3), with representative meteorological data collected and distributed by the BAAQMD for such analyses. This report presents an evaluation of the ISCST3 results based on BAAQMD provided data, which is discussed further in the sections below. The chemical concentrations at the receptor locations from the nearby surface streets and highway are estimated using CAL3QHCR, the USEPA's and BAAQMD's recommended model for evaluating impacts from roadways. Based on the modeling results, ENVIRON then developed quantitative estimates of cancer risks and non-cancer HIs associated with residential exposure to the pollutants that may be emitted from the nearby sources.

The effects of two mitigation strategies (a landscaped set-back area and filtration) were also analyzed. Additional information about the methods used in these analyses, as well as detailed tables summarizing the analyses, can be found in the attached Tables and Appendix B.

1.2 Report Organization

This report is divided into nine sections as follows:

Section 1.0 – Introduction: describes the purpose and scope of the AAQ HRA and outlines the report organization.

Section 2.0 – Site Description and Regulatory Background: presents a description of the proposed project and provides a review of the regulatory background for the HRA.

Section 3.0 – Chemical Selection: describes the selection of chemicals to be evaluated in the HRA.

Section 4.0 – Risk Characterization Methods: discusses the exposure pathways that may exist and the methods used to estimate potential cancer risks and chronic non-cancer HIs related to emissions from off-site sources.

Section 5.0 – Estimated Chemical Concentrations in Air: describes the methodology for the estimation of ambient air concentrations of pollutants emitted from the nearby stationary and mobile sources.

Section 6.0 – Results for Project Analysis: presents the results of the HRA in relation to significance thresholds.

Section 7.0 – Uncertainties: summarizes some of the uncertainties resulting from various assumptions used in the air dispersion evaluation as well as from those used in the emission inventory development.

Section 8.0 – Conclusions: summarizes the results of the HRA.

Section 9.0 – References: includes all references cited in this report.

The appendices include supporting information as follows:

Appendix A – Traffic Modeling: presents technical details of the traffic modeling.

Appendix B – Filtration Calculation: includes the technical details of the filtration calculations.

Appendix C – Stationary Source Inquiry Data: includes all data received from BAAQMD.

2 Site Description and Regulatory Background

The purpose of this section is to describe the proposed Project and provide a review of the regulatory background for the HRA.

2.1 Site Description

The proposed Pleasanton Gateway development is a residential housing project located in the City of Pleasanton, situated between Interstate 680 (I-680) and Valley Avenue to the West and East, respectively. Immediately north-northwest of the Site is a shopping center developed with a Safeway grocery store, beyond which is Bernal Avenue further north. The land to the south-southeast of the Site is undeveloped. The Project location is depicted in Figure 1.

Scheduled for occupancy as early as 2015, the Project will comprise approximately 14 acres with single-family detached homes; 7 acres with multifamily homes (approximately 30 units per acre) and 5.4-acres of common open space. Landscaping, including approximately 375 planted trees, will be present along the western Site boundary. In the southwestern corner of the Site, a combination landscaped berm and soundwall of approximately 14 to 16 feet in height will be surrounded by a grove of approximately 90 trees. All residential and common area buildings will be equipped with Minimum Efficiency Reporting Value (MERV) 13 filtration on the heating and cooling systems.

2.2 Regulatory Background

The City of Pleasanton certified an Environmental Impact Report (EIR) in early 2012 for certain General Plan Amendments and Rezonings, including the rezoning of the Pleasanton Gateway site. Mitigation Measure 4.B-4 requires that projects on sites where “screening thresholds are exceeded” shall prepare an HRA to assess exposure to toxic air contaminants (TAC) and shall implement mitigation measures recommended by the HRA necessary to reduce exposure to TACs to below “BAAQMD’s threshold of significance at the time of project approval.” However, BAAQMD currently has no adopted threshold and states that lead agencies should determine the appropriate threshold for themselves. The City of Pleasanton has not yet adopted thresholds of significance for the risks and hazards evaluated in this report; however, the United States Environmental Protection Agency (USEPA), BAAQMD, and other local agencies have provided guidance on acceptable limits.

The USEPA has long found 100 in a million to be an “acceptable” level of cancer risk for conducting air toxic analyses and making risk management decisions at the facility and community-scale level (BAAQMD 2009a). As described by the BAAQMD, the USEPA considers a cancer risk of 100 per million to be within the “acceptable” range of cancer risk. Furthermore, in the 1989 preamble to the benzene National Emissions Standards for Hazardous Air Pollutants (NESHAP) rulemaking (1989), the USEPA states that it “…strives to provide maximum feasible protection against risks to health from hazardous air pollutants by (1) protecting the greatest number of persons possible to an individual lifetime risk level no higher than approximately one in one million and (2) limiting to no higher than approximately one in ten thousand [100 in one million] the estimated risk that a person living near a plant would have if he or she were exposed to the maximum pollutant concentrations for 70 years.” Subsequent to the rulemaking, Congress endorsed this risk level as being acceptable when it codified this

portion of the benzene rulemaking in Section 112(f) of the Clean Air Act. 42 U.S.C. §7412(f)(2)(B). EPA continues to cite to this preamble language and the 100 in a million standard as presenting an acceptable level of risk when it conducts rulemakings in the air quality context. The 100 per one million excess cancer cases is also consistent with the ambient cancer risk in the most pristine portions of the Bay Area based on BAAQMD regional modeling (BAAQMD 2009a). Additionally, the City of San Francisco now uses a total cancer risk of 100 in a million from all off-site sources on all development projects. Thus, there is substantial evidence to utilize the 100 in a million threshold for cancer risk to evaluate the total potential impact from local off-site sources on the new on-site sensitive receptors.

Additionally, BAAQMD-recommended thresholds of 10 for chronic HI and 0.8 $\mu g/m^3$ for $PM_{2.5}$ were also used (BAAQMD 2012a), as shown in Table 6 (discussed later in this report). In accordance with CEQA guidelines, this report evaluates impacts from potential off-site sources (stationary and mobile sources within 1,000 feet of a project boundary) on new on-site sensitive receptors (here, future residents of the Project).

Both the stationary sources and roadway source evaluations required air dispersion modeling, and are discussed separately below and in Appendix A.

3 Chemical Selection

The purpose of this section is to identify the chemicals for quantitative evaluation in the HRA. The off-site sources considered in this HRA include: (1) two gasoline dispensing facilities (GDF); (2) a diesel-fueled emergency generator; and (3) high-volume roadways, which in this case is comprised of three surface streets and one freeway. The GDF emissions were broken up into tank emissions and use emissions. Based on BAAQMD's approach, chemicals modeled to account for these emissions include benzene, toluene, ethylbenzene, and xylenes (BTEX), as well as hexane. For the off-site emergency generator, the BAAQMD recommends using diesel particulate matter (DPM) as a surrogate for all TAC emissions from diesel-fueled compression-ignition internal combustion engines, according to Footnote 6 of Table 2-5-1 of Regulation 2-5.

For on-road traffic, exhaust and evaporative TOGs from gasoline-fueled vehicles were evaluated based on the speciation profiles presented in the BAAQMD Recommended Method for Screening and Modeling Local Risk and Hazards (BAAQMD 2011b). These chemicals are identified in Appendix A (Table A.8), and include BTEX as well as DPM which is a surrogate for exposure to exhaust from diesel-fueled vehicles. Diesel exhaust, a complex mixture that includes hundreds of individual constituents (Cal/EPA 1998), is identified by the State of California as a known carcinogen (Cal/EPA 2011). Under California regulatory guidelines, DPM is used as a surrogate measure of exposure for the mixture of chemicals that make up diesel exhaust as a whole (Cal/EPA 2011). Cal/EPA and other proponents of using the surrogate approach to quantifying cancer risks associated with the diesel mixture indicate that this method is preferable to use of a component-based approach. A component-based approach involves estimating risks for each of the individual components of a mixture. Critics of the component-based approach believe it will underestimate the risks associated with diesel as a whole mixture because the identity of all chemicals in the mixture may not be known and/or exposure and health effects information for all chemicals identified within the mixture may not be available. Furthermore, Cal/EPA has concluded that "potential cancer risk from inhalation exposure to whole diesel exhaust will outweigh the multi-pathway cancer risk from the speciated components" (Cal/EPA 2003).

4 Risk Characterization Methods

The following sections discuss in detail the various components required to conduct the HRA. Cancer risk and chronic HI at the Project were calculated from ambient annual and hourly concentrations using intake factors, cancer potency factors, and chronic reference exposure levels calculated consistent with Office of Environmental Health Hazard Assessment (OEHHA, Cal/EPA 2003) and BAAQMD guidance (2010).

4.1 Exposure Assessment

Potentially Exposed Populations: The on-site receptor populations included in this evaluation represent a lifetime exposure for a resident who moves to the Site at first date of occupancy (assumed to be early 2015) while her/his mother enters her third trimester of pregnancy, is born three months later and lives on site in the same location until s/he reaches 70-years of age. This is a very conservative assumption consistent with BAAQMD guidelines. As discussed further in Section 7, the USEPA has estimated that 50% of the population lives in the same residence for only 9 years, while only 10% remain in the same house for 26 years (USEPA 2011). Adults, moreover, spend about 66% of their total daily time at home (USEPA 2011), rather than the 100% assumed here.

Exposure Assumptions: The exposure parameters used to estimate excess lifetime cancer risks and chronic non-cancer HIs for all potentially exposed populations were obtained using risk assessment guidelines from BAAQMD (2010) and are presented in the attached Table 3.

Calculation of Intake: The dose estimated for each exposure pathway is a function of the concentration of a chemical and the intake of that chemical. The inhalation intake factor for the potentially exposed resident is shown in Table 3. The chemical intake or dose is estimated by multiplying the inhalation intake factor, IF_{inh}, by the chemical concentration in air, C_i. When coupled with the chemical concentration, this calculation is mathematically equivalent to the dose algorithm given in OEHHA Hot Spots guidance (Cal/EPA 2003).

4.2 Toxicity Assessment

The toxicity assessment characterizes the relationship between the magnitude of exposure and the nature and magnitude of adverse health effects that may result from such exposure. For purposes of calculating exposure criteria to be used in risk assessments, adverse health effects are classified into two broad categories, cancer and non-cancer endpoints. Toxicity values used to estimate the likelihood of adverse effects occurring in humans at different exposure levels are identified as part of the toxicity assessment component of a risk assessment. Toxicity values for the chemicals evaluated in this analysis are summarized in Table 4.

4.3 Cancer Risk Adjustment Factors

The estimated excess lifetime cancer risks for a resident were adjusted using the cancer risk adjustment factors (CRAFs) recommended by BAAQMD (2010) based on the age sensitivity factors (ASFs) recommended in the Cal/EPA OEHHA Technical Support Document (TSD, Cal/EPA 2009a). This approach accounts for an “anticipated special sensitivity to carcinogens” of infants and children. Cancer risk estimates are weighted by a factor of 10 for exposures that occur from the third trimester of pregnancy to two years of age and by a factor of three for

exposures that occur from two years through 15 years of age. No weighting factor (i.e., an ASF of one, which is equivalent to no adjustment) is applied to ages 16 to 70 years. As described in Appendix A, annual emissions for each year were adjusted by the ASF assuming an infant was in the third trimester of pregnancy at the start of the project; the average CRAF is shown in Table 5.

4.4 Risk Characterization

Cancer risk and chronic HI were calculated using an approach that is consistent with OEHHA and BAAQMD guidance using annual ambient air concentrations, intake factors, cancer potency factors, and chronic reference exposure levels..

4.4.1 Estimation of Cancer Risks

Excess lifetime cancer risks are estimated as the upper-bound incremental probability that an individual will develop cancer over a lifetime as a direct result of exposure to potential carcinogens. The estimated risk is expressed as a unitless probability. The cancer risk attributed to a chemical is calculated by multiplying the chemical intake or dose at the human exchange boundaries (e.g., lungs) by the chemical-specific cancer potency factor (CPF).

The equation used to calculate the potential excess lifetime cancer risk for the inhalation pathway is as follows:

$$Risk_{inh} = C_i \times CF \times IF_{inh} \times CPF \times CRAF$$

Where:

$Risk_{inh}$ = Cancer Risk; the incremental probability of an individual developing cancer as a result of inhalation exposure to a particular potential carcinogen (unitless)

C_i = Annual Average Air Concentration for $Chemical_i$ ($\mu g/m^3$)

CF = Conversion Factor (mg/µg)

IF_{inh} = Intake Factor for Inhalation (m^3/kg-day)

CPF_I = Cancer Potency Factor for $Chemical_i$ (mg chemical/kg body weight-day)$^{-1}$

CRAF= Cancer Risk Adjustment Factor (unitless)

4.4.2 Estimation of Chronic Non-cancer Hazard Quotients/Indices

The potential for exposure to result in chronic non-cancer effects is evaluated by comparing the estimated annual average air concentration (which is equivalent to the average daily air concentration) to the chemical-specific non-cancer chronic reference exposure levels (RELs). When calculated for a single chemical, the comparison yields a ratio termed a hazard quotient (HQ). To evaluate the potential for adverse chronic non-cancer health effects from

simultaneous exposure to multiple chemicals, the HQs for all chemicals are summed, yielding a hazard index or HI.

The equations used to calculate the chemical-specific HQs and the overall HI are:

$$\text{Chronic } HQ_i = C_i / cREL_i$$

$$\text{Chronic HI} = \Sigma HQ_i$$

Where:

Chronic HQ_i	=	Chronic Hazard Quotient for $Chemical_i$ (unitless)
Chronic HI	=	Hazard Index (unitless)
C_i	=	Annual Average Air Concentration for $Chemical_i$ ($\mu g/m^3$)
$cREL_i$	=	Chronic Non-cancer Reference Exposure Level for $Chemical_i$ ($\mu g/m^3$)

5 Estimated Chemical Concentrations in Air

This section describes the estimation of chemical concentrations in the air at on-site locations.

5.1 Modeled Sources

5.1.1 Stationary Sources

BAAQMD has developed a Stationary Source and Risk Analysis Tool ("BAAQMD Risk Analysis Tool") for permitted sources within the District to identify off-site stationary sources of TACs. ENVIRON utilized the BAAQMD Risk Analysis Tool to compile a list of potential stationary sources to be evaluated within 1,000 feet of the Project boundary (see Table 1 for the list of stationary sources evaluated).

The cancer risk and chronic HI from each of these stationary sources was modeled using the ISCST3 (USEPA 1995a and USEPA 1995b) in accordance with BAAQMD recommendations. These concentrations are used to assess the potential human health risks as described in Section 6.

Two GDFs were identified within 1,000 feet of the Project, Chevron Gas (also called, "Bernal Corners") and Safeway. Chevron Gas, located at 1875 Valley Avenue, is approximately 350 feet northeast of the Project. The quantity of dispensing stations, allowable annual throughput, and benzene emissions per million gallons of gasoline throughput were provided in the risk screening memo provided by BAAQMD (2003), as shown in Appendix C.1. Emissions of other air toxics were calculated by scaling the individual compound's evaporative losses by the evaporative losses of benzene as provided for Total Organic Gas (TOG) (BAAQMD 2012b). The Safeway GDF at 6782 Bernal Avenue is located in the adjacent parcel to the north-northwest of the Project, approximately 430 feet across a Safeway parking lot. At the time of modeling, BAAQMD had no risk estimations for the GDF; instead, BAAQMD provided ENVIRON with the Authority to Construct for the GDF, which states that the maximum gasoline throughput for any consecutive 12-month period at the Safeway GDF is limited to 13.6 million gallons of gasoline (BAAQMD 2012c), as shown in Appendix C.2. Emissions from the Safeway GDF were estimated by scaling the emissions estimated for the Chevron Gas GDF by the annual throughput. Other source release parameters necessary for modeling of both GDFs were identified from BAAQMD guidance (BAAQMD 2011a).

The City of Pleasanton owns and operates a diesel generator at the fire station at 1600 Oak Vista Way, which is within 1,000 feet of the Project boundary. In order to evaluate this generator, emissions and stack dimensions were provided in a memo from BAAQMD (2005), as shown in Appendix C.3. BAAQMD guidance was followed to estimate other release parameters.[7]

One dry cleaner was found within 1,000 feet of the Project boundary, but it has a risk of zero in one million in the BAAQMD Risk Analysis Tool, so it does not contribute to total local risk at the Project.

5.1.2 Roadways

BAAQMD CEQA Guidelines recommend performing a health risk assessment of all high volume roadways within 1,000 feet of the Project, which are defined as roadways with over 10,000 vehicles per day or 1,000 trucks per day. For the Project, I-680, Bernal Avenue, Valley Avenue, and four I-680 ramps fall into this category, as shown in Table 2 and Figure 1. Concentrations of TACs were estimated using CAL3QHCR, the USEPA's and BAAQMD's recommended model for evaluating impacts from roadways. CAL3QHCR reports concentrations at identified individual locations, called receptors.

5.2 Receptor Locations

Receptors were placed in a grid with 25-meter spacing across the Project. The height of the receptors is 1.8 meters, the breathing height recommended in BAAQMD CEQA Guidelines. The technical approach used to estimate air concentrations is described in Appendix A.

6 HRA Results

In this Section, the HRA results are compared to the risk thresholds.

6.1 Summary of Unmitigated Impacts on New Receptors from All Local Off-Site Sources

Results of the HRA, including cancer risks, chronic HI, and $PM_{2.5}$ concentrations, are summarized in Table 6. These results are compared to the thresholds described in Section 2 above. Excess cancer risk and chronic HI do not exceed the threshold; however, the total $PM_{2.5}$ concentration is slightly above the threshold. Results of the unmitigated scenario for cancer risk are shown in Figure 2.

6.2 Mitigation Analysis

As discussed in the previous section, the conservative analysis of the impact of all roadways and stationary sources shows that the lifetime cancer risk for an outdoor concentration with unobstructed air flows from the roadways is below the total risk threshold of 100 in a million. However, the $PM_{2.5}$ concentration exceeds the threshold.

This conservative, unmitigated, analysis would not necessarily be characteristic of actual impacts on residents of the proposed Project as actual impacts would be reduced by vegetation, such as trees, obstructing air flow and filtering out particulate matter and MERV-13 filtration on air intakes and recirculation, which also filter out particulate matter. Further, actual impacts are likely much lower due to the conservative nature of the analysis. For example, most residents will not live in the proposed Project for 70 years and when they are living at the Project, will spend time away from home.

6.2.1 Landscaped Set-Back Area

ENVIRON evaluated the potential particulate matter removal and risk reduction that may be achieved by the presence of a vegetative barrier to mitigate the impacts of the I-680 highway. Recent scientific literature has detailed investigations conducted at the University of California at Davis on the effect of vegetative barriers in reducing air pollutant concentrations from roadway traffic exhaust. Fujii et al. (2008) evaluated the efficacy of three tree species (deoder, redwood and live oak, where deodars and redwoods are evergreens, and live oaks are deciduous) in removal of fine particulate matter at a variety of wind speeds. In general, deoder (a type of cedar) and redwood were the most effective over a range of wind speeds, with removal efficiencies of up to 50% at wind speeds in the 1 to 2 meters per second (m/s) range, decreasing to virtually zero removal at a wind speed of 3.5 m/s.

According to project landscaping plans (Smith+Smith 2013a), a total of approximately 375 redwood trees, planted approximately five to 10 feet apart, will be planted along the western perimeter of the Project. Additionally, in the southwestern corner of the Site where cancer risk was found to be the highest during preliminary modeling, a combination landscaped berm and soundwall of approximately 14 to 16 feet in height will be surrounded by a grove of approximately 90 trees. According to the project landscape architect, Jason Milam of Smith+Smith Landscape Architects, the redwood trees are evergreens and are expected to be approximately eight feet tall and three-and-a-half to four feet wide at the time of planting. At

maturity, redwood trees can measure up to approximately 100 feet high, with dense, heavy foliage. Redwood trees are considered fast-growing tree species and can grow at a rate of about three feet per year (Smith+Smith 2013b). The trees will be interspersed to mimic a natural forest, with approximately three to four rows of trees along the freeway. The trees will be planted in a naturalistic arrangement and are expected to grow in a way that will fill in all gaps between them so that the project is not visible from the highway. According to Smith+Smith, the trees will form a significant barrier in approximately five to ten years after planting. Shrubs are also planned along the southern and eastern perimeters (Smith+Smith 2013a). The combination of foliage will to provide a continuous buffer from ground level upward.

To estimate the pollutant concentration and risk reduction from this vegetative barrier, ENVIRON assumed a mature tree height of 30 feet along the entire western boundary of the project site adjacent to the roadway. Thus emissions passing through the barrier from the I-680 highway only would be mitigated. To estimate the reduction in concentration and risk, the average concentration for each hour was modeled using CAL3QHCR, as discussed in previous sections. These hourly concentrations were adjusted based on the corresponding hourly wind speed at the BAAQMD's Pleasanton meteorological station for the year 2005.

Based on this approach, ENVIRON conservatively estimates that a 26 percent particle removal efficiency and risk reduction could be achieved by implementing a vegetative barrier along the western perimeter of the Site. The estimated lifetime cancer risk from all local off-site sources after this mitigation strategy has been applied is depicted in Figure 3.

The trees will exceed the 30-foot height assumed in this analysis after a period of approximately seven to eight years. It is important to note that residential cancer risk is based on a 70-year exposure period, the large majority of which would occur after the trees reach these heights. Though the proposed species may have canopy densities on the lower end of species analyzed in Fujii et al. (2008) when initially planted, it is reasonable to conclude that the three and four rows of trees proposed for the western edge of the Site will be similar to, if not more effective than, the single barrier of trees evaluated in Fujii et al. (2008).

6.2.2 Building Air Filtration

Further, the change in impacts after adding filtration to the air intake and the recirculation mechanical systems was evaluated. Additional information on this analysis (including input parameters) is presented in Appendix B. It is important to note that the required filtration efficiency necessary to reduce $PM_{2.5}$ impacts below thresholds will depend on the final building design (e.g. ventilation and recirculation system) and individual residence design (e.g. size, location within the building). The air filtration analysis presented here was based on preliminary information provided by Pleasanton Gateway LLC on location and dimensions of residential buildings and ventilation and recirculation rates consistent with ASHRAE 62.2-2010 (ASHRAE 2010) which is required under the 2010 California Green Building Standards Code (also known as CALGreen, CBSC 2010).

The impact of the filtration on the cancer risk from DPM depends on the flows of air in and out of the building. These flows were identified as the flow of air through the forced ventilation, through recirculation, through open windows and doors, and through infiltration through cracks and

permeable surfaces facing outdoors. The impacts of the filtration were quantified assuming the residence is a completely-mixed volume (i.e., concentrations inside the home are the same regardless of location). Excess cancer risk from roadways is mostly attributable to DPM. The DPM can be filtered out of air traveling through the ventilation and recirculation using particulate filters; hence, a resident's cancer risk is reduced when inside their residence compared to their risk outdoors. However, unfiltered air can still enter the building through open windows or doors and through infiltration.

The analysis was based on conservative assumptions regarding resident behavior. Because window operation is controlled by the user and windows are not always open, the flows are not continuous throughout the day. Therefore, for this analysis the impact of the filtration was evaluated in hourly increments and an annual average risk was calculated. Residents are not always indoors, so their exposure when outside at the proposed site must be considered. The time spent outside by age group was obtained from EPA's Exposure Factor Handbook and weighted by years in each age bin and the age sensitivity factor. This equates to approximately three hours outside per day, which is conservative as all this time will not be spent at the proposed site. The risk during this outdoor time is assumed be equivalent to spending three hours in the outdoor "Commons" area located in the central portion of the Project complex. In other words, this analysis assumes that an individual will spend 21 hours per day inside their residence and three hours in the Commons, such that the individual is on the Site all day. The analysis also assumes that the individual is on the site for 350 days per year for 70 years.

This analysis assumes that MERV-13 or equivalent filters capable of at least 90% filtration efficiency for DPM/$PM_{2.5}$ are installed on both the air intake and recirculation for the residences located at the Site, and that the filters operate at least during periods of heating and cooling. The estimated total lifetime cancer risk after this mitigation strategy has been applied is depicted in Figure 4.

6.3 Summary of Mitigated Impacts on New Receptors from All Local Off-Site Sources

The maximum estimated total cancer risk for new residents due to off-site stationary sources (including the modeling results for stationary sources within the 1,000-foot boundary) and highways and surface streets within 1,000 feet of the Project boundary, after mitigation, is 17 in a million, and does not exceed the significance threshold of 100 in a million (see Table 6 and Figure 5). Similarly, the estimated chronic HI and the annual average $PM_{2.5}$ concentrations fall below the corresponding significance thresholds.

7 Uncertainties

Understanding the degree of uncertainty associated with each component of a risk assessment is critical to interpreting the results of the risk assessment. As recommended by the National Research Council ([NRC] 1994), [a risk assessment should include] "a full and open discussion of uncertainties in the body of each EPA risk assessment, including prominent display of critical uncertainties in the risk characterization." The NRC (1994) further states that "when EPA reports estimates of risk to decision-makers and the public, it should present not only point estimates of risk, but also the sources and magnitude of uncertainty associated with these estimates." Similarly, recommendations to Cal/EPA on risk assessment practices and uncertainty analysis from the Risk Assessment Advisory Committee (RAAC) were adapted from NRC recommendations (RAAC 1996). Thus, to ensure an objective and balanced characterization of risk and to place the risk assessment results in the proper perspective, the results of a risk assessment should always be accompanied by a description of the uncertainties and critical assumptions that influence the key findings of the risk assessment.

In accordance with the recommendations described above, ENVIRON has evaluated the uncertainties associated with this HRA, including emissions estimation, air dispersion modeling, and risk estimation. The following sections summarize the critical uncertainties associated with the emissions estimation, air dispersion modeling and risk estimation components of the risk assessment.

7.1 Estimation of Emissions

There are a number of uncertainties associated with the estimation of emissions from the sources evaluated that may affect the subsequent estimation of exposure concentrations and risk characterization. Emission factors were estimated based on the vehicle fleets of Alameda County, which may differ than the vehicle mix along the thoroughfares evaluated. Though EMFAC2011 presents emissions estimates through 2035, the database contains uncertainties related to future advances in vehicle technology, especially considering the emissions for 2035 were assumed to be constant over a 50 year period.

7.2 Estimation of Exposure Concentrations

There are a number of uncertainties associated with the estimation of exposure concentrations from air dispersion modeling of potential emissions from the Facility. This section briefly describes some of the uncertainties that may influence the exposure concentrations used in the risk characterization.

7.2.1 Estimates from Air Dispersion Models

As discussed in Section 5.2, the dispersion model ISCST3 was used to estimate average offsite DPM exposure concentrations at the various offsite receptor locations. This model uses the Gaussian plume equation to calculate ambient air concentrations from emission sources. For this model, the magnitude of error for the maximum concentration is estimated to range from 10 to 40% (USEPA 2005). Therefore, offsite exposure concentrations used in this assessment represent approximate offsite exposure concentrations.

7.2.2 Source Representation

The source parameters (*i.e.*, release velocity and release temperature) used to model emission points are sources of uncertainty. Source parameters were derived from information provided through the BAAQMD Stationary Source Inquiry, described above, for the stationary source modeling. The source parameters used to model emission sources add uncertainty. For all emission sources, ENVIRON used source parameters which were either recommended as defaults or expected to produce more conservative results. As there might be discrepancies in actual emissions characteristics of a source and its representation in the model, exposure concentrations used in this assessment represent approximate exposure concentrations.

7.2.3 Meteorological Data Selection

Uncertainty also exists in the meteorological data used in the ISCST3 and CAL3QHCR air dispersion models. On-site meteorological data were not available for the Facility and as such, ENVIRON used meteorological data from the Pleasanton meteorological station (approximately 3 miles North of the Site), as provided by BAAQMD, for air dispersion modeling. The uncertainties due to the use of offsite meteorological data resulted in approximate exposure concentrations.

7.3 Risk Characterization

7.3.1 Exposure Assumption Uncertainties

Consistent with BAAQMD guidance (BAAQMD 2010), risks were estimated assuming that hypothetical residents at the receptor points spend 70 years at one location. However, the USEPA has estimated that 50% of the population lives in the same residence for only 9 years, while only 10% remain in the same house for 26 years (USEPA 2011). Adults, moreover, spend about 66% of their total daily time at home (USEPA 2011), rather than the 100% assumed here. Accordingly, the actual risks to hypothetical residents at the modeled receptor locations are likely lower than those calculated in this assessment.

7.3.2 Toxicity Assessment Uncertainties

The Cal/EPA CPF for DPM was used to estimate cancer risks associated with exposure to DPM from the off-site generator. However, the CPF derived by Cal/EPA for DPM is highly uncertain in both the estimation of response and dose. In the past, due to inadequate animal test data and epidemiology data on diesel exhaust, the International Agency for Research on Cancer (IARC), a branch of the World Health Organization (WHO), had classified DPM as Probably Carcinogenic to Humans (Group 2); the USEPA had also concluded that the existing data did not provide an adequate basis for quantitative risk assessment (USEPA 2002). However, based on two recent scientific studies (Attfield 2012 and Silverman 2012), IARC recently re-classified DPM as Carcinogenic to Humans to Group 1 (IARC 2012), which means that the agency has determined that there is “sufficient evidence of carcinogenicity” of a substance in humans and represents the strongest weight-of-evidence rating in IARC’s carcinogen classification scheme. This determination by the IARC may provide additional impetus for the US EPA to identify a quantitative dose-response relationship between exposure to DPM and cancer.

7.3.3 Risk Calculation

The USEPA (1989a) notes that the conservative assumptions used in a risk assessment are intended to assure that the estimated risks do not underestimate the actual risks posed by a site and that the estimated risks do not necessarily represent actual risks experienced by populations at or near a site. By using standardized conservative assumptions in a risk assessment, USEPA (1989b) further states that:

> *"These values [risk estimates] are upper-bound estimates of excess cancer risk potentially arising from lifetime exposure to the chemical in question. A number of assumptions have been made in the derivation of these values, many of which are likely to overestimate exposure and toxicity. The actual incidence of cancer is likely to be lower than these estimates and may be zero."*

The estimated risks in this risk assessment are based primarily on a series of conservative assumptions related to predicted environmental concentrations, exposure, and chemical toxicity. The use of conservative assumptions tends to produce upper-bound estimates of risk. Although it is difficult to quantify the uncertainties associated with all the assumptions made in this risk assessment, the use of conservative assumptions is likely to result in substantial overestimates of exposure, and hence, risk. BAAQMD acknowledges this uncertainty by stating: "the methods used [to estimate risk] are conservative, meaning that the real risks from the source may be lower than the calculations, but it is unlikely that they will be higher" (BAAQMD 2013).

8 Conclusions

The Project consists of new residential receptors which are subject to environmental impacts from stationary sources and nearby highways and surface streets. The conservative analysis described herein indicates that the proposed Project does not exceed the thresholds of significance for cancer risk and chronic HI effects, but is over the threshold for $PM_{2.5}$. With project design features such as setback from I-680, planting and maintenance of a vegetative tree barrier and filtration mitigations described above impacts are reduced by over 90% in all residential areas of the Project, as shown in Figure 6. The estimated annual average $PM_{2.5}$ concentration exceeds the significance threshold prior to mitigation; however, after mitigations are implemented, the annual average $PM_{2.5}$ concentration at the proposed Project is reduced to below the significance thresholds.

To provide perspective for the results of a risk assessment, the California Environmental Protection Agency (Cal/EPA) OEHHA indicates that the estimated cancer risks can be "compared to the overall risk of cancer in the general U.S. population" or "to the risk posed by all harmful chemicals in a particular medium, such as air. Based on recent ambient air monitoring data for the top 10 TACs that generally pose the greatest known ambient risk in California, the statewide number of excess cancer cases per million people over a 70-year, lifetime exposure is 680 for the year 2007 (Cal/EPA 2009b). More local to the Project, BAAQMD conducted a study of background risk in the nine counties that compose the District and found the risks in the greater Pleasanton area to be in the range of 400 to 800 in a million (BAAQMD 2009). Furthermore, the American Cancer Society (ACS) reports that nearly one in every two Californians will be diagnosed with cancer during their lifetime, corresponding to a background cancer risk of 500,000 in one million (ACS 2013).

9 References

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Tables

Table 1
Stationary Source Emissions
The Commons at Gateway
Pleasanton, CA

Source Number[1]	Facility Name	Street Address	Source Type	Emissions (g/s)[2,3]
N/A	Safeway Gas	Bernal Ave	GDF	1.3E-02
G10915	Bernal Corners/Chevron Gas	1875 Valley Ave	GDF	6.6E-03
16937	City of Pleasanton	1600 Oak Vista Way	Diesel Generator	4.0E-05
5315	Bernal Cleaners	6654 Koll Center Pkwy	Dry Cleaner	0

Notes:

1. All facilities within 1,000 feet of the proposed project as identified in the BAAQMD Stationary Source Screening Analysis Tool consistent with BAAQMD guidance. If a source was just further than 1,000 feet, and the address associated with the source is within 1,000 feet, the source was conservatively included here.

2. Emissions from the GDFs are presented as total air toxic emissions. Benzene emissions from Bernal Corners GDF are as provided in the risk screening memo for the Bernal Corners GDF from BAAQMD (March 27, 2003). Emissions of other air toxics were calculated relative to the benzene concentration as provided by BAAQMD in the Recommended Methods for Screening and Modeling Local Risks and Hazards (table of speciated Total Organic Gases from evaporative sources). Emissions from the Safeway GDF were calculated by scaling the emissions from the Bernal Corners GDF by the expected annual gasoline throughput.

3. Emissions from the City of Pleasanton Diesel Generator are as presented in the risk screening memo for the City of Pleasanton as provided by BAAQMD.

Abbreviations:

GDF - gasoline dispensing facility
g/s - grams per second
N/A - not applicable

References:

BAAQMD. 2012. Recommended Methods for Screening and Modeling Local Risks and Hazards. May.

Memo from Catherine Fortney to Raymond Salalila, BAAQMD. 2005. Application #12285; City of Pleasanton. April 21.

Memo from Hari Doss, to Madhav Patil, BAAQMD. 2003. Risk Screening for Bernal Corners GDF; GDF # 10915; Application #7133. March 27.

Table 2
Modeled Roadways
The Commons at Gateway
Pleasanton, CA

Roadway[1]	ADT[2]
	vpd
I-680	125,719
I-680 - Northbound Offramp	3,981
I-680 - Northbound Onramp	11,629
I-680 - Southbound Offramp	11,943
I-680 - Southbound Onramp	4,400
Bernal Avenue - West of I-680	21,482
Bernal Avenue - East of I-680	27,501
Valley Avenue - North of Bernal Avenue	4,878
Valley Avenue - South of Bernal Avenue	13,284

Notes:
1. All roadways within 1,000 feet of the Project.
2. ADT calculated as described in Appendix A.

Abbreviations:
I-680 - Interstate 680
ADT - average daily traffic
vpd - vehicles per day

References:
-California Department of Transportation's Traffic Data Branch. 2011. Available online: http://traffic-counts.dot.ca.gov/
-City of Pleasanton. Traffic Counts Map. Available online: http://www.ci.pleasanton.ca.us/services/traffic/traffic-counts-map.html

Table 3
Exposure Parameters
The Commons at Gateway
Pleasanton, CA

Exposure Parameter	Units	Resident	
		Lifetime	Child
Daily Breathing Rate (DBR) [1]	[L/kg-day]	302	581
Exposure Time (ET) [2]	[hours/24 hours]	24	24
Exposure Frequency (EF) [3]	[days/year]	350	350
Exposure Duration (ED) [4]	[years]	70	9
Averaging Time (AT)	[days]	25550	25550
Intake Factor, Inhalation (IF_{inh})	[m^3/kg-day]	0.29	0.072

Notes:
1. Daily breathing rates for residents reflect default breathing rates from BAAQMD 2010.
2. Exposure time for residents reflect default exposure time from BAAQMD 2010.
3. Exposure frequency for residents reflect default exposure frequency from BAAQMD 2010.
4. The exposure duration for residents reflect default exposure duration from BAAQMD 2010.

Calculation:
Resident Adult and Child:
IF_{inh} = DBR * ET * EF * ED * CF / AT
CF = 0.001 (m^3/L)

Abbreviations:
BAAQMD - Bay Area Air Quality Management District
L - liter
kg - kilogram
m^3 - cubic meter

References:
Bay Area Air Quality Management District (BAAQMD). 2010. Air Toxics NSR Program Health Risk Screening Analysis (HRSA) Guidelines. January.

Table 4
Toxicity Values
The Commons at Gateway
Pleasanton, CA

Chemical	CAS Number	Cancer Potency Factor	Chronic Reference Exposure Level	Acute Reference Exposure Level
		$[mg/kg\text{-}day]^{-1}$	$\mu g/m^3$	$\mu g/m^3$
Diesel PM	9-90-1	1.1	5	
Acetaldehyde	75-07-0	0.01	140	470
Acrolein	107-02-8		0.35	2.5
Benzene	71-43-2	0.1	60	1300
1,3-Butadiene	106-99-0	0.6	20	
Ethylbenzene	100-41-4	0.0087	2000	
Formaldehyde	50-00-0	0.021	9	55
Hexane	110-54-3		7000	
Methanol	67-56-1		4000	28000
Methyl Ethyl Ketone	78-93-3			13000
Naphthalene	91-20-3	0.12	9	
Propylene	115-07-1		3000	
Styrene	100-42-5		900	21000
Toluene	108-88-3		300	37000
Xylenes	10-60-5		700	22000

Notes:
1. All fractions are from USEPA Speciation Profile 4674 for Medium Duty Trucks.
2. All fractions are provided by BAAQMD (BAAQMD 2012).

Abbreviation:
BAAQMD - Bay Area Air Quality Management District
TOG - total organic gas
USEPA - United States Environmental Protection Agency

Reference:
BAAQMD. 2012. Recommended Methods for Screening and Modeling Local Risks and Hazards. May.

Table 5
Cancer Risk Adjustment Factor[1]
The Commons at Gateway
Pleasanton, CA

Receptor	Cancer Risk Adjustment Factor (CRAF)
Lifetime Resident[2]	1.7

Notes:
1.CRAF based on ASF recommendations by the Cal/EPA Office of Environmental Health Hazard Assessment (OEHHA) 2009 and BAAQMD 2010.
2. Based on BAAQMD 2010.

Abbreviations:
ASF - Age Sensitivity Factor
BAAQMD - Bay Area Air Quality Management District
Cal/EPA - California Environmental Protection Agency
CRAF - Cancer Risk Adjustment Factor
OEHHA - Office of Environmental Health Hazard Assessment

References:
Bay Area Air Quality Management District (BAAQMD). 2010. Air Toxics NSR
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Table 6
Summary of Risk and Hazard Analyses for Maximally Impacted New On-Site Receptor
The Commons at Gateway
Pleasanton, CA

Source Type	Source	Cancer Risk (in a million)		Chronic Hazard Index (-)	$PM_{2.5}$ ($\mu g/m^3$)	
		Unmitigated	Mitigated[2]		Unmitigated	Mitigated[3]
Stationary Sources (Modeled)	Safeway Gas	3		0.002	N/A	
	Bernal Corners/Chevron Gas	1		0.04	N/A	
	City of Pleasanton[1]	0.01		2E-04	2.4E-05	
	Bernal Cleaners	0		0	0	
Highways & Surface Streets	Interstate 680	73	16	0.06	0.8	0.2
	Interstate 680 Ramps	3	0.7	0.002	0.03	0.01
	Bernal Avenue	2	0.5	0.002	0.03	0.006
	Valley Avenue	2	0.4	0.002	0.03	0.007
Total Risk from All Local Sources[4]		**75**	**17**	**0.1**	**0.83**	**0.24**
Threshold		100		10	0.8	
Exceeds Threshold?		**No**	**No**	**No**	**Yes**	**No**

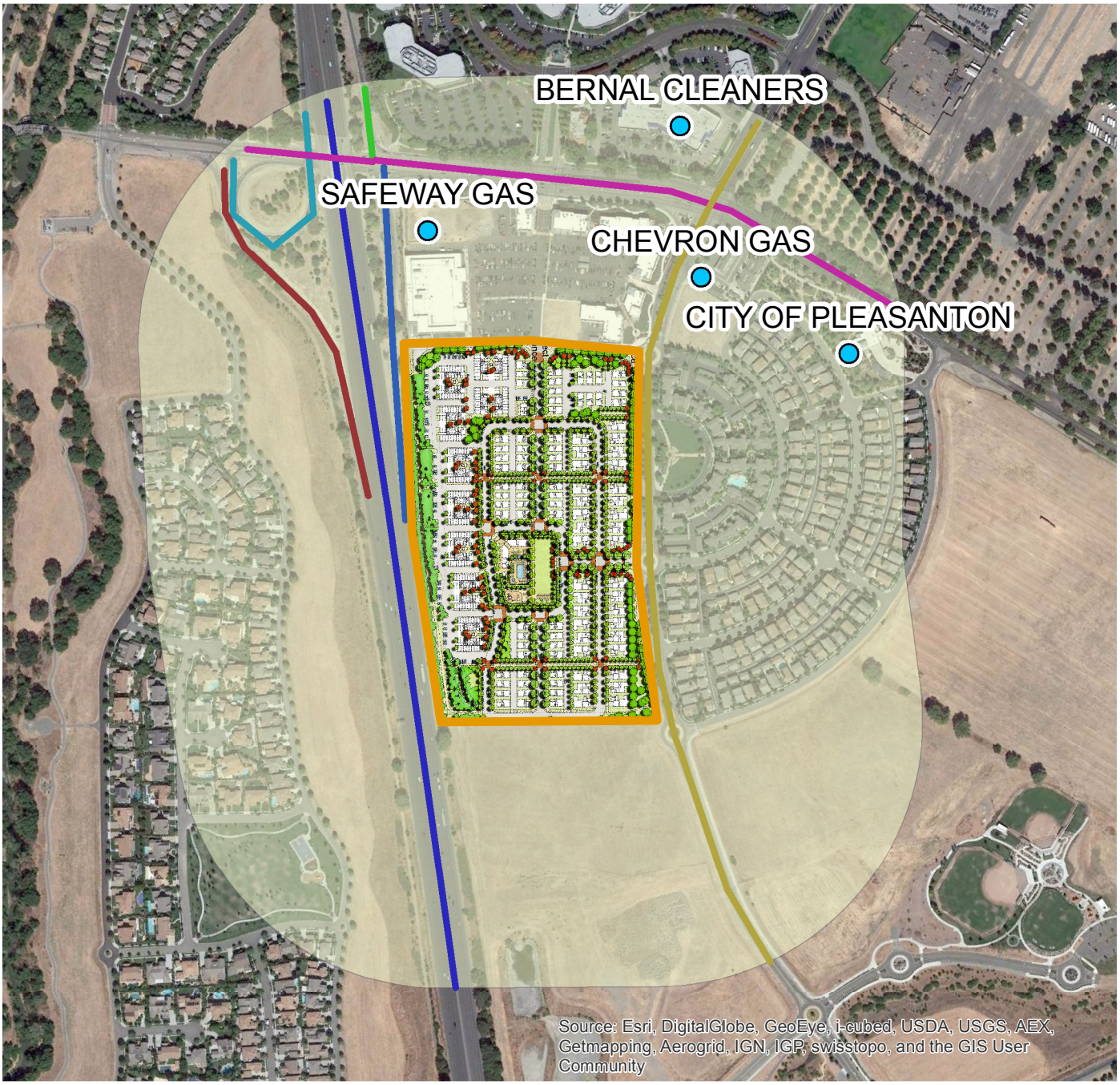
Notes:

1. Diesel PM from the City of Pleasanton generator is conservatively assumed to be comprised only of $PM_{2.5}$.
2. Cancer risks for the mitigated scenario assume residential building filtration consisting of MERV 13 filters installed on heating and cooling systems. For this analysis of overall risk reduction due to air filtration, receptors are assumed to spend 3 hours/day outdoors in the Commons Area and have at least one residential window open when the temperature is between 65 and 80 degrees Fahrenheit, which equates to approximately 5.5 hours/day.
3. Mitigation scenario for $PM_{2.5}$ uses the average reduction from cancer risk by source as a surrogate for reductions in $PM_{2.5}$.
4. The maximum values for different sources may not occur at the same receptor location. Thus, the value at the maximally impacted new on-site receptor presented here is less than the sum of values from each source type.

Abbreviations:

m: meter
MERV: Minimum Efficiency Reporting Value
µg: microgram
N/A: not applicable
PM: particulate matter

Figures



Legend

- Project Boundary
- 1,000ft Zone of Influence
- Stationary Source Locations

Roadways Modeled

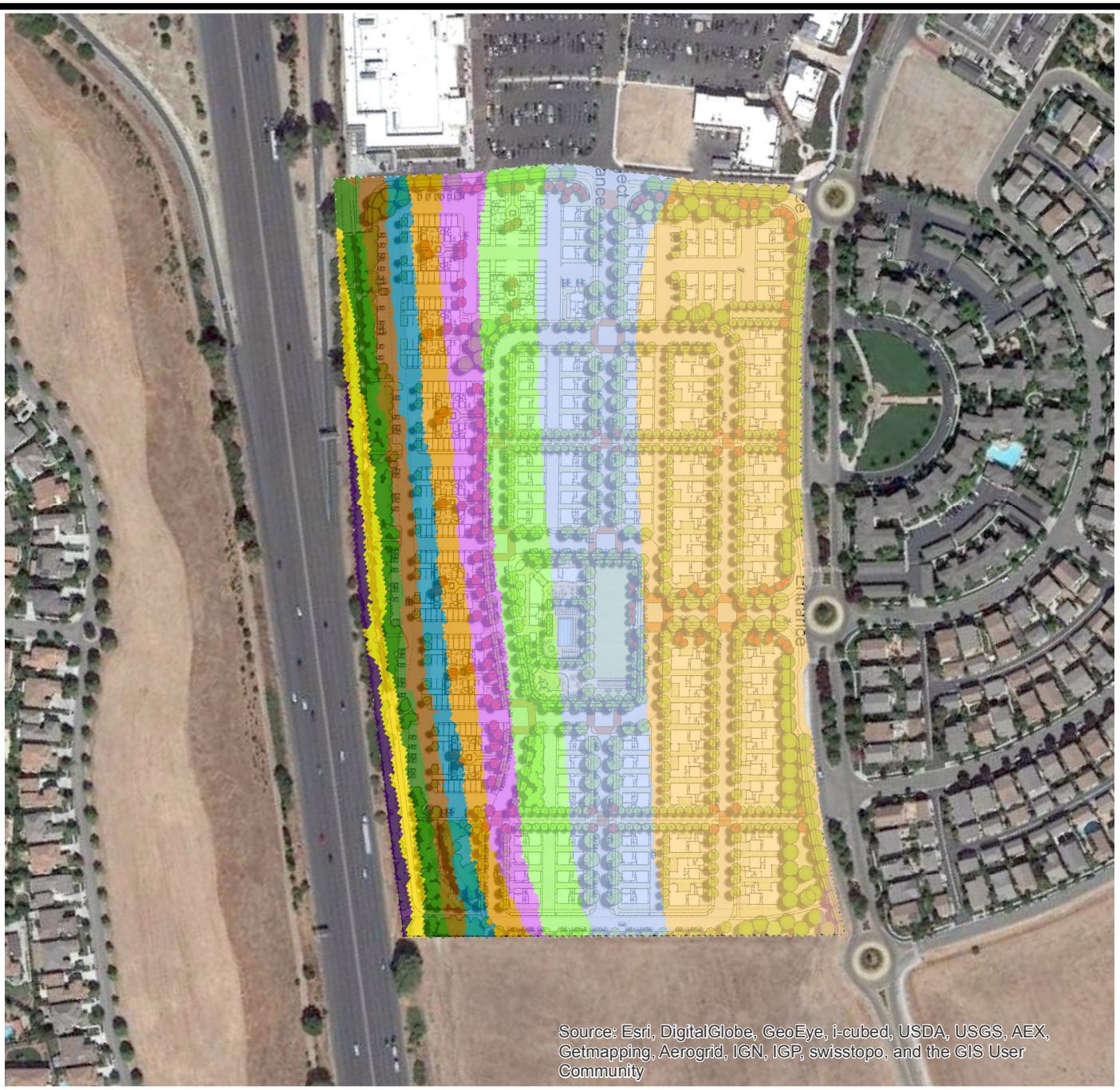
- Bernal Avenue
- I-680
- I-680 Northbound Offramp
- I-680 Northbound Onramp
- I-680 Southbound Offramp
- I-680 Southbound Onramp
- Valley Avenue

N

0 250 500 1,000 Feet

Figure 1
Project Location
and Off-Site Sources
The Commons at Gateway
Pleasanton, CA

ENVIRON



Legend

Cancer Risks (in a million)

- 10 - 20
- 20 - 30
- 30 - 40
- 40 - 50
- 50 - 60
- 60 - 70
- 70 - 80
- 80 - 90
- 90 - 100
- 100 - 110
- 110 - 120

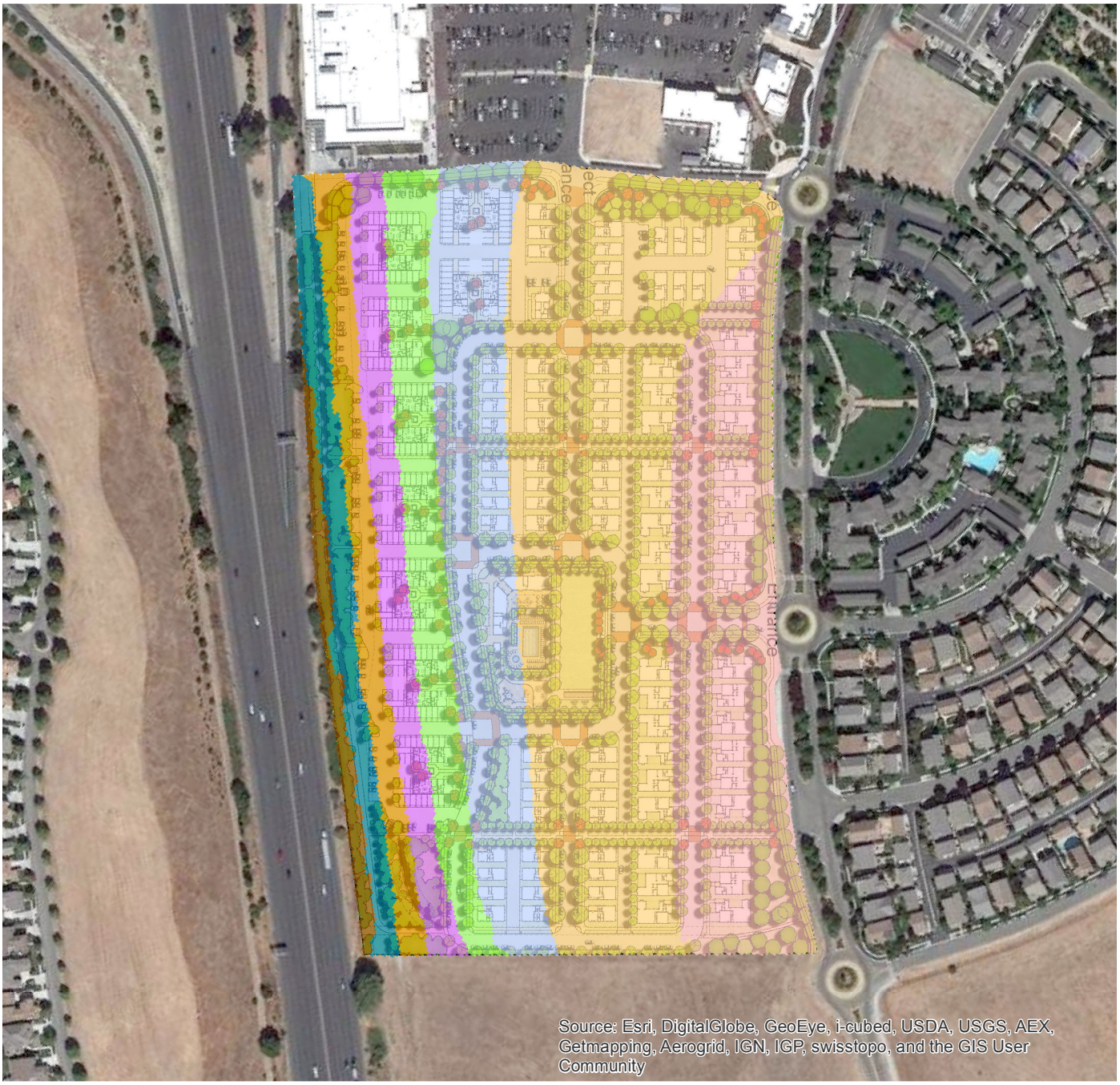
Sources: All
Mitigations: None

0 250 500 1,000 Feet

N

Figure 2
Total Cancer Risk
(Unmitigated)
The Commons at Gateway
Pleasanton, CA

ENVIRON



Legend

Cancer Risk (in a million)

- 10 - 20
- 20 - 30
- 30 - 40
- 40 - 50
- 50 - 60
- 60 - 70
- 70 - 80
- 80 - 90

N

Sources: All
Mitigations: Landscaped Set-Back Area (Trees and Other Vegetation)

0 250 500 1,000 Feet

Figure 3
Total Cancer Risk (Mitigated)
The Commons at Gateway
Pleasanton, CA

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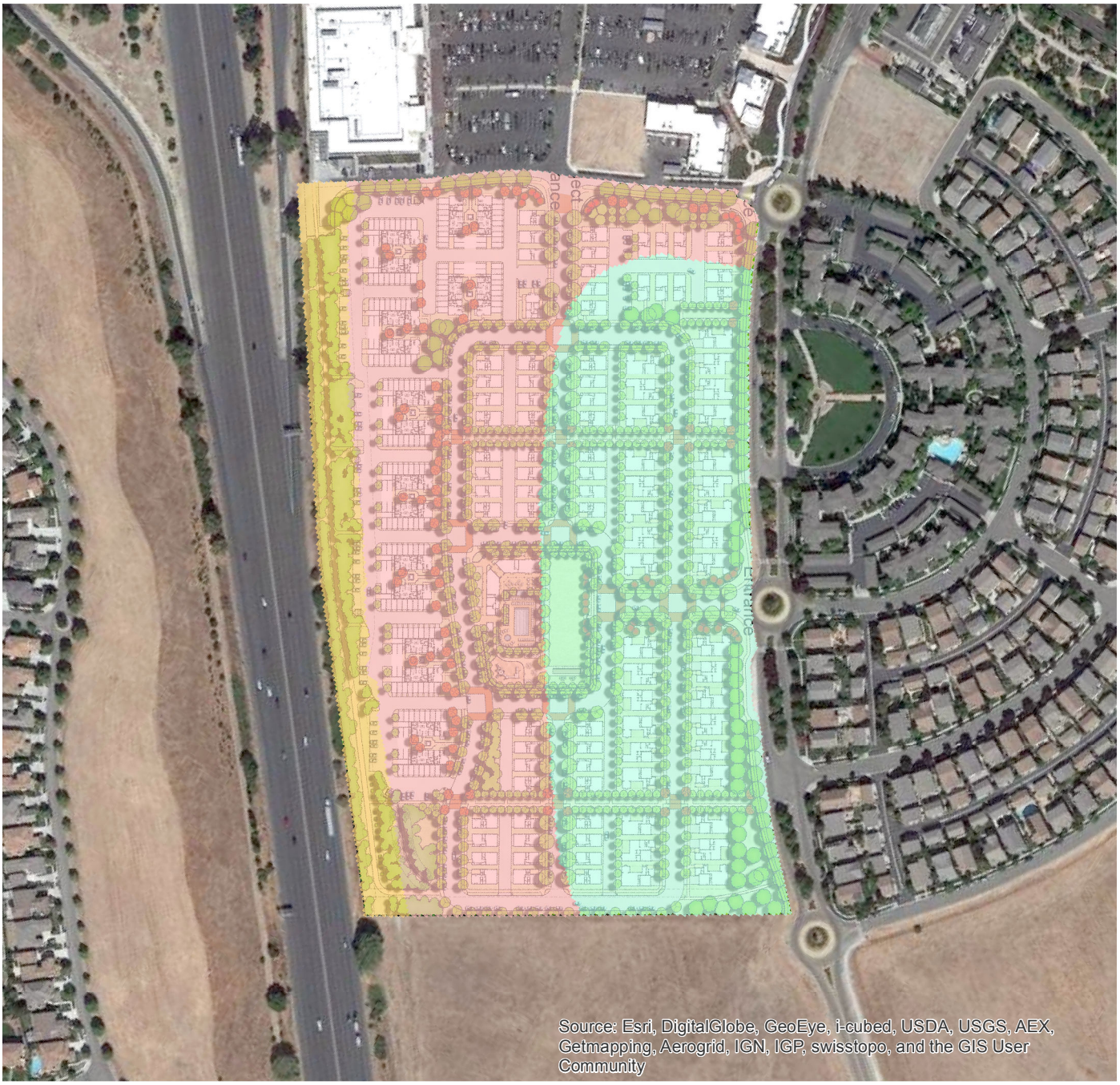


Legend

Cancer Risk (in a million)

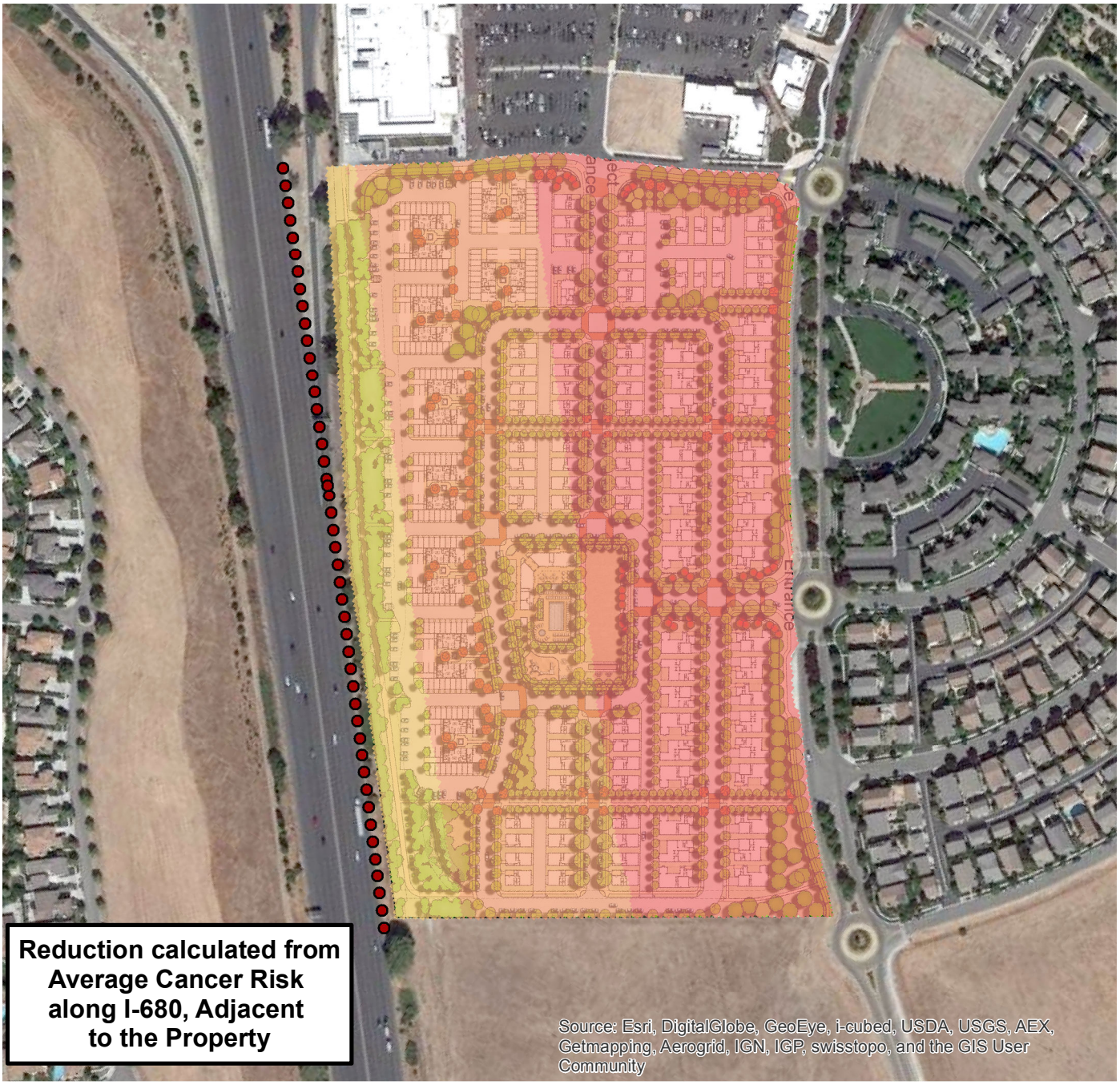
- 5 - 10
- 10 - 20
- 20 - 30

Sources: All
Mitigations: Landscaped Set-Back Area (Trees and Other Vegetation)
Filtration

0 250 500 1,000 Feet

Figure 4
Total Cancer Risk
(Mitigated)
The Commons at Gateway
Pleasanton, CA

ENVIRON



Legend

I-680 Risk Reduction

(percent)

- 85% - 90%
- 90% - 95%
- 95%+

Sources: All

Mitigations: Set-Back
Landscaped Area (Trees and Other Vegetation)
Filtration

0 250 500 1,000 Feet

Figure 5
I-680 Cancer Risk Reduction from Mitigation Measures
The Commons at Gateway
Pleasanton, CA

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Appendix A

Traffic Modeling Technical Appendix

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Acronyms and Abbreviations

ADT	Average Daily Traffic
ARB	Air Resources Board
ASF	Age Sensitivity Factor
BAAQMD	Bay Area Air Quality Management District
CALTRANS	California Department of Transportation
CEQA	California Environmental Quality Act
CM	Centimeters
DPM	Diesel Particulate Matter
EMFAC	EMission FACtor Model
ENVIRON	ENVIRON International Corporation
HRA	Health Risk Assessment
I-680	Interstate 680
OEHHA	Office of Environmental Health Hazard Assessment, State of California
$PM_{2.5}$	Fine Particulate Matter Less than 2.5 Micrometer in Diameter
TAC	Toxic Air Contaminant
TOG	Total Organic Gases
USEPA	United States Environmental Protection Agency
VMT	Vehicle Miles Traveled

A.1 Introduction

As discussed in the body of this report, ENVIRON International Corporation (ENVIRON) prepared a Health Risk Assessment (HRA) for Pleasanton Gateway LLC for The Commons at Gateway Project in Pleasanton, California ("Project"). As part of this HRA, the health risk from nearby roadways were evaluated using methods consistent with the Bay Area Air Quality Management District (BAAQMD) California Environmental Quality Act (CEQA) Guidelines[1] and Recommended Methods for Screening and Modeling Local Risks and Hazards.[2] This appendix discusses the methodology used in the HRA for risk from roadways near the Project. Consistent with BAAQMD guidance, all roadways within 1,000 feet of the project with over 10,000 average daily traffic (ADT) were modeled using CAL3QHCR.

A.2 Technical Approach

Fine particulate matter Less than 2.5 Micrometer in Diameter ($PM_{2.5}$) and toxic air contaminant (TAC) concentrations from Project and background traffic on major roadways at existing sensitive receptors were estimated using CAL3QHCR, United States Environmental Protection Agency (USEPA's) and BAAQMD's preferred model for determining air pollutant concentrations from traffic. CAL3QHCR incorporates hourly emission factors and traffic volumes with a full year of hourly meteorological data to estimate air concentrations for inert pollutants including particulate matter, such as diesel particulate matter (DPM) and gaseous TACs. For the HRA, the following TACs associated with traffic were evaluated:

- DPM from diesel-fueled vehicles;
- Total organic gas (TOG) from the exhaust of diesel-fueled vehicles;
- TOG from the exhaust of gasoline-fueled vehicles;
- Evaporative TOG from gasoline-fueled vehicles;
- $PM_{2.5}$ from the exhaust of all vehicles; and
- $PM_{2.5}$ from the brake and tire wear of all vehicles.

Air dispersion models, such as CAL3QHCR, require a variety of inputs, such as source geometry (e.g., configuration of roadways), hourly traffic volumes, hourly emission factors, meteorological parameters, topography information, and receptor parameters. When site-specific information is unknown, default parameter sets were used that are designed to produce conservative (i.e., overestimates of) air concentrations.

As mentioned above, BAAQMD CEQA Guidelines recommend performing a health risk assessment of all roadways within 1,000 feet of the Project with over 10,000 vehicles per day or 1,000 trucks per day. For the Project, Interstate 680 (I-680), Bernal Avenue, Valley Avenue, and two I-680 ramps fall into this category. To be conservative, all four ramps within 1,000 feet of the Project were included in the analysis.

[1] BAAQMD. 2012. California Environmental Quality Act Air Quality Guidelines. May.

[2] BAAQMD. 2012. Recommended Methods for Screening and Modeling Local Risks and Hazards. May.

Occupancy of the Project is expected to begin as early as 2015. Therefore, the roadway health risk assessment incorporates emission factors and traffic volumes starting in 2015.

A.2.1Emission Factors

Emission factors were estimated for the pollutants bulleted above using California Air Resources Board (ARB's) most recent on-road emission estimator model, EMFAC2011.[3] EMFAC2011 is composed of a series of models that estimate emissions by certain area designations. To estimate emissions, the SG and LDV modules were used for Alameda County.

Total county emissions (in units of tons/year) and total daily Vehicle Miles Traveled (VMT) (in units of miles/year) for each vehicle class, fuel type, and TAC were obtained from the SG Module of EMFAC2011. The SG Module incorporates emission reductions from ARB's On-Road Heavy-Duty Diesel Vehicles Regulation. These total emissions were converted to emission factors (in units of grams/mile) using the total VMT.

CAL3QHCR requires one emission factor for a pollutant for each hour. Therefore, an emission factor that is the weighted average of vehicle class specific emission factors was calculated using the percentage of each vehicle class for each hour. The vehicle classes considered for estimating concentrations of each TAC are shown in Appendix Table A.1. Percentage of VMT is used as a surrogate for actual fleet mix of vehicles on the road. For non-diesel heavy duty vehicles, the hourly percentage of each vehicle class was calculated using hourly VMT reported in "Burden Mode" of the LDV Module of EMFAC2011. Information on diesel heavy duty vehicles is not estimated in the LDV Module, nor is hourly VMT for these vehicles reported in any EMFAC2011 Module. Therefore, the hourly percentage of total VMT for each diesel heavy duty vehicle was obtained directly from ARB[4] and is shown in Appendix Table A.2.

EMFAC VMT data for all of Alameda County incorporates the total Alameda County truck percentage. Truck percentages can vary greatly from road to road or highway to surface street, and trucks tend to have higher emission factors per mile than other vehicles. Therefore, actual truck percentages on individual roadways are important. California Department of Transportation (Caltrans) estimates truck counts on California Highways.[5] For I-680, a truck percentage of 6.5%, the percentage at the junction with I-580, was used. For surface streets where specific truck counts are not known, the BAAQMD recommended default percent for surface streets in Alameda County, 4.09%, was used. Default daily percentages of VMT obtained from EMission FACtor Model (EMFAC) were adjusted to be consistent with these estimates.

Hourly weighted emission factors are shown in Appendix Table A.3.

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[3] Available online: http://www.arb.ca.gov/msei/modeling.htm

[4] Personal Communication between Jennie Louie (ENVIRON) and Kathy Jaw (ARB). October 13, 2011.

[5] California Department of Transportation's Traffic Data Branch. 2011. Truck Traffic 2010. Available online: http://traffic-counts.dot.ca.gov/

A.2.2Hourly Traffic Volumes

Average daily traffic volumes along each roadway were obtained from Caltrans's Traffic Data Branch[6,7] and the City of Pleasanton.[8] As shown in Appendix Table A.4, traffic volumes were projected from the base year to the expected 2015 traffic volumes using the increase in total VMT for the County as estimated in EMFAC2011.

Daily traffic volumes were converted to hourly traffic volumes using an assumed percentage of traffic for each hour. Hourly VMT calculated for emissions was used to estimate percentage of traffic for each hour, which is shown in Appendix Table A.5.

A.2.3Hourly Percent of Vehicle Fuel Type

Because the emissions of some TACs depend on the fuel burned in combustion, the hourly traffic volumes must be broken down into diesel and gasoline fueled traffic volumes. The hourly percentage of diesel and gasoline fueled vehicles is calculated using the fraction of VMT at each hour that are diesel or gasoline fueled, similar to the method used for fleet mix of vehicles. Hourly VMT calculated for emissions was used to estimate the percentage of diesel and gasoline fueled vehicles reported in Appendix Table A.5.

A.2.4Roadway Source Geometry

The roadway geometry used in the model was determined using an aerial map of the Project area. Consistent with CAL3QHCR guidance, each roadway was broken into a series of straight segments, or "links", which have constant emission factors and traffic volumes. The width of the link includes all travel lanes and, consistent with CAL3QHCR guidance, an additional three meters on each side to account for the turbulent mixing of air behind the moving vehicles. Figure X of the report shows the modeled roadways.

A.2.5Meteorological Data

To characterize the transport and dispersion of pollutants in the atmosphere, CAL3QHCR requires hourly meteorological data in the same format as the data required by the Industrial Source Complex Short Term Model (ISCST3), another EPA air dispersion model. BAAQMD provides meteorological data in this format from stations around the Bay Area. For this analysis, meteorological data from 2005 from the Pleasanton Station (Site ID 1905) with a mixing height of 300 meters was used. This site is approximately 3 miles North of the Project.

An important consideration in an air dispersion modeling analysis is the selection of rural or urban dispersion coefficients. As discussed in the AERMOD model section, the rural designation was chosen, which results in the use of the rural mixing height found in the meteorological data and rural dispersion parameters. An analysis of the surface roughness of the area was completed and 57 centimeters (cm) was determined to be the most appropriate roughness based on the land uses in the area.

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6 California Department of Transportation's Traffic Data Branch. 2011. Traffic Volumes 2010. Available online: http://traffic-counts.dot.ca.gov/

7 California Department of Transportation's Traffic Data Branch. 2011. Ramp Volumes 2010. Available online: http://traffic-counts.dot.ca.gov/

8 City of Pleasanton. Traffic Counts Map. Available online: http://www.ci.pleasanton.ca.us/services/traffic/traffic-counts-map.html

A.2.6Scaling Factors

Excess lifetime cancer risks are calculated assuming a 70 year exposure. Vehicular emission factors are expected to decrease with time due to the improvement of engines and increasingly stringent engine control regulations. Additionally, due to physiological and developmental differences as compared to adults, infants and children are anticipated to have special sensitivity to carcinogens.[9] Hence, impacts from roadways would be expected to be greater in earlier years. To take into account the decreasing emission factors and toxicity with time, BAAQMD recommends multiplying emission factors calculated for the occupancy year by 70-year age sensitivity weighted average scaling factors. These scaling factors are calculated using the following method, consistent with BAAQMD guidance.

Average daily emission factors are estimated for each TAC for each year following occupancy until 2035, the final year EMFAC2011 estimates emissions. These emission factors are calculated using the same methodology described above, but are estimated using total daily vehicle class percentages instead of hourly percentages. These yearly emission factors are combined with BAAQMD's recommended Age Sensitivity Factors (ASF) to estimate the 70 year ASF-weighted average emission factors, as shown in Appendix Table A.6. The scaling factor is the difference between the weighted emission factor and the emission factor for the first year of occupancy and is shown in Appendix Table A.7.

A.2.7Speciation

The cancer risk and chronic non-cancer indices are based on DPM concentrations from diesel vehicles and TOG concentrations from gasoline vehicles. The maximum modeled annual concentration for DPM, $PM_{2.5}$, hourly concentration for diesel exhaust TOG, and annual and hourly concentrations for gasoline exhaust TOG and gasoline non-exhaust TOG onsite is estimated by CAL3QHCR. To estimate cancer risk and noncancer hazard indices, specific chemical concentrations must be calculated. Diesel exhaust, a complex mixture that includes hundreds of individual constituents,[10] is identified by the State of California as a known carcinogen.[11] Under California regulatory guidelines, diesel particulate matter is used as a surrogate measure of carcinogen exposure for the mixture of chemicals that make up diesel exhaust as a whole.[12] Cal/EPA and other proponents of using the surrogate approach to quantifying cancer risks associated with the diesel mixture indicate that this method is preferable to use of a component-based approach. A component-based approach involves estimating risks for each of the individual components of a mixture. Critics of the component-based approach believe it will underestimate the risks associated with diesel as a whole mixture because the identity of all chemicals in the mixture may not be known and/or exposure and health effects information for all chemicals identified within the mixture may not be available. Furthermore, Cal/EPA has concluded that "potential cancer risk from inhalation exposure to whole diesel exhaust will outweigh the multi-pathway cancer risk from the speciated

[9] Cal/EPA. 2009. Technical Support Document for Cancer Potency Factors: Methodologies for Derivation, Listing of Available Values, and Adjustment to Allow for Early Life Stage Exposures. May.

[10] Cal/EPA, OEHHA. 1998a. Findings of the Scientific Review Panel on The Report on Diesel Exhaust, as adopted at the Panel's April 22, 1998, meeting.

[11] Cal/EPA. 2011. OEHHA/ARB Consolidated Table of Approved Risk Assessment Health Values. February 14. http://www.arb.ca.gov/toxics/healthval/contable.pdf. Accessed July 2011.

[12] Ibid.

components."[13] Because a surrogate approach has not been recommended for effects from gasoline fueled equipment at the time of this report, the component-based approach was used to estimate the effects from the gasoline equipment. To speciate TOG, BAAQMD recommended speciation profiles were used, as shown in Appendix Table A.8.

[13] Cal/EPA. OEHHA. 2003. The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments. August.

Appendix Tables

Appendix Table A.1
Vehicle Classes Considered in Emission Estimation
The Commons at Gateway
Pleasanton, California

Vehicle Class[1]	Fuel	Considered Heavy Duty Truck[2]	Included in Emission Estimation					
			$PM_{2.5}$		DPM[4]	TOG		
			Exhaust[3]	Brake and Tire Ware[3]		Diesel Exhaust[4]	Gasoline Exhaust[5]	Gasoline Evaporative[5]
All Other Buses	Diesel	--	X	X	X	X	--	--
LDA	Gasoline	--	X	X	--	--	X	X
LDA	Diesel	--	X	X	X	X	--	--
LDT1	Gasoline	--	X	X	--	--	X	X
LDT1	Diesel	--	X	X	X	X	--	--
LDT2	Gasoline	--	X	X	--	--	X	X
LDT2	Diesel	--	X	X	X	X	--	--
LHD1	Gasoline	X	X	X	--	--	X	X
LHD1	Diesel	X	X	X	X	X	--	--
LHD2	Gasoline	X	X	X	--	--	X	X
LHD2	Diesel	X	X	X	X	X	--	--
MCY	Gasoline	--	X	X	--	--	X	X
MDV	Gasoline	--	X	X	--	--	X	X
MDV	Diesel	--	X	X	X	X	--	--
MH	Gasoline	--	X	X	--	--	X	X
MH	Diesel	--	X	X	X	X	--	--
Motor Coach	Diesel	--	X	X	X	X	--	--
OBUS	Gasoline	--	X	X	--	--	X	X
PTO	Diesel	X	X	X	X	X	--	--
SBUS	Gasoline	--	X	X	--	--	X	X
SBUS	Diesel	--	X	X	X	X	--	--
T6 Ag	Diesel	X	X	X	X	X	--	--
T6 CAIRP heavy	Diesel	X	X	X	X	X	--	--
T6 CAIRP small	Diesel	X	X	X	X	X	--	--
T6 instate construction heavy	Diesel	X	X	X	X	X	--	--
T6 instate construction small	Diesel	X	X	X	X	X	--	--
T6 instate heavy	Diesel	X	X	X	X	X	--	--
T6 instate small	Diesel	X	X	X	X	X	--	--
T6 OOS heavy	Diesel	X	X	X	X	X	--	--
T6 OOS small	Diesel	X	X	X	X	X	--	--
T6 Public	Diesel	X	X	X	X	X	--	--
T6 utility	Diesel	X	X	X	X	X	--	--
T6TS	Gasoline	X	X	X	--	--	X	X
T7 Ag	Diesel	X	X	X	X	X	--	--
T7 CAIRP	Diesel	X	X	X	X	X	--	--
T7 CAIRP construction	Diesel	X	X	X	X	X	--	--
T7 NNOOS	Diesel	X	X	X	X	X	--	--
T7 NOOS	Diesel	X	X	X	X	X	--	--
T7 other port	Diesel	X	X	X	X	X	--	--
T7 POAK	Diesel	X	X	X	X	X	--	--
T7 POLA	Diesel	X	X	X	X	X	--	--
T7 Public	Diesel	X	X	X	X	X	--	--
T7 Single	Diesel	X	X	X	X	X	--	--
T7 single construction	Diesel	X	X	X	X	X	--	--
T7 SWCV	Diesel	X	X	X	X	X	--	--
T7 tractor	Diesel	X	X	X	X	X	--	--
T7 tractor construction	Diesel	X	X	X	X	X	--	--
T7 utility	Diesel	X	X	X	X	X	--	--
T7IS	Gasoline	X	X	X	--	--	X	X
UBUS	Gasoline	--	X	X	--	--	X	X
UBUS	Diesel	--	X	X	X	X	--	--

Notes:
1. All vehicle classes reported in the SG Module of EMFAC2011.
2. The EMFAC default fleet mix of Heavy Duty Trucks are adjusted for the actual truck percentages on the road.
3. All vehicles considered in $PM_{2.5}$ emissions.
4. Only diesel fueled vehicles are considered when estimating DPM and TOG from diesel emissions.
5. Only gasoline fueled vehicles are considered when estimating TOG from gasoline emissions.

Abbreviations:
DPM - Diesel Particulate Matter
PM - Particulate Matter
TOG - Total Organic Gases

Appendix Table A.2
ARB Truck Temporal Profile
The Commons at Gateway
Pleasanton, California

EMFAC Vehicle Category[1]	Fuel Type	Hour																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
All Other Buses	Diesel	3.77%	2.52%	0	0	0	2.3%	5.48%	2.2%	7.25%	10.22%	6.91%	8.71%	8.15%	7.48%	7.15%	4.28%	7.76%	2.32%	0.69%	0.08%	2.58%	6.35%	3.8%	0
Motor Coach	Diesel	4.000%	1.370%	2.950%	7.069%	3.690%	5.579%	7.969%	6.379%	5.359%	6.269%	6.499%	6.299%	5.639%	5.789%	4.250%	2.610%	3.790%	1.670%	2.640%	1.150%	3.330%	3.130%	1.240%	1.330%
PTO	Diesel	4.000%	1.370%	2.950%	7.069%	3.690%	5.579%	7.969%	6.379%	5.359%	6.269%	6.499%	6.299%	5.639%	5.789%	4.250%	2.610%	3.790%	1.670%	2.640%	1.150%	3.330%	3.130%	1.240%	1.330%
SBUS	Diesel	0	0	0	0	0	0	16.66%	16.67%	16.67%	0	0	0	0	0	0	16.66%	16.67%	16.67%	0	0	0	0	0	0
T6 Ag	Diesel	3.77%	2.52%	0	0	0	2.3%	5.48%	2.2%	7.25%	10.22%	6.91%	8.71%	8.15%	7.48%	7.15%	4.28%	7.76%	2.32%	0.69%	0.08%	2.58%	6.35%	3.8%	0
T6 CAIRP heavy	Diesel	3.77%	2.52%	0	0	0	2.3%	5.48%	2.2%	7.25%	10.22%	6.91%	8.71%	8.15%	7.48%	7.15%	4.28%	7.76%	2.32%	0.69%	0.08%	2.58%	6.35%	3.8%	0
T6 CAIRP small	Diesel	3.77%	2.52%	0	0	0	2.3%	5.48%	2.2%	7.25%	10.22%	6.91%	8.71%	8.15%	7.48%	7.15%	4.28%	7.76%	2.32%	0.69%	0.08%	2.58%	6.35%	3.8%	0
T6 instate construction heavy	Diesel	3.77%	2.52%	0	0	0	2.3%	5.48%	2.2%	7.25%	10.22%	6.91%	8.71%	8.15%	7.48%	7.15%	4.28%	7.76%	2.32%	0.69%	0.08%	2.58%	6.35%	3.8%	0
T6 instate construction small	Diesel	3.77%	2.52%	0	0	0	2.3%	5.48%	2.2%	7.25%	10.22%	6.91%	8.71%	8.15%	7.48%	7.15%	4.28%	7.76%	2.32%	0.69%	0.08%	2.58%	6.35%	3.8%	0
T6 instate heavy	Diesel	3.77%	2.52%	0	0	0	2.3%	5.48%	2.2%	7.25%	10.22%	6.91%	8.71%	8.15%	7.48%	7.15%	4.28%	7.76%	2.32%	0.69%	0.08%	2.58%	6.35%	3.8%	0
T6 instate small	Diesel	3.77%	2.52%	0	0	0	2.3%	5.48%	2.2%	7.25%	10.22%	6.91%	8.71%	8.15%	7.48%	7.15%	4.28%	7.76%	2.32%	0.69%	0.08%	2.58%	6.35%	3.8%	0
T6 OOS heavy	Diesel	3.77%	2.52%	0	0	0	2.3%	5.48%	2.2%	7.25%	10.22%	6.91%	8.71%	8.15%	7.48%	7.15%	4.28%	7.76%	2.32%	0.69%	0.08%	2.58%	6.35%	3.8%	0
T6 OOS small	Diesel	3.77%	2.52%	0	0	0	2.3%	5.48%	2.2%	7.25%	10.22%	6.91%	8.71%	8.15%	7.48%	7.15%	4.28%	7.76%	2.32%	0.69%	0.08%	2.58%	6.35%	3.8%	0
T6 Public	Diesel	3.77%	2.52%	0	0	0	2.3%	5.48%	2.2%	7.25%	10.22%	6.91%	8.71%	8.15%	7.48%	7.15%	4.28%	7.76%	2.32%	0.69%	0.08%	2.58%	6.35%	3.8%	0
T6 utility	Diesel	3.77%	2.52%	0	0	0	2.3%	5.48%	2.2%	7.25%	10.22%	6.91%	8.71%	8.15%	7.48%	7.15%	4.28%	7.76%	2.32%	0.69%	0.08%	2.58%	6.35%	3.8%	0
T7 Ag	Diesel	4.000%	1.370%	2.950%	7.069%	3.690%	5.579%	7.969%	6.379%	5.359%	6.269%	6.499%	6.299%	5.639%	5.789%	4.250%	2.610%	3.790%	1.670%	2.640%	1.150%	3.330%	3.130%	1.240%	1.330%
T7 CAIRP	Diesel	4.000%	1.370%	2.950%	7.069%	3.690%	5.579%	7.969%	6.379%	5.359%	6.269%	6.499%	6.299%	5.639%	5.789%	4.250%	2.610%	3.790%	1.670%	2.640%	1.150%	3.330%	3.130%	1.240%	1.330%
T7 CAIRP construction	Diesel	4.000%	1.370%	2.950%	7.069%	3.690%	5.579%	7.969%	6.379%	5.359%	6.269%	6.499%	6.299%	5.639%	5.789%	4.250%	2.610%	3.790%	1.670%	2.640%	1.150%	3.330%	3.130%	1.240%	1.330%
T7 NNOOS	Diesel	4.000%	1.370%	2.950%	7.069%	3.690%	5.579%	7.969%	6.379%	5.359%	6.269%	6.499%	6.299%	5.639%	5.789%	4.250%	2.610%	3.790%	1.670%	2.640%	1.150%	3.330%	3.130%	1.240%	1.330%
T7 NOOS	Diesel	4.000%	1.370%	2.950%	7.069%	3.690%	5.579%	7.969%	6.379%	5.359%	6.269%	6.499%	6.299%	5.639%	5.789%	4.250%	2.610%	3.790%	1.670%	2.640%	1.150%	3.330%	3.130%	1.240%	1.330%
T7 other port	Diesel	4.000%	1.370%	2.950%	7.069%	3.690%	5.579%	7.969%	6.379%	5.359%	6.269%	6.499%	6.299%	5.639%	5.789%	4.250%	2.610%	3.790%	1.670%	2.640%	1.150%	3.330%	3.130%	1.240%	1.330%
T7 POAK	Diesel	4.000%	1.370%	2.950%	7.069%	3.690%	5.579%	7.969%	6.379%	5.359%	6.269%	6.499%	6.299%	5.639%	5.789%	4.250%	2.610%	3.790%	1.670%	2.640%	1.150%	3.330%	3.130%	1.240%	1.330%
T7 POLA	Diesel	4.000%	1.370%	2.950%	7.069%	3.690%	5.579%	7.969%	6.379%	5.359%	6.269%	6.499%	6.299%	5.639%	5.789%	4.250%	2.610%	3.790%	1.670%	2.640%	1.150%	3.330%	3.130%	1.240%	1.330%
T7 Public	Diesel	4.000%	1.370%	2.950%	7.069%	3.690%	5.579%	7.969%	6.379%	5.359%	6.269%	6.499%	6.299%	5.639%	5.789%	4.250%	2.610%	3.790%	1.670%	2.640%	1.150%	3.330%	3.130%	1.240%	1.330%
T7 Single	Diesel	4.000%	1.370%	2.950%	7.069%	3.690%	5.579%	7.969%	6.379%	5.359%	6.269%	6.499%	6.299%	5.639%	5.789%	4.250%	2.610%	3.790%	1.670%	2.640%	1.150%	3.330%	3.130%	1.240%	1.330%
T7 single construction	Diesel	4.000%	1.370%	2.950%	7.069%	3.690%	5.579%	7.969%	6.379%	5.359%	6.269%	6.499%	6.299%	5.639%	5.789%	4.250%	2.610%	3.790%	1.670%	2.640%	1.150%	3.330%	3.130%	1.240%	1.330%
T7 SWCV	Diesel	4.000%	1.370%	2.950%	7.069%	3.690%	5.579%	7.969%	6.379%	5.359%	6.269%	6.499%	6.299%	5.639%	5.789%	4.250%	2.610%	3.790%	1.670%	2.640%	1.150%	3.330%	3.130%	1.240%	1.330%
T7 tractor	Diesel	4.000%	1.370%	2.950%	7.069%	3.690%	5.579%	7.969%	6.379%	5.359%	6.269%	6.499%	6.299%	5.639%	5.789%	4.250%	2.610%	3.790%	1.670%	2.640%	1.150%	3.330%	3.130%	1.240%	1.330%
T7 tractor construction	Diesel	4.000%	1.370%	2.950%	7.069%	3.690%	5.579%	7.969%	6.379%	5.359%	6.269%	6.499%	6.299%	5.639%	5.789%	4.250%	2.610%	3.790%	1.670%	2.640%	1.150%	3.330%	3.130%	1.240%	1.330%
T7 utility	Diesel	4.000%	1.370%	2.950%	7.069%	3.690%	5.579%	7.969%	6.379%	5.359%	6.269%	6.499%	6.299%	5.639%	5.789%	4.250%	2.610%	3.790%	1.670%	2.640%	1.150%	3.330%	3.130%	1.240%	1.330%

Notes:
1. Percentage of daily VMT for each hour of the day for each vehicle class in HD Module of EMFAC2011, as provided by ARB.

Abbreviations:
ARB - California Air Resources Board
VMT - vehicle miles travelled

Reference:
Personal Communication between Jennie Louie (ENVIRON) and Kathy Jaw (ARB). October 13, 2011.

Appendix Table A.3
Hourly Emission Factors
The Commons at Gateway
Pleasanton, California

Hour	Highway						Surface Streets					
	$PM_{2.5}$		DPM	TOG			$PM_{2.5}$		DPM	TOG		
	Exhaust	Brake and Tire Ware		Diesel Exhaust	Gasoline Exhaust	Gasoline Evaporative	Exhaust	Brake and Tire Ware		Diesel Exhaust	Gasoline Exhaust	Gasoline Evaporative
	g/mile											
1	0.0188	0.0229	0.1062	0.3039	0.0909	0.0865	0.0136	0.0217	0.1082	0.3068	0.0903	0.0859
2	0.0264	0.0269	0.0919	0.2913	0.0938	0.0883	0.0199	0.0251	0.0949	0.2962	0.0924	0.0870
3	0.0292	0.0259	0.0877	0.3031	0.1362	0.1264	0.0236	0.0249	0.0896	0.3065	0.1223	0.1135
4	0.0633	0.0306	0.1140	0.3282	0.1025	0.0955	0.0524	0.0294	0.1152	0.3307	0.0984	0.0916
5	0.0262	0.0244	0.1077	0.3239	0.0989	0.0933	0.0195	0.0234	0.1105	0.3289	0.0955	0.0902
6	0.0238	0.0236	0.1199	0.3244	0.1034	0.0950	0.0174	0.0225	0.1223	0.3286	0.0992	0.0914
7	0.0111	0.0206	0.1207	0.3182	0.0909	0.0860	0.0082	0.0200	0.1232	0.3215	0.0904	0.0856
8	0.0058	0.0193	0.1198	0.3234	0.0901	0.0859	0.0047	0.0191	0.1236	0.3271	0.0898	0.0855
9	0.0067	0.0197	0.1138	0.3052	0.0951	0.0892	0.0053	0.0193	0.1174	0.3095	0.0933	0.0877
10	0.0107	0.0210	0.1155	0.3050	0.0964	0.0902	0.0081	0.0203	0.1189	0.3104	0.0941	0.0883
11	0.0096	0.0207	0.1159	0.3130	0.0946	0.0894	0.0073	0.0201	0.1200	0.3195	0.0927	0.0878
12	0.0085	0.0204	0.1168	0.3098	0.0937	0.0883	0.0066	0.0199	0.1209	0.3162	0.0923	0.0871
13	0.0078	0.0202	0.1202	0.3130	0.0916	0.0871	0.0061	0.0198	0.1249	0.3207	0.0907	0.0863
14	0.0079	0.0203	0.1195	0.3148	0.0928	0.0880	0.0062	0.0199	0.1244	0.3228	0.0915	0.0868
15	0.0064	0.0198	0.1234	0.3152	0.0915	0.0869	0.0052	0.0196	0.1289	0.3244	0.0907	0.0862
16	0.0051	0.0195	0.1238	0.3196	0.0926	0.0876	0.0043	0.0193	0.1305	0.3301	0.0914	0.0866
17	0.0061	0.0198	0.1236	0.3128	0.0949	0.0899	0.0050	0.0195	0.1292	0.3223	0.0929	0.0881
18	0.0043	0.0192	0.1144	0.3175	0.0928	0.0876	0.0038	0.0191	0.1230	0.3286	0.0916	0.0866
19	0.0050	0.0195	0.1177	0.3318	0.0912	0.0865	0.0043	0.0193	0.1259	0.3426	0.0905	0.0859
20	0.0041	0.0192	0.1297	0.3487	0.0915	0.0866	0.0037	0.0192	0.1389	0.3603	0.0907	0.0860
21	0.0076	0.0200	0.1142	0.3158	0.0901	0.0859	0.0059	0.0197	0.1188	0.3224	0.0897	0.0855
22	0.0086	0.0204	0.1183	0.3042	0.0898	0.0857	0.0066	0.0199	0.1222	0.3104	0.0895	0.0854
23	0.0072	0.0204	0.1130	0.3025	0.0906	0.0863	0.0058	0.0199	0.1191	0.3125	0.0900	0.0858
24	0.0058	0.0198	0.1195	0.3408	0.0918	0.0874	0.0049	0.0197	0.1280	0.3532	0.0908	0.0865

Notes:
1. Hourly emission factors estimated using EMFAC2011 as described in the report. Highway emission factors assume 6.5% of vehicles are trucks, while surface street emission factors assume 4.09% of vehicles are trucks.

Abbreviations:
DPM - Diesel Particulate Matter
g - gram
PM - Particulate Matter
TOG - Total Organic Gases

Appendix Table A.4
Traffic Volume Scaling
The Commons at Gateway
Pleasanton, California

Year	EMFAC Total County VMT[1]
2010	39,510,078
2011	39,885,875
2015	41,393,129

Roadway[2]	ADT[3]	Year of Traffic Data[4]	Increase in Traffic in 2015[5]	ADT Modeled[6]
I-680	120,000	2010	104.8%	125,719
I-680 - Northbound Offramp	3,800	2010	104.8%	3,981
I-680 - Northbound Onramp	11,100	2010	104.8%	11,629
I-680 - Southbound Offramp	11,400	2010	104.8%	11,943
I-680 - Southbound Onramp	4,200	2010	104.8%	4,400
Bernal Avenue - West of I-680	20,700	2011	103.8%	21,482
Bernal Avenue - East of I-680	26,500	2011	103.8%	27,501
Valley Avenue - North of Bernal Avenue	4,700	2011	103.8%	4,878
Valley Avenue - South of Bernal Avenue	12,800	2011	103.8%	13,284

Notes:
1. Daily VMT estimated by SG Module of EMFAC2011.
2. All roadways within 1,000 feet of the Project.
3. ADT from highway and ramps obtained from Caltrans and ADT from surface streets obtained from the City of Pleasanton.
4. Year of Traffic Data is the year for which the traffic data is estimated.
5. Increase in Traffic in 2015 is the ratio between 2015 VMT and VMT from the year of traffic data as shown above.
6. Modeled ADT is the 2015 ADT, calculated using the following formula:

[Modeled ADT] = [ADT in year of traffic data] x [Increase in traffic in 2015]

Abbreviations:
I-680 - Interstate 680
ADT - average daily traffic
VMT - vehicle miles travelled

References:
California Department of Transportation's Traffic Data Branch. 2011. Available online: http://traffic-counts.dot.ca.gov/
City of Pleasanton. Traffic Counts Map. Available online: http://www.ci.pleasanton.ca.us/services/traffic/traffic-counts-map.html

Appendix Table A.5
Temporal Profile of Traffic
The Commons at Gateway
Pleasanton, California

Hour	Highway[1]			Surface Streets[1]		
	Percent of Total Traffic[2]	Percent of Hourly Traffic[3]		Percent of Total Traffic[2]	Percent of Hourly Traffic[3]	
		Diesel Fueled	Gasoline Fueled		Diesel Fueled	Gasoline Fueled
1	1.20%	17.6%	82.4%	1.15%	11.8%	88.2%
2	0.46%	29.6%	70.4%	0.42%	21.0%	79.0%
3	0.51%	34.3%	65.7%	0.42%	26.7%	73.3%
4	0.37%	59.6%	40.4%	0.29%	48.4%	51.6%
5	0.56%	24.8%	75.2%	0.51%	17.5%	82.5%
6	0.98%	20.1%	79.9%	0.91%	13.9%	86.1%
7	3.82%	8.3%	91.7%	3.79%	5.5%	94.5%
8	7.70%	3.5%	96.5%	7.79%	2.4%	97.6%
9	7.08%	4.6%	95.4%	7.08%	3.1%	96.9%
10	4.43%	8.3%	91.7%	4.35%	5.6%	94.4%
11	4.71%	7.2%	92.8%	4.66%	4.9%	95.1%
12	5.89%	6.1%	93.9%	5.87%	4.1%	95.9%
13	6.14%	5.3%	94.7%	6.15%	3.6%	96.4%
14	6.04%	5.4%	94.6%	6.03%	3.7%	96.3%
15	6.95%	3.9%	96.1%	7.01%	2.7%	97.3%
16	7.05%	2.7%	97.3%	7.13%	2.0%	98.0%
17	7.36%	3.6%	96.4%	7.37%	2.5%	97.5%
18	8.06%	2.2%	97.8%	8.17%	1.6%	98.4%
19	5.64%	2.8%	97.2%	5.72%	2.0%	98.0%
20	4.21%	1.8%	98.2%	4.29%	1.4%	98.6%
21	3.25%	5.4%	94.6%	3.27%	3.6%	96.4%
22	3.28%	6.2%	93.8%	3.29%	4.1%	95.9%
23	2.44%	5.1%	94.9%	2.46%	3.5%	96.5%
24	1.87%	3.5%	96.5%	1.88%	2.5%	97.5%

Notes:
1. Highway values assume 6.5% of vehicles are trucks (EMFAC2011), while surface street values assume 4.09% (BAAQMD 2012) of vehicles are trucks.
2. Percent of total traffic used to convert ADT to hourly traffic volumes. The percent is calculated using VMT reported in EMFAC2011 and provided by ARB as described in the report.
3. Percent of hourly traffic is used to separate total traffic into diesel and gasoline fueled vehicles. Ratios of VMT are also used to calculate this percent.

Abbreviations:
ADT - average daily traffic
ARB - California Air Resources Board
VMT - vehicle miles travelled

Sources:
BAAQMD. 2012. *Recommended Methods for Screening and Modeling Local Risks and Hazards.* May.

Appendix Table A.6
Age Sensitivity Factors
The Commons at Gateway
Pleasanton, California

Year	ASF	Period	Weighting
2015	10	1	0.14
2016	10	1	0.14
2017	4.75	1	0.068
2018	3	1	0.043
2019	3	1	0.043
2020	3	1	0.043
2021	3	1	0.043
2022	3	1	0.043
2023	3	1	0.043
2024	3	1	0.043
2025	3	1	0.043
2026	3	1	0.043
2027	3	1	0.043
2028	3	1	0.043
2029	3	1	0.043
2030	3	1	0.043
2031	1.5	1	0.021
2032	1	1	0.014
2033	1	1	0.014
2034	1	1	0.014
2035-2084	1	50.25	0.72

Notes:
1. All years between first year of occupancy and the last year for which EMFAC2011 reports information.
2. ASF profile with time, as recommended by BAAQMD. ASFs assume an infant was in the third trimester of pregnancy at first occupancy of the Project. Fraction values take into account the change in ASF in the middle of the year.
3. 2035 information is assumed to represent the remaining years into the 70 year exposure.
4. Weighting is the product of the ASF and period and represents the weighting of each year's emission factor.

Abbreviations:
ASF - Age Sensitivity Factor
BAAQMD - Bay Area Air Quality Management District

Reference:
BAAQMD. 2012. Recommended Methods for Screening and Modeling Local Risks and Hazards. May.

Appendix Table A.7
Emissions Scaling Factors
The Commons at Gateway
Pleasanton, California

Pollutant[2]		Highway[1]	Surface Streets[1]
DPM		1.064	1.069
TOG	Gasoline Exhaust	0.944	0.951
	Gasoline Evaporative	1.131	1.130

Notes:
1. Highway values assume 6.5% of vehicles are trucks, while surface street values assume 4.09% of vehicles are trucks.
2. Scaling factors for all pollutants considered in cancer risk calculation. These factors were calculated using methodologies described in the report.

Abbreviations:
DPM - Diesel Particulate Matter
TOG - Total Organic Gases

Appendix Table A.8
Speciation Profiles
The Commons at Gateway
Pleasanton, California

Chemical	CAS Number	Fraction of TOG		
		Diesel Exhaust[1]	Gasoline Exhaust[2]	Gasoline Evaporative[2]
1,3-Butadiene	106990	--	0.0055	--
Acetaldehyde	75070	0.15942	0.0028	--
Acrolein	107028	0.01297	0.0013	--
Benzene	71432	0.01045	0.0247	0.0036
Ethylbenzene	100414	--	0.0105	0.0012
Formaldehyde	50000	0.08505	0.0158	--
Hexane	110543	--	0.016	0.0154
Methanol	67561	--	0.0012	--
Methyl Ethyl Ketone	78933	--	0.0002	--
Naphthalene	91203	--	0.0005	--
Propylene	115071	--	0.0306	--
Styrene	100425	--	0.0012	--
Toluene	108883	--	0.0576	0.017
Xylenes	10605	--	0.048	0.00578

Notes:
1. All fractions are from USEPA Speciation Profile 4674 for Medium Duty Trucks.
2. All fractions are provided by BAAQMD (BAAQMD 2012).

Abbreviation:
BAAQMD - Bay Area Air Quality Management District
TOG - total organic gas
USEPA - United States Environmental Protection Agency

Reference:
BAAQMD. 2012. Recommended Methods for Screening and Modeling Local Risks and Hazards. May.

Appendix B

Filtration Technical Appendix

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Appendix Table B.1 Air Filtration Parameters

Acronyms and Abbreviations

ACH	Air Changes Per Hour
ARB	California Air Resources Board
ASF	Age Sensitivity Factor
ASHRAE	American Society of Heating, Refrigeration, and Air-Conditioning Engineers
BAAQMD	Bay Area Air Quality Management District
DPM	Diesel Particulate Matter
ENVIRON	ENVIRON International Corporation
HRA	Health Risk Assessment
HVAC	Heating, Ventilation And Air-Conditioning
MERV	Minimum Efficiency Reporting Value
OEHHA	Office of Environmental Health Hazard Assessment, State of California
$PM_{2.5}$	Fine Particulate Matter Less than 2.5 Micrometer in Diameter
USEPA	United States Environmental Protection Agency

B.1. Introduction

As discussed in the body of this report, ENVIRON International Corporation (ENVIRON) prepared a Health Risk Assessment (HRA) for Pleasanton Gateway LLC for The Commons at Gateway Project in Pleasanton, California ("Project"). As part of the HRA, ENVIRON quantified the effect of filtration on the mechanical system of the buildings as mitigation. This appendix discusses the methodology for the quantification of the effect of the filtration.

B.2. Background

Consistent with Bay Area Air Quality Management District (BAAQMD) guidance, the HRA for roadways conservatively quantifies the lifetime excess cancer risk for residents assuming a 70-year *outdoor* exposure. In other words, the resident is assumed to breathe outdoor air at the residence for 70 years, 350 days per year, 24 hours per day.[1] However, when home, residents spend a majority of their time indoors.[2] Typically, the majority of the estimated excess lifetime cancer risk from living near roadways is caused by diesel particulate matter (DPM), which is considered a carcinogen by the state of California.[3] Additionally, fine particulate matter Less than 2.5 Micrometer in Diameter ($PM_{2.5}$), has been shown to cause health problems and is also regulated through state and federal ambient air quality standards. Filtration on the residence's heating, ventilation and air-conditioning (HVAC) system can help reduce the concentration of DPM and $PM_{2.5}$ indoors; reducing a resident's exposure to them and thereby reduce the health impacts from living near roadways.

Regulations guide the design of new residences. For example, those built in California must comply with the California Green Buildings Standards Code, also known as CalGreen,[4] along with other sections of California's Energy Efficiency Standards for Residential and Nonresidential Buildings, also known as Title 24.[5] Residences are currently built to reduce the leakage of outside air in through cracks and holes in the building envelope, in order to conserve energy required for heating and cooling. However, regulations also mandate that fresh air be brought into residences to maintain healthy indoor air quality.[6] Therefore, fresh air is typically brought in through a mechanical ventilation system. Filtration of air flowing through the HVAC system can help reduce concentrations of particulates (such as DPM and $PM_{2.5}$) indoors. The estimated reduction of particulates that can be achieved by a filtration system is influenced by a variety of factors, which requires quantifying unfiltered air entering the building through windows or cracks in the building envelope, evaluating occupant behavior, such as window operations, and understanding the forced ventilation and recirculation flow rates.

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1 California Environmental Protection Agency and California Office of Environmental Health Hazard Assessment. Air Toxics Hot Spots Program Risk Assessment Guidelines: *The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*. 2003.

2 United States Environmental Protection Agency. *Exposure Factors Handbook 2011 Edition* (Final). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-09/052F, 2011.

3 California Air Resources Board. Consol*idated Table of OEHHA/ARB Approved Risk Assessment Health Values*. 2011.

4 California Building Standards Commission. *2010 California Green Building Standards Code: CalGreen. 2010*. California Code of Federal Regulations, Title 24, Part 11.

5 California Energy Commission. *2008 Building Energy Efficiency Standards*. 2008. CEC-400-2008-001-CMF.

6 ASHRAE. *ANSI/ASHRAE Standard 62.2-2010 Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings*. Atlanta, GA: ASHRAE, 2010. ISSN 1041-2336.

This appendix describes the method used to quantitatively assess the reduction of particualte concentration indoors due to filtration on the air intake and recirculation systems and the conservative assumptions used when specific information was unknown.

B.3. General Information

In a simple model, indoor air concentrations could be calculated by applying the filter efficiency to the outdoor particulate concentration. However, this method assumes that all air that enters the building will be filtered. Unfiltered air flows into a building through open windows and doors and through cracks and openings in walls. Also, to accurately represent a resident's exposure to particulates, their exposure during time spent outdoors should be considered. A resident's exposure concentration combines the indoor and outdoor concentrations with assumptions about time spent indoors versus outdoors. To more accurately estimate health impacts indoors, the air flow in and out of a building and window operations, in addition to the filtration of particulates, should be taken into account. For particulates that are not removed via filtration, indoor concentrations can be assumed equal to outdoor concentrations. The approach described here combines hourly outdoor concentrations of particulates estimated through air dispersion modeling, filtration efficiencies, HVAC system characteristics, building characteristics, occupancy behavior, and box model methodologies.

There is a large body of literature published related to filtration of pollutants from air entering the indoor environment from the outdoors. Also, many standards relate to designing a space to reduce the concentration of pollutants indoors. For example, the American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) sets standards with supporting documentation for filtration efficiencies and other HVAC design parameters. These include ASHRAE 52.2-2007,[7] which defines classes of filters and their corresponding filtration limit, and ASHRAE 62.2-2010,[8] which defines the necessary ventilation flow rates into a building. Other articles[9] assert that a box model that accounts for operable windows closely represents the actual concentration flows in an indoor environment. Other literature discusses the mathematical theory used to estimate unsteady state concentrations using box models.[10] There are studies which suggest average time windows are open in residences[11] and standards for temperature control.[12] This approach combines information from the literature to estimate exposure concentrations as a function of hourly outdoor concentration. The outdoor concentration of particulates from roadways was estimated using CAL3QHCR, as described in Appendix A.

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[7] ASHRAE. *ANSI/ASHRAE Standard 52.2-2007 Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size*. Atlanta. 2008. ISSN 1041-2336.

[8] ASHRAE. *ANSI/ASHRAE Standard 62.2-2010 Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings*. Atlanta, GA: ASHRAE, 2010. ISSN 1041-2336.

[9] Hayes, S. R. *Use of an Indoor Air Quality Model to Estimate Indoor Ozone Levels*. AWMA, 1991, Vols. 41:161-170. ISSN 1047-3289.

[10] Nazaroff, William W and Alvarez-Cohen, Lisa. *Environmental Engineering Science*. New York: Jogn Whiley & Sons, 2001. ISBN 0-471-1-14494-0.

[11] Price, Phillip P. and Sherman, Max and Lee, Robert H. and Piazza, Thomas. *Study of Ventilation Practices, and Household Characteristics in New California Home*. California Energy Commission, PIER Program. CEC-500-2007-033. Final Report ARB Contract 03-326.

[12] Western Regional Climate Center. Period of Record General Climate Summary - Heating Degree Days. Available online at: http://www.wrcc.dri.edu/index.html

B.4. Technical Approach

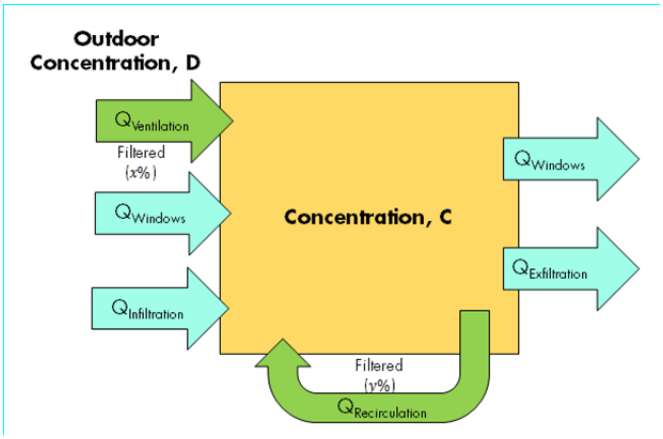
B.4.1. Box Model

The approach used in this analysis to estimate exposure concentrations incorporates an transient (unsteady state) box model. A box model is a steady state or transient mathematical model that can be used to predict concentrations in a specific space. The air flow through a residential unit is a complex system, but this approach assumes instantaneous complete mixing for each hour in order to yield a tractable model and predict reasonable airborne concentrations within the space.[13]

The space considered in this analysis is the indoor environment of the residential unit. While an indoor environment often has different rooms with air that will likely not be completely mixed between the rooms, inhabitants will spend time in different rooms and in different locations in those rooms. Therefore, assuming indoor air is completely mixed allows for reasonable predictions of the overall average concentrations of contaminants to which an inhabitant would be exposed.

The flows into the building that are considered in this model include flows through windows, forced intake of outdoor air through mechanical ventilation, and infiltration through cracks and openings. To balance the system, the flows out of the building must also be considered, which are flows through windows and cracks. Forced air recirculation is also considered. The outdoor air intake and forced recirculation of the mechanical ventilation system is assumed to be filtered, while all other flows are assumed to be unfiltered. Figure 1 shows the air flows through the residence that are considered in the model. Reactions or deposition producing or removing the particlate indoors are not considered in this analysis.

Figure 1. Air Flows Considered in Model.



In this box model, the flows in and out of the space are balanced to avoid assuming the buildup of or reduction in air pressure. Mass balance principles are used to form a first order differential equation to estimate a rate of change of the particulate concentration. This differential equation

[13] Hayes, S. R. *Use of an Indoor Air Quality Model to Estimate Indoor Ozone Levels*. AWMA, 1991, Vols. 41:161-170. ISSN 1047-3289.

is solved to produce an equation of concentration with time based on the flows of air through the space.

A mass balance with time of this system is represented by:

$$\frac{dCV}{dt} = Q_{in}C_{in} - Q_{out}C \qquad \textbf{(Eq. 1)}$$

Where:

Q_{in}	= Flow of air into the space [volume/time]
Q_{out}	= Flow of air out of the space [volume/time]
C_{in}	= Concentration of particulate in the air entering the space [mass/volume]
C	= Concentration of particulates in the space [mass/volume]
V	= Volume of space [volume]

The mass balance of the air flows through the area in question yields the following:

$$\frac{dCV}{dt} = C_{in}\left(Q_{Ventilation}(1-x) + Q_{Windows} + Q_{Infiltration}\right) - C\left(Q_{Windows} + Q_{Exfiltration} + Q_{Recirculation} - Q_{Recirculation}(1-y)\right) \qquad \textbf{(Eq. 2)}$$

Where:

C	= Indoor concentration of pollutant [mass/volume]
$Q_{Windows}$	= Flow rate through open windows [volume/time]
$Q_{Infiltration}$	= Flow rate through infiltration [volume/time]
$Q_{Exfiltration}$	= Flow rate through exfiltration [volume/time]
$Q_{Recirculation}$	= Flow rate through recirculation [volume/time]
$Q_{Ventilation}$	= Flow rate through forced ventilation of outdoor air [volume/time]
t	= Time [time]
V	= Volume of unit [volume]
x	= Fractional removal of particulates through filter on ventilation
y	= Fractional removal of particulates through filter on recirculation

The solution to differential equation for the concentration C at time t is:

$$C(t) = C_o \exp\left[-\frac{\left(Q_{Windows} + Q_{Infiltration} + Q_{Recirculation} - Q_{Recirculation}(1-y)\right)}{\mathrm{V}} * (\mathrm{t} - t_o)\right] + \frac{C_{in}\left(Q_{Ventilation}(1-x) + Q_{Windows} + Q_{Infiltration}\right)}{\left(Q_{Windows} + Q_{Exfiltration} + Q_{Recirculation} - Q_{Recirculation}(1-y)\right)} * (1 - \exp[-\left(Q_{Windows} + Q_{Exfiltration} + Q_{Recirculation} - Q_{Recirculation}(1-y)\right)/V * (t - t_o)]) \qquad \textbf{(Eq. 3)}$$

Where:

Co	= Concentration of particulates at t_0 [mass/volume]
t	= Time elapsed since t_0 [time]
t_0	= Initial time [time]

B.4.2. Hourly Calculations

To account for the hourly fluctuations of each parameter when calculating yearly average concentrations, the concentration equation is solved for every hour of the year, with the initial indoor concentration for each hour being equal to that at the end of the previous hour. The outdoor concentration of a pollutant varies with time based on meteorological conditions and emission rates. Flows through the residential unit can also change based on meteorological conditions or occupancy behavior, such as window openings. This hourly calculation allows for the pairing of the changes in different parameters with time to estimate a more accurate annual average concentration.

This approach also allows for an assumption that residents will be outside for a certain number of hours of the day, and hence would be exposed to outdoor concentrations during this time. In addition, this approach allows for the consideration of unfiltered particulates. The time spent outside by age group was obtained from United States Environmental Protection Agency (USEPA's) Exposure Factor Handbook[14] and weighted by years in each age bin and the age sensitivity factor. This equates to approximately 3 hours outside per day, which is conservative as all this time will not be spent at the proposed site. These three hours were chosen at random between 8AM and 8PM.

B.4.3. Flow Assumptions

The flow rate through windows can vary based on whether windows are open and the hourly wind characteristics. The approach described in this study assumes residents will open windows when temperature falls within a specific range, as shown in Appendix Table B.1. The flow of air through open windows in a building varies greatly with wind speed, direction of windows with respect to the wind, and the size of the windows.[15] Because the information about window design is not always known, assumptions were made for an average flow rate through the windows. For this analysis, flows through open windows was conservatively assumed to be 0.5 air changes per hour (ACH), which is greater than the 50th percentile flow through windows for buildings in the west region from USEPA's Exposure Handbook.[16]

The flow rates of recirculation and ventilation could vary based on how the HVAC system is designed and operated. For this analysis, the flow rate of ventilation is calculated assuming compliance with Section 4.1 of the ASHRAE 62.2 Standard, as described in Appendix Table B.1. Air is assumed to flow through the recirculation system and filter when the resident is heating or cooling the unit, which is assumed to be when the temperature falls within a specific range, as shown in Appendix Table B.1. The recirculation flow rate was assumed based on likely recirculation rates provided in conversation with HVAC engineers.

The flow rate through infiltration can be determined using knowledge of air leakage areas of the building,[17] energy efficiency standards,[18] or tests of building infiltration. Because the buildings

[14] USEPA. 2011. Exposure Factors Handbook. EPA/600/R-09/052F. September.
[15] ASHRAE. *1997 ASHRAE Handbook Fundamentals*. Atlanta, GA: ASHRAE, 1997.
[16] USEPA. 2011. Exposure Factors Handbook. EPA/600/R-09/052F. September.
[17] ASHRAE. *1997 ASHRAE Handbook Fundamentals*. Atlanta, GA: ASHRAE, 1997.
[18] California Energy Commission. *2008 Building Energy Efficiency Standards*. 2008. CEC-400-2008-001-CMF.

are not constructed yet, the air permeability requirement mentioned in the ASHRAE 62.1 User's Guide[19] was assumed to be characteristic of the buildings, as described in Appendix Table B.1.

The filtration efficiency is dependent on the type of filtration technology used. To filter particulates, the Minimum Efficiency Reporting Value (MERV) rating can be used. The MERV rating is a scale that describes the effectiveness of air filters. The MERV rating ranges from 1 to 16, with a higher rating corresponding to a smaller minimum particle size captured by the filter.[20] For this analysis, MERV 13 filters were assumed to be installed on the recirculation and ventilation flows into all of the building.

It is important to note that the required filtration efficiency necessary to reduce impacts will depend on the final building design (e.g. ventilation and recirculation system) and individual residence design (e.g. size, location within the building). The air filtration analysis presented here was based on preliminary information provided by Pleasanton Gateway LLC on location and dimensions of residential buildings and ventilation and recirculation rates consistent with ASHRAE 62.2-2010[21] which is required under the 2010 California Green Building Standards Code (also known as CALGreen).[22]

B.5. Summary

The annual average filtered particulate concentration over all hours of the year would be used to estimate excess lifetime cancer risks and compared to thresholds. This risk takes into account residents' time outside and hourly changes in meteorology, window openings, and heating and cooling recirculation.

[19] ASHRAE. 2011 62.1 User's Manual. ANSI/AHSRAE Standard 62.1-2010. *Ventilation for Acceptable Indoor Air Quality*.

[20] ASHRAE. *ANSI/ASHRAE Standard 52.2-2007 Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size*. Atlanta. 2008. ISSN 1041-2336.

[21] American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE). 2010. ANSI/ASHRAE Standard 62.2-2010 Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings. Atlanta, GA: ISSN 1041-2336.

[22] California Building Standards Commission (CBSC). 2010. 2010 California Green Building Standards Code (CALGreen). California Code of Regulations, Title 24, Part 11. June.

Appendix Tables

Appendix Table B.1
Air Filtration Parameters
The Commons at Gateway
Pleasanton, California

Mechanical System Considerations:

Flow	Air Origin	Percent of DPM Filtered[5]	Flow Rate m^3/hr
Ventilation[1], $Q_{ventilation}$	Outdoors	90%	59
Windows[2], $Q_{windows}$	Outdoors	--	153
Infiltration[3], $Q_{infiltration}$	Outdoors	--	8
Recirculation[4], $Q_{recirculation}$	Indoors	90%	1020

Site Information:

Parameter	Value	Units
Height of Ceiling[6]	9	ft
Time Outdoors	3	hrs/day
Minimum Temperature Windows Open[8]	65	F
Minimum Temperature Windows Open[8]	80	F
High Temperature for Heating[9]	55	F
Low Temperature for AC[9]	80	F

Ventilation Assumptions:

Parameter	Value	Units
Vented Flow Rate	80	cfm
Home size	1200	ft^2
Bedrooms	2	
Time Venting	26	min/hr
Flow Rate of Ventilation	59	m^3/hour

Outdoor Time:

Age bin	Time outdoors minutes/day	ASF	Time years
Birth to <1 month	0	10	0.08
1 to <3 months	8	10	0.17
3 to <6 months	26	10	0.25
6 to <12 months	139	10	0.5
1 to <2 years	36	10	1
2 to <3 years	76	3	1
3 to <6 years	107	3	3
6 to <11 years	132	3	5
11 to <16 years	100	3	5
16 to <21 years	102	1	5
18 to <65 years	281	1	47
>= 65 years	298	1	5
Time weighted average		177	minutes/day
Approximate Average Daily Outdoors Time		3	hours/day

Notes:

1. Ventilation flow rate found using Ventilation Assumptions. The flow rate of ventilation is calculated assuming compliance with ASHRAE 62.2 Standard. Section 4.1 of ASHRAE 62.2 states that the flow rate of outdoor air at each hour must be no less than the rate specified in the equation below. The flow rate per minute is fixed, so the ventilation only operates for part of the hour to achieve compliance with this standard, as shown in the Ventilation Assumptions. The flow rate per minute is based on the design of the ducts.

$$Q_{Ventilation} = 0.01A_{floor} + 7.5(N_{br} + 1)$$

Where:

A_{floor} = floor area, ft^2

N_{br} = number of bedrooms

2. Flow rate through windows is found assuming an air exchange rate through windows of 0.5 air changes per hour, which is greater than the 50th percentile air exchange rate for buildings in the west region from EPA's Exposure Handbook.

3. Infiltration rate is based on an infiltration rate of 0.4 cfm/ft^2 of occupiable area, as mentioned in ASHRAE 62.1 User's Manual as the permeability of most energy efficiency codes.

4. Recirculation rate assumes the same flow rate per minute as the ventilation flow rate. This calculation assumes recirculation occurs when ventilation does not.

5. Filtration percentages consistent with minimum removal of DPM with a MERV-13 rated filter.

6. Approximate height of residential ceilings.

7. Time spent outdoors calculated by weighing time spent outdoors by age bin found in EPA's Exposure Factors Handbook by the time in that age bin and the age sensitivity factor associated with each age bin as shown in the Outdoor Time section. The hours the resident spends outside each day is assigned randomly between 8AM and 8PM each day. During these hours, the resident is assumed to be exposed to concentrations of air toxics predicted for the courtyard area of the Project.

8. Residents are assumed to open their windows whenever the outdoor temperature is between the minimum and maximum temperature shown here.

Appendix C

Stationary Source Inquiry Data

Appendix C.1

Bernal Corners/Chevron Gas GDF Information Provided by BAAQMD

MEMO
3/27/03

TO : MR.MADHAV PATIL, TOXICS

FROM : MR.HARI S. DOSS VIA MR.BRIAN BATEMAN, MANAGER, AIR TOXICS SECTION

SUBJECT: Risk screening for BERNAL CORNERS GDF; GDF# 10915;Application# 7133;

BACKGROUND:

The permit application is for an increase in throughput. The operation results in the emission of Benzene. Risk screen was performed using ISCST-3 to determine the maximum ground level concentration with emissions based on 1 million gallon per year throughput. The Unloading and Breathing losses were analyzed as point sources and Refueling and Spillage losses were analyzed as volume source with release heights of 1 meter and 0 meters respectively. Pleasanton met data is utilized to in the model

EMISSION DATA:

The following emission rate for 1 million gallon of reformulated gasoline is used to determine the maximally exposed receptor.

BALANCED SYSTEM WITH 95 % CONTROL BENZENE EMISSIONS:

UNLOADING LOSS:	=	3.63 E-6 GMS/SEC
BREATHING LOSS:	=	1.08 E-6 GMS/SEC
POINT SOURCE TOTAL	=	4.71 E-6 GMS/SEC
REFUELING LOSS:	=	3.21 E-5 GMS/SEC
SPILLAGE LOSS:	=	6.05 E-5 GMS/SEC

CONCLUSION:

The increased risk to the maximally exposed Residential receptor is 1.8 in a million for 1 million gallon per year throughput Thus in accordance with the Toxic Section Risk Management Policy the screen passes for 1 million gallon throughput. The throughput corresponding to the passing risk of 10 in a million is calculated and presented below.

ALLOWABLE THROUGHPUT:

Allowable throughput of reformulated gasoline is:
5.711 gallons per year

MM-gal/yr.

Appendix C.2

Safeway GDF Information Provided by BAAQMD

ALAMEDA COUNTY
Tom Bates
Scott Haggerty
Jennifer Hosterman
Nate Miley
(Secretary)

CONTRA COSTA COUNTY
John Gioia
(Chairperson)
David Hudson
Mary Piepho
Mark Ross

MARIN COUNTY
Katie Rice

NAPA COUNTY
Brad Wagenknecht

SAN FRANCISCO COUNTY
John Avalos
Edwin M. Lee
Eric Mar

SAN MATEO COUNTY
Carole Groom
Carol Klatt

SANTA CLARA COUNTY
Susan Garner
Ash Kalra
(Vice-Chair)
Liz Kniss
Ken Yeager

SOLANO COUNTY
James Spering

SONOMA COUNTY
Susan Gorin
Shirlee Zane

Jack P. Broadbent
EXECUTIVE OFFICER/APCO

December 11, 2012

LHB & Associates, Ltd.
867 Pacific Street, Ste. 120
San Luis Obispo, CA 93401

Attention: JR (Robert) Beard

For Facility ID: 200004
Safeway Fuel Center #2856
6782 Bernal Avenue
Pleasanton, CA 94566

Authority to Construct for Permit Application No. 401137, Facility No. 200004

Approved Devices

This is your Authority to Construct (A/C) the following project:

Build new site with Phase I OPW EVR and Phase II VST with Carbon Canister and Veeder-Root ISD EVR. Install new underground storage tanks as described below. No other modifications are authorized. This A/C will supercede A/C #203845.

The BAAQMD has granted this Authority to Construct for the following Device(s):

S1; GDF; Gasoline Dispensing Operation

Nozzle Information:

Nozzle Product Type:	Quantity
Gasoline – Triple Product	18
Diesel	18

Tank and Vapor Recovery Information:

Tank Volume (Gallons)	Phase I Type	Phase II Type	Material
30,000	OPW EVR (VR-102)	VST with Carbon Canister and Veeder Root ISD EVR (VR-204)	Gasoline
12,000	OPW EVR (VR-102)	VST with Carbon Canister and Veeder Root ISD EVR (VR-204)	Gasoline
10,000	OPW EVR (VR-102)	VST with Carbon Canister and Veeder Root ISD EVR (VR-204)	Gasoline
8,000	None-Exempt Material	None-Exempt Material	Diesel

Contact Information

If you have any questions, please contact your assigned Permit Engineer:

Mark Tang, Air Quality Permit Technician II

Tel: (415) 749-4905 **Fax:** (415) 749-4949 **Email:** mtang@baaqmd.gov

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Authority to Construct Conditions

1. The Phase I equipment shall be installed in accordance with the applicable California Air Resources Board (CARB) Executive Order: VR-101 (Phil-Tite EVR Phase I systems), VR-102 (OPW EVR Phase I systems), VR-103 (EBW EVR Phase I systems) or VR-104 (CNI EVR Phase I systems).
2. The VST EVR Phase II Vapor Recovery System with ISD shall be installed, operated, and maintained in accordance with the System Operating Manual approved by CARB.

Start-up Testing Requirements

These are required prior to issuing a Permit to Operate:

The following performance tests shall be successfully conducted at least ten (10) days, but no more than thirty (30) days after start-up. For the purpose of compliance with this Condition, all tests shall be conducted after back-filling, paving, and installation of all required Phase I and Phase II components:

1. **Phase I Adaptor Static Torque Test on all rotatable Phase I adaptors in accordance with CARB TP-201.3 at least once in each 36-month period.**
2. **One of the following tests in each 36-month period. The measured leak rate for each component shall be within the limits set in the applicable CARB Executive Order:**
    1. **Stations equipped with drop tube overfill prevention devices (""flapper valves""): a Drop Tube Overfill Prevention Device and Spill Container Drain Valve Leak Test in accordance with CARB Test Procedure TP-201.1D and the applicable CARB Executive Order.**
    2. **All other stations: a Drop Tube/Drain Valve Assembly Leak Test in accordance with CARB Test Procedure TP-201.1C and the applicable CARB Executive Order.**
3. **Phase I Adaptor Static Torque Test on all rotatable Phase I adaptors in accordance with CARB TP-201.3 at least once in each 36-month period.**
4. **One of the following tests in each 36-month period. The measured leak rate for each component shall be within the limits set in the applicable CARB Executive Order:**
5. **Stations equipped with drop tube overfill prevention devices (""flapper valves""): a Drop Tube Overfill Prevention Device and Spill Container Drain Valve Leak Test in accordance with CARB Test Procedure TP-201.1D and the applicable CARB Executive Order.**
6. **All other stations: a Drop Tube/Drain Valve Assembly Leak Test in accordance with CARB Test Procedure TP-201.1C and the applicable CARB**

Executive Order.**Static Pressure Performance Test using CARB Test Procedure TP-201.3 (3/17/99) in accordance with E.O. VR-203, Ex. 4. If the tank size is 500 gallons or less, the test shall be performed on an empty tank.**

7. **Dynamic Back Pressure Test using CARB Test Procedure TP-201.4 (7/3/02) in accordance with the condition listed in item 1 of the Vapor Collection Section of E.O. VR-204, Exhibit 2. The dynamic back pressure shall not exceed 0.35" WC @ 60 CFH and 0.62" WC @ 80 CFH.**
8. **Liquid Removal Test using E.O. VR-204, Exhibit 5.**
9. **Vapor Pressure Sensor Verification Test using E.O. VR-204, Exhibit 8**
10. **Nozzle Bag Test on all nozzles in accordance with E.O. VR-204, Exhibit 10.**
11. **Veeder-Root Vapor Polisher Operability Test in accordance with E.O. VR-204, Exhibit 11.**
12. **Veeder-Root Vapor Polisher Emissions Test in accordance with E.O. VR-204, Exhibit 12.**
13. **ISD Vapor Flow Meter Operability test in accordance with E.O. VR-204, Ex. 13**

Operating Conditions

These Conditions will be made a part of the Permit to Operate:

1. The amount of fuel dispensed at this source shall not exceed the following limits during any consecutive 12-month period:
   - 13.6 million Gallons of Gasoline - unleaded

2. The owner/operator of the source shall complete source testing per the applicable Executive Order. The owner/operator shall notify BAAQMD Source Test Division and submit source test results.

3. The Phase I OPW EVR shall be installed, operated, and maintained in accordance with the most recent revision of the California Air Resources Board (CARB) Executive Order (EO) VR-102.

4. The Phase II VST with Carbon Canister & ISD EVR shall be installed, operated, and maintained in accordance with the most recent revision of the California Air Resources Board (CARB) Executive Order (EO) VR-204.

5. The applicant shall notify Source Test by email at gdfnotice@baaqmd.gov or by FAX at (510) 758-3087, at least 48 hours prior to any testing required for permitting. Test results for all performance tests shall be submitted in a District-approved format within thirty days of testing. Start-up tests results submitted to the District must include the application number and the GDF number. (For annual test results submitted to the District, enter ""Annual"" in lieu of the application number.) Test results may be submitted by email (gdfresults@baaqmd.gov), FAX (510) 758-

3087) or mail (BAAQMD Source Test Section, Attention Hiroshi Doi, 939 Ellis Street, San Francisco CA 94109).

6. The owner/operator shall conduct and pass the following tests at the indicated intervals:
    - A Static Pressure Performance Test, in accordance with CARB procedure TP-201.3 or the applicable equivalent District test procedure (ST-30) at least once in each 12-month period. If the tank size is 500 gallons or less, the test shall be performed on an empty tank.
    - Phase I Adaptor Static Torque Test on all rotatable Phase I adaptors in accordance with CARB TP-201.3 at least once in each 36-month period.
    - One of the following tests in each 36-month period. The measured leak rate for each component shall be within the limits set in the applicable CARB Executive Order:
        i. Stations equipped with drop tube overfill prevention devices (""flapper valves""): a Drop Tube Overfill Prevention Device and Spill Container Drain Valve Leak Test in accordance with CARB Test Procedure TP-201.1D and the applicable CARB Executive Order.
        ii. All other stations: a Drop Tube/Drain Valve Assembly Leak Test in accordance with CARB Test Procedure TP-201.1C and the applicable CARB Executive Order.

7. The VST EVR Phase II system with the Veeder-Root Vapor Polisher and ISD shall be capable of demonstrating on-going compliance with the vapor integrity requirements of CARB Executive Order E.O. VR-204. The owner or operator shall conduct and pass the following tests at least once in each consecutive 12-month period following successful completion of start-up testing. Tests shall be conducted and evaluated using the below referenced test methods and standards:
    - Dynamic Back Pressure Test - TP-201.4 (7/3/02) in accordance with the condition listed in item 1 of the Vapor Collection Section of E.O. VR-204, Exhibit 2. The dynamic back pressure shall not exceed 0.35"" WC @ 60 CFH and 0.62"" WC @ 80 CFH
    - Liquid Removal Test in accordance with E.O. VR-204, Option 1 (Only test hoses containing more than 25 ml liquid)
    - Vapor Pressure Sensor Verification Test in accordance with E.O. VR-204
    - Veeder-Root Vapor Polisher Operability Test. in accordance with E.O. VR-204
    - Veeder-Root Vapor Polisher Emissions Test in accordance with E.O. VR-204
    - ISD Vapor Flow Meter Operability Test in accordance with E.O. VR-204

8. The owner/operator shall maintain the following monthly records in a District-approved log for at least 24 months from the date of entry (60

months if the facility has been issued a Title V or Synthetic Minor Permit). Log entries shall be retained on-site, either at a central location or at the engine's location, and made immediately available to the District staff upon request.

- Daily hours of operation.
- Daily consumption of fuel (in gallons or scf).
- Hours and amount of fuel in parts a) and b) shall be totaled on a rolling consecutive 12-month basis.

Start-up Requirements

This Authority to Construct is not a Permit to Operate**. The Authority to Construct requires that you do the following:**

1. Complete a Start-up Notification Form for each approved device.
2. Send the Start-up Notification Form(s) to the assigned Permit Engineer via e-mail, fax or mail **at least seven days** prior to operating your equipment.
3. Fulfill any Start-up Conditions (such as Start-up Source Test Requirements) required for any of the approved devices.

A Permit to Operate will not be issued without completeing these steps.

Authorization of Limited Use

The Authority to Construct authorizes operation during the start-up period from the date of initial operation indicated in your Start-up Notification until the Permit to Operate is issued, up to a maximum of 90 days. All conditions included in this Authority to Construct will be in effect during the start-up period.

Right of Access

In accordance with Regulation 1-440, BAAQMD shall be granted the right of access to any premises on which an air pollution source(s) located for the purposes of:

a) The inspection of the source,

b) The sampling of materials used at the source,

c) The conduct of an emission source test, and

d) The inspection of any records required by BAAQMD rule or permit condition.

Compliance with BAAQMD, State and Federal Rules and Regulations

This Authority to Construct does not authorize violations of the rules and regulations of BAAQMD (these may be viewed at www.baaqmd.gov), California or Federal law. Compliance with conditions in this permit does not mean that the permit holder is currently in compliance with BAAQMD Rules and Regulations. It is the responsibility of the permit holder to have knowledge of and be in compliance with all applicable rules and regulations.

Authority to Construct

This Authority to Construct expires two years from the issuance date unless the Authority to Construct has been renewed in accordance with Regulation 2-1-407.

Period

***Note**: This Authority to Construct does not modify or extend deadlines to comply with applicable BAAQMD, State or Federal requirements.*

Instructions for AC Renewal

To renew your Authority to Construct send a detailed request letter stating how you meet the requirements of 2-1-407 to the Permit Engineer.

Public Records Notice

Unless you have already designated specifically identified materials in your permit application as trade secret, or confidential under the California Public Record Act, all data in your permit application, the permit itself, and all permit conditions will be considered a matter of public record and may be disclosed to a third party.

Jack P. Broadbent
Executive Officer/APCO

By Engineering Division

Appendix C.3

City of Pleasanton Generator Information Provided by BAAQMD

INTEROFFICE MEMO

DATE: **April 21, 2005**

TO: **Raymond Salalila**

THRU: **Scott Lutz**

THRU: **Daphne Chong**

FROM: **Catherine Fortney**

SUBJ: **Application #12285; CITY OF PLEASANTON**

P#16937, City of Pleasanton, has made an application for a standby generator, to be located adjacent to its new firestation #4 in Pleasanton. The engine has been certified by the California Air Resources Board under Executive Order U-R-014-0072, as a member of the EPA/CARB family 4VPXL07.3ACB. For calculating emissions from this engine, ISO 8178 D2 cycle weighted emission factors for all criteria pollutants except SO2 were provided by the engine manufacturer. The engine has PM emissions of 0.079 g/bhp-hr, and NOx emissions of 3.53 g/bhp-hr and thus meet the District's BACT/TBACT standards for large compression ignition internal combustion engines.

The District uses PM emissions as a proxy for toxic emission exposure to surrounding residential and industrial populations. A PM emissions level of 0.64 lbs/year automatically triggers a health risk assessment according to the District Risk Management Policy. At a maximum 50 hours per year permitted operation of this engine, this application exceeds a PM emission level of 0.64 lbs/year and so requires that a health risk assessment be performed.

Source 1 is a Kohler Model 200REOZD generator with a Volvo Model TAD741GE engine, rated at 316 BHP at standby. At 0.079 g/bhp-hr and 316 bhp, the annualized maximum total PM emissions for 50 hours per year operation are

316 bhp*0.079 g/bhp-hr* 50 hr/yr / 365.25 days/yr /24 hr/day /3600 sec/hr = 3.955 E^{-5} g/sec

The emissions will exit through a 8" stack, located 9 feet above ground. The stack is vertical with a raincap.

Because no representative meteorological data was available for this site, an ISCST3 model for PM10 exposure was used to estimate maximum 1-hour average ambient PM10 concentrations. Annual average concentrations were estimated to be equal to ten percent of the predicted maximum 1-hour maximum average concentration at each receptor. Distance and directionality were used as the primary considerations to determine sites of maximum exposure. Residential risk is based on a continuous 70-year exposure to annual average pollutant concentrations. Off-site worker risk is based on a worker exposed for 5 days per week, 8 hours per day, 48 weeks per year for 46 years out of a 70-year lifetime.

The immediate vicinity is mostly residential and industrial, with the closest residential receptor approximately 132 feet from the source. A full screen model was used to estimate average ground level concentrations of PM in the immediate vicinity of the facility.

At 50 hr/year operation, the generator would result in an annual maximum residential GLC of 0.0304 μg/m3, resulting in a carcinogenic risk of approximately 9.12 in a million, with an associated health hazard index significantly less than 1.0. These numbers are consistent with the District's Risk Management Policy. I recommend that the generator be approved for construction as proposed.

B.2 - CalEEMod Outputs

21480008 Commons at Gateway

Alameda County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric
Apartments Mid Rise	210	Dwelling Unit
Single Family Housing	97	Dwelling Unit

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Utility Company**	Pacific Gas & Electric Company
Climate Zone	4	**Precipitation Freq (Days)**	63		

1.3 User Entered Comments

Project Characteristics -

Land Use - Total residences include 210 apartments, 62 three story single family homes, and 35 two story single family homes.

Construction Phase - Default construction schedule assumed beginning August 2013.

Off-road Equipment - ARB Offroad App D Load Factors
Vechicle Emission Factors - VPRA Residential Fleet Mix

Woodstoves - Altered the amount of woodburning stoves and fireplaces.

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2013	9.56	2.85	2.45	0.00	0.34	0.16	0.50	0.11	0.16	0.27	0.00	385.38	385.38	0.04	0.00	386.13
2014	0.58	3.27	3.60	0.01	0.26	0.20	0.45	0.01	0.20	0.21	0.00	570.95	570.95	0.05	0.00	571.93
Total	**10.14**	**6.12**	**6.05**	**0.01**	**0.60**	**0.36**	**0.95**	**0.12**	**0.36**	**0.48**	**0.00**	**956.33**	**956.33**	**0.09**	**0.00**	**958.06**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	3.41	0.05	3.55	0.00		0.00	0.21		0.00	0.21	25.96	111.98	137.95	0.13	0.00	141.24
Energy	0.03	0.28	0.12	0.00		0.00	0.02		0.00	0.02	0.00	726.10	726.10	0.02	0.01	730.60
Mobile	2.01	2.49	19.32	0.02	2.48	0.10	2.58	0.10	0.10	0.20	0.00	2,171.47	2,171.47	0.11	0.00	2,173.76
Waste						0.00	0.00		0.00	0.00	43.22	0.00	43.22	2.55	0.00	96.87
Water						0.00	0.00		0.00	0.00	0.00	44.55	44.55	0.61	0.02	62.34
Total	**5.45**	**2.82**	**22.99**	**0.02**	**2.48**	**0.10**	**2.81**	**0.10**	**0.10**	**0.43**	**69.18**	**3,054.10**	**3,123.29**	**3.42**	**0.03**	**3,204.81**

3.0 Construction Detail

3.2 Site Preparation - 2013

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.09	0.00	0.09	0.05	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.05	0.44	0.24	0.00		0.02	0.02		0.02	0.02	0.00	39.10	39.10	0.00	0.00	39.19
Total	**0.05**	**0.44**	**0.24**	**0.00**	**0.09**	**0.02**	**0.11**	**0.05**	**0.02**	**0.07**	**0.00**	**39.10**	**39.10**	**0.00**	**0.00**	**39.19**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.90	0.90	0.00	0.00	0.90
Total	**0.00**	**0.00**	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.90**	**0.90**	**0.00**	**0.00**	**0.90**

3.3 Grading - 2013

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.13	0.00	0.13	0.05	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.11	0.88	0.50	0.00		0.04	0.04		0.04	0.04	0.00	85.75	85.75	0.01	0.00	85.93
Total	**0.11**	**0.88**	**0.50**	**0.00**	**0.13**	**0.04**	**0.17**	**0.05**	**0.04**	**0.09**	**0.00**	**85.75**	**85.75**	**0.01**	**0.00**	**85.93**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.99	2.99	0.00	0.00	3.00
Total	**0.00**	**0.00**	**0.02**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**2.99**	**2.99**	**0.00**	**0.00**	**3.00**

3.4 Building Construction - 2013

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.18	1.18	0.84	0.00		0.08	0.08		0.08	0.08	0.00	126.26	126.26	0.01	0.00	126.57
Total	**0.18**	**1.18**	**0.84**	**0.00**		**0.08**	**0.08**		**0.08**	**0.08**	**0.00**	**126.26**	**126.26**	**0.01**	**0.00**	**126.57**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.02	0.25	0.15	0.00	0.01	0.01	0.02	0.00	0.01	0.01	0.00	37.96	37.96	0.00	0.00	37.98
Worker	0.07	0.07	0.66	0.00	0.10	0.00	0.11	0.00	0.00	0.01	0.00	86.34	86.34	0.01	0.00	86.46
Total	**0.09**	**0.32**	**0.81**	**0.00**	**0.11**	**0.01**	**0.13**	**0.00**	**0.01**	**0.02**	**0.00**	**124.30**	**124.30**	**0.01**	**0.00**	**124.44**

3.4 Building Construction - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.37	2.44	1.84	0.00		0.16	0.16		0.16	0.16	0.00	281.03	281.03	0.03	0.00	281.66
Total	**0.37**	**2.44**	**1.84**	**0.00**		**0.16**	**0.16**		**0.16**	**0.16**	**0.00**	**281.03**	**281.03**	**0.03**	**0.00**	**281.66**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.04	0.51	0.30	0.00	0.03	0.02	0.04	0.00	0.02	0.02	0.00	84.57	84.57	0.00	0.00	84.61
Worker	0.13	0.14	1.32	0.00	0.23	0.01	0.24	0.01	0.01	0.02	0.00	188.15	188.15	0.01	0.00	188.39
Total	**0.17**	**0.65**	**1.62**	**0.00**	**0.26**	**0.03**	**0.28**	**0.01**	**0.03**	**0.04**	**0.00**	**272.72**	**272.72**	**0.01**	**0.00**	**273.00**

3.5 Architectural Coating - 2013

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	9.12					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.00	0.03	0.02	0.00		0.00	0.00		0.00	0.00	0.00	2.39	2.39	0.00	0.00	2.40
Total	**9.12**	**0.03**	**0.02**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**	**0.00**	**2.39**	**2.39**	**0.00**	**0.00**	**2.40**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.69	3.69	0.00	0.00	3.70
Total	**0.00**	**0.00**	**0.03**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**3.69**	**3.69**	**0.00**	**0.00**	**3.70**

3.6 Paving - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.03	0.19	0.12	0.00		0.02	0.02		0.02	0.02	0.00	15.75	15.75	0.00	0.00	15.80
Paving	0.00					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.03**	**0.19**	**0.12**	**0.00**		**0.02**	**0.02**		**0.02**	**0.02**	**0.00**	**15.75**	**15.75**	**0.00**	**0.00**	**15.80**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.47	1.47	0.00	0.00	1.47
Total	**0.00**	**0.00**	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.47**	**1.47**	**0.00**	**0.00**	**1.47**

4.0 Mobile Detail

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	1,383.90	1,503.60	1274.70	3,092,720	3,092,720
Single Family Housing	928.29	977.76	850.69	2,063,312	2,063,312
Total	2,312.19	2,481.36	2,125.39	5,156,032	5,156,032

4.3 Trip Type Information

	Miles			Trip %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW
Apartments Mid Rise	12.40	4.30	5.40	26.10	29.10	44.80
Single Family Housing	12.40	4.30	5.40	26.10	29.10	44.80

Appendix C:
Phase I Environmental Site Assessment

geologica

Report
Phase I Environmental Site Assessment

Pleasanton Gateway Redevelopment Property

APN 947-8-33
1500-1800 Valley Avenue
Pleasanton, California

Submitted to:

Pleasanton Gateway LLC
December 21, 2012

Prepared by:

Geologica Inc.

5 Third Street, Suite 224
San Francisco, California 94103
Phone: (415) 597-7883
Fax: (415) 597-7880

geologica

Innovative Strategies for Managing Environmental Liability

December 21, 2012

Pleasanton Gateway LLC
1600 Dell Avenue
Campbell, CA 95008

Attention: Mr. Scott Trobbe

Subject:

Report
Phase I Environmental Site Assessment
Pleasanton Gateway Redevelopment Property
APN 947-8-33
1500-1800 Valley Ave
Pleasanton, CA

Dear Mr. Trobbe,

GEOLOGICA INC. (GEOLOGICA) is pleased to present this Phase I Environmental Site Assessment (ESA) report for the above-referenced property. The purpose of this ESA was to evaluate the site for indications of recognized environmental conditions that have the potential to impact soil and groundwater beneath the subject property.

We have enjoyed working with you on this project and appreciate the opportunity to be of service. Should you have any questions, please do not hesitate to contact us at (415) 596-7883.

Very truly yours,

GEOLOGICA, INC.

Greg Romero
Project Geologist

Brian F. Aubry, R.G., C.E.G., C.Hg
Principal

GEOLOGICA INC.
5 Third Street, Suite 224 ~ San Francisco, California 94103
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Report
Phase I Environmental Site Assessment

Pleasanton Gateway Redevelopment Property

APN 947-8-33
1500-1800 Valley Avenue
Pleasanton, California

Prepared for:

Pleasanton Gateway LLC

Prepared by:

GEOLOGICA INC.

5 Third Street, Suite 224
San Francisco, California 94103
Phone: (415) 597-7883
Fax: (415) 597-7880

December 21, 2012

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REPORT
PHASE I ENVIRONMENTAL SITE ASSESSMENT
PLEASANTON GATEWAY REDEVELOPMENT PROPERTY
APN 947-8-33
1500-1800 VALLEY AVENUE
PLEASANTON, CA

EXECUTIVE SUMMARY

Purpose This Phase I Environmental Site Assessment (ESA) was prepared by GEOLOGICA, INC. (GEOLOGICA) to identify Recognized Environmental Conditions (RECs) at or near the above-identified Site or Subject Property. This ESA was performed in conjunction with the contemplated development of the site.

Guidance Protocol Work was performed in general conformance with the limitations of ASTM Designation E1527-05.

Scope This assessment was accomplished through, and limited to, the following tasks:

- Interviews with knowledgeable personnel;
- Site walk-through and windshield survey of subject property vicinity;
- Review of records reasonably available at local and regional public agencies through agency visits, telephone contacts, and environmental database search;
- Investigation of site history through interviews and review of readily available historic documentation such as: a) Aerial photos; b) Topographic maps; c) Sanborn Fire Insurance Maps; d) Historic city directories; e) Agency files; and f) Previous site investigation documents; and,
- Review of readily available relevant documentation available through standard resources regarding environmental, physiographic, hydrologic, geologic, and hydrogeologic conditions.

Site Location and Surrounding Properties The subject site comprises 26-acres of undeveloped vacant land and is located in a commercial and residential area of Pleasanton, CA. The site is bounded by Highway 680 to the west, Bernal Avenue to the north, Valley Avenue to the east and vacant undeveloped land to the south. The site is identified as Assessor Parcel Number (APN) 947-8-33 and anticipated to be addressed 1500 through 1800 Valley Avenue.

Site Reconnaissance The 26-acre subject property is undeveloped and currently vacant consisting of grass and tilled soil on open land. The vacant property is designated to be changed from commercial use to a residential development. No evidence of onsite dumping or illegal disposal was observed onsite.

Physical Setting The ground surface in the site vicinity is generally flat with a slight downward gradient to the west. The site elevation is approximately 320 ft above mean sea level and a seasonal, north-trending stream, Arroyo de la Laguna is located on the west side of Highway 680. The site is located near the center of the Coast Range geomorphic province, a northwesterly trending complex of subparallel ridges and valleys which extends several hundred miles to the north and south. The ridges in the region are typically composed of resistant sandstones or marine volcanics, and the valley areas are composed of relatively deep alluvial deposits with mean soil particles decreasing with increasing distance from the upland source. The depth to bedrock is estimated at 100 to 150 feet below ground surface (bgs). The soil profile is typical of in-situ weathering of uplifted marine sedimentary and volcanic bedrock sources which consist of

unconsolidated, moderately sorted, permeable, and fine to medium-grained colluvium. The upper portion of the soil profile was formed when bedrock was uplifted to its present configuration, and ranges in depths from 10 to 50 feet. According to the City of Pleasanton Water Department, there are several perennial aquifers in the area. The near-surface aquifer is inferred to be unconfined and encountered between 20 and 60 feet below ground surface (bgs). Groundwater beneath the site likely flows west towards Arroyo de Laguna (LFR, 2000).

Hazardous Materials and Other Environmental Issues

The site is currently undeveloped and vacant. No evidence of hazardous material storage, disposal, dumping or other environmental issues was observed.

Site History

According to historical sources, the subject area was previously used for agricultural purposes, and has always been vacant, and mainly used for hay production in the past. Review of topographic maps and aerial photographs dating to 1906 and 1939, respectively indicated no evidence of historic buildings or structures in the immediate area. The 26-acre subject property was part of a larger 39-acre property, and in 2010, approximately 12 of the 39-acres was developed into the Pleasanton Gateway Shopping Center with Safeway grocery store. The remaining 26-acres south of the shopping center remain vacant and undeveloped and are now planned for a residential development.

Previous Investigations

Report Phase I Environmental Site Assessment for Pleasanton Gateway Vacant Land, APN 947-0008-017, Pleasanton, CA (Geologica, 2009)

GEOLOGICA conducted a Phase I Environmental Site Assessment in December 2009 for Comerica Bank, for 39-acres of undeveloped vacant land, designated to be used for commercial and office uses. GEOLOGICA reviewed previous Phase Is and soil investigations and determined that no organochlorine pesticides or metals were detected in soil samples at the site above the residential PGRs or regional background levels, and is not likely to represent a significant threat to human health of the environment. Furthermore, no adjacent properties pose a significant risk to the subject property. GEOLOGICA concluded that no Recognized Environmental Conditions were noted during their investigation and that no additional Phase II work was recommended.

Report Phase I Environmental Site Assessment for Redevelopment Acreage, Corner of Hwy 680 and Bernal Ave Pleasanton, CA (Geologica, 2008)

GEOLOGICA conducted a Phase I Environmental Site Assessment in March 2008 for Pleasanton Gateway LLC, for 12.5-acres of vacant land located on the northwest corner of the larger 39-acre undeveloped property. GEOLOGICA concluded that no Recognized Environmental Conditions were noted during their investigation. No additional Phase II work was recommended.

Phase I Environmental Site Assessment Bernal Property Bernal Property Bernal Ave at Highway 680 Pleasanton, CA (LFR, 2000)

The Phase I Environmental Site Assessment for the Bernal Property was performed by Levine-Fricke (LFR) in July 2000. The Assessment was done for a larger 500-acre property located south of Bernal Avenue and on the east and west sides of Highway 680 in Pleasanton, CA. The 39-acre subject property is part of the greater 500-acre undeveloped property and is located on the east side of Highway 680. The west side of Highway 680 has since been developed into a residential community and park, however, from 1910 to 1980 this parcel of land was used for a wastewater treatment plant that included an effluent holding and aeration reservoir ("Lake Monaco"), and 12 sludge drying beds. LFR concluded that there was no evidence of adverse environmental conditions associated with the site. However, LFR did recommend that further environmental investigation be conducted due to the historical uses of the site for agricultural production, disposal of treated sanitary sewer effluent, radionuclides and chemicals of concern. The investigation subsequently confirms that historical on-site use consisted primarily of hay

production. The 39-acre subject property is not reportedly related to the adjacent sanitary sewer effluent area.

Follow-up Phase II Soil Investigations by LFR (2000b) and Cehn (2000).

Soil Investigations were conducted at the 500-acre Bernal Property by LFR (2000b) on both the east and west sides of Highway 680 in Pleasanton, CA. The purpose of the investigations was to assess the presence of organochlorine pesticides and metals in soil potentially associated with previous agricultural activities at the site and potential soil impacts related to the past uses, in specific areas of the 500-acre site for wastewater treatment and sludge disposal. Samples were collected from 58 borings from three areas: the agricultural area (of which the 39-acre subject property is a part); the former Lake Monaco area (not part of the 39-acre site); and the former sludge drying bed area (also not part of the 39-acre site).

Sampling results from within the Subject Property:

- LFR (2000b) collected a total of 48 samples in the agricultural areas for testing for organochlorine pesticides and metals from depths of 0 to 6-in and 12 to 18 in below grade including approximately 8 to 10 soil samples on the subject property and the rest (44 samples) were from off-site locations. Analytical results indicated from all the samples indicated that no concentrations of organochlorine pesticides at the site exceeded the residential PRGs and that concentrations of metals were within the published background ranges for the western United States.

Sampling results from areas outside the Subject Property:

- LFR (2000) collected 11 samples (Lake Monaco area) and 12 samples (sludge drying bed area) for testing for pesticides, PCBs, VOCs, TPH, and metals from depths of 0 to 3 ft and 6 to 9 ft. The analytical results indicated that PCBs and VOCs were not present above the analytical detection limits at the site and low concentrations of metals and organochlorine pesticides detected were well below the residential PRGs. Furthermore, low TPH as diesel concentrations detected were considered unlikely to be a significant threat to human health or the environment.
- Cehn (2000) conducted a Radiological Testing, Sampling and Analysis Program to investigate sub-surface soils for possible radiological impacts at the 500-acre Bernal property. Samples were collected from the "sludge drying area" and the "Lake Monaco" area which are both off-site from the subject property on the other side of Highway 680. Cehn (2000) concluded that the only radioactive elements detected at the site were naturally occurring radioactive potassium, radium, and thorium, and man-made radioactive cesium and plutonium-238. Cehn further concluded that the variability of the results for both natural and man-made radioactivity measured at the site was typical of variability expected in measurements made over wide areas. Therefore, no further analysis of the site with respect to radiological conditions was recommended.

Offsite Properties There is no direct evidence that contamination from other off-site properties in the area have impacted the property.

Conclusions We have performed a Phase I Environmental Site Assessment in conformance with the ASTM 1527-05 Scope of Work for a Phase I Environmental Site Assessment of the Pleasanton Gateway Redevelopment Property in Pleasanton, CA. No Recognized Environmental Conditions (RECs) were noted during this investigation. This assessment noted the following:

On-Site

- Results of a previous Phase I Environmental Site Assessments and a Soil Investigation by GEOLOGICA (2008, 2009) and LFR (2000, 2000b) concluded that there was no evidence of adverse environmental conditions associated with the property. No organochlorine pesticides or metals were detected in soil samples at the site above the residential PRGs or regional background levels, and not likely to represent a significant threat to human health or the environment.

Off-Site Impacts to Subject Property

- No VOCs, PCBs, TPH, organochlorine pesticides, or metals were detected in adjacent properties that were above the residential PRGs or regional background levels, and not likely to represent a significant threat to human health or the environment.
- Radiological testing was also conducted at an adjacent property to the southwest in a report by Joel I. Cehn (2000). It was concluded that the variability of the results for both natural and man-made radioactivity measured at the site was typical of variability found and expected in measurements made over wide areas. Cehn recommended that no further radiological analysis be conducted at the site.

Recommendations No additional work is recommended at this time.

1 INTRODUCTION

This report presents the results of a Phase I Environmental Site Assessment (ESA) prepared for the Pleasanton Gateway Redevelopment Property ("subject property or site") located in Pleasanton, CA, as shown in **Figure 1 – Site Location Map**. The anticipated property address for the redevelopment property is 1500-1800 Valley Avenue with APN 947-8-33. Currently, the subject property comprises 26-acres of vacant land.

1.1 PURPOSE

The purpose of this Phase I ESA was to review past and present land use practices and activities at and near the subject property for evidence of Recognized Environmental Conditions (RECs) that could result in impacts to soil, surface water, and/or groundwater at, beneath, or originating from, the subject property. The result of this Phase I ESA is a listing of identified Recognized Environmental Conditions, defined by ASTM as "*... the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property.*"

This ESA was performed in conjunction with the contemplated redevelopment of the site from commercial to residential.

1.2 GUIDANCE PROTOCOL

Work was conducted in general conformance with the scope and limitations of the American Society for Testing Materials (ASTM) *Standard Practice for Environmental Site Assessment: Phase I Environmental Site Assessment Process (Standard Designation E1527-05).*

1.3 SCOPE OF SERVICES

This assessment was accomplished through, and limited to, the following tasks:

- Interviews with knowledgeable personnel;
- Site walk-through and windshield survey of subject property vicinity;
- Review of records reasonably available at local and regional public agencies through agency visits, telephone contacts, and environmental database search;
- Investigation of site history through interviews and review of readily available historic documentation such as: a) Aerial photos; b) Topographic maps; c) Sanborn Fire Insurance Maps; d) Historic city directories; e) Agency files; and f) Previous site investigation documents; and.

- Review of readily available relevant documentation available through standard resources regarding environmental, physiographic, hydrologic, geologic, and hydrogeologic conditions.

1.4 EXCLUSIONS

The collection of air, soil, groundwater, surface water, drinking water, asbestos survey, or lead-based paint, or performance of analytical laboratory testing for hydrocarbons, lead, radon, or other compounds, was not included as a part of our scope of services, nor is the sampling and testing of these materials within the normal scope of a Phase I ESA. This work did not constitute comprehensive regulatory compliance, endangered species, wetlands, indoor air quality, or high voltage power line audits.

1.5 CREDENTIALS

This report has been prepared under the professional supervision of the principal(s) whose signature(s) appear herein. Resumes for those individuals are included in **Attachment 1**. The information contained in this report has received appropriate technical review and approval. The conclusions represent professional judgments and are founded upon the findings of the investigations identified in the report and the interpretation of such data based on our experience and expertise according to the existing standards of care for work of this kind.

2 SITE DESCRIPTION

This section describes the site location and physical characteristics based on: a site visit by GEOLOGICA Project Geologist Greg Romero; information and data obtained from topographic maps and physical environment information provided by Environmental Data Resources (EDR); and, office-based research.

2.1 SITE LOCATION

The site is located in Pleasanton, California as shown in **Figure 1 – Site Location Map**. The subject site comprises 26-acres of undeveloped vacant land and is located in a commercial and residential area of Pleasanton. The site is bounded by Highway 680 to the west, Bernal Avenue to the north, Valley Avenue to the east and vacant undeveloped land to the south. A **Site Layout Map** is provided as **Figure 2.** The site is identified as Assessor Parcel Number (APN) 947-8-33 and anticipated to be addressed 1500 through 1800 Valley Avenue. Selected photographs of the property and vicinity are reproduced in **Appendix A**.

2.2 SURROUNDING PROPERTIES

The subject property is located in a mixed commercial and residential area of Pleasanton. Adjacent and nearby properties observed during the December 13, 2012 site observation visit included:

- North – Pleasanton Gateway Shopping Center with Safeway, beyond which is Bernal Avenue.
- East – Valley Avenue, beyond which are residential apartments.
- South – Undeveloped land, beyond which is Laguna Creek Lane.
- West – Highway 680, beyond which are residential homes.

No visible evidence was observed of environmental impacts to the subject site from the above-listed adjacent and nearby properties.

2.3 PHYSICAL SETTING

This section summarizes site and general area physical setting information.

2.3.1 SITE AND AREA TOPOGRAPHY AND OCCURRENCE OF SURFACE WATER

The ground surface in the site vicinity is generally flat with a slight downward gradient to the west. The site elevation is approximately 320 ft above mean sea level and a seasonal, north-trending stream, Arroyo de la Laguna, is located on the west side of Highway 680 (LFR, 2000).

2.3.2 Regional and Local Geology and Soil conditions

The site is located near the center of the Coast Range geomorphic province, a northwesterly trending complex of subparallel ridges and valleys which extends several hundred miles to the north and south. The ridges in the region are typically composed of resistant sandstones or marine volcanics, and the valley areas are composed of relatively deep alluvial deposits with mean soil particles decreasing with increasing distance from the upland source. The depth to bedrock is estimated at 100 to 150 feet below ground surface (bgs). The soil profile is typical of in-situ weathering of uplifted marine sedimentary and volcanic bedrock sources which consist of unconsolidated, moderately sorted, permeable, and fine to medium-grained colluvium. The upper portion of the soil profile was formed when bedrock was uplifted to its present configuration, and ranges in depths from 10 to 50 feet (LFR, 2000).

2.3.3 Groundwater

According to the City of Pleasanton Water Department, there are several perennial aquifers in the area. The near-surface aquifer is inferred to be unconfined and encountered between 20 and 60 feet feet below ground surface (bgs). Groundwater beneath the site likely flows west towards Arroyo de Laguna (LFR, 2000).

3 SITE RECONNAISSANCE

A site reconnaissance of the property was conducted on December 13, 2012 by: GEOLOGICA Project Geologist Mr. Greg Romero. The purpose of the site reconnaissance was to observe existing property conditions and to evaluate evidence for recognized environmental conditions, including hazardous materials and/or wastes.

Observations noted during the site reconnaissance are summarized below. The property layout and general setting is provided in **Figure 2 – Site Layout Map**. Site photographs of the property and immediate vicinity are included in **Appendix A**.

3.1 CURRENT USES AND OCCUPANTS

The 26-acre subject property is undeveloped and currently vacant consisting of grass and tilled soil on open land. The vacant property is designated to be changed from commercial use to a residential development. No evidence of onsite dumping or illegal disposal was observed onsite.

3.2 HAZARDOUS MATERIALS – USE AND STORAGE

This section describes site hazardous materials use and storage conditions.

3.2.1 HAZARDOUS MATERIALS

The site is currently undeveloped and vacant. No evidence of hazardous materials, storage, disposal, and dumping was observed.

3.2.2 ASTS, USTS, AND OTHER CONTAINMENT STRUCTURES

There was no evidence or surface indications of aboveground storage tanks (AST) or underground storage tanks (USTs) on the property. Furthermore, the EDR database search indicated no historical presence of USTs at the site.

3.2.3 TRANSFORMERS AND ELECTRICAL EQUIPMENT

The site is currently undeveloped and vacant. No transformers and electrical equipment where observed at the subject property.

3.3 UTILITIES AND INFRASTRUCTURE

Site utility services and infrastructure are described in the following sections.

3.3.1 ELECTRICAL SERVICE AND NATURAL GAS

The site is currently undeveloped and vacant.

3.3.2 Backup Generators

The site is currently undeveloped and vacant.

3.3.3 Potable Water

The site is currently undeveloped and vacant.

3.3.4 Industrial, Sanitary, and Stormwater Sewers

The site is currently undeveloped and vacant.

3.4 Hazardous and Non-Hazardous Wastes

This section describes liquid and solid waste streams generated or produced at the subject property.

3.4.1 Hazardous Waste

The site is currently undeveloped and vacant. No evidence of hazardous waste, storage, disposal, and dumping was observed.

3.4.2 Waste Oils and Other Wastes

The site is currently undeveloped and vacant. No evidence of waste oils or other waste, storage, disposal, and dumping was observed.

3.4.3 Solid Waste

The site is currently undeveloped and vacant. No solid waste was observed.

3.5 Other Environmental Issues

Other than the items described above and below, no evidence of current or historical underground storage tanks (USTs), vent pipes, fill pipes, hydraulic lifts, drums, chemical containers, drains, sumps, clarifiers, drywells, discharge areas, discolored soils, pools of liquid, odors, wells, septic tanks, concrete or asphalt patches, monitoring wells, etc. was observed. No evidence of distressed vegetation, dumping, or disturbed soil was observed onsite.

3.5.1 Asbestos

The site is currently undeveloped and vacant.

3.5.2 Lead-Based Paints

The site is currently undeveloped and vacant.

3.5.3 HIGH POWER TOWER-MOUNTED TRANSMISSION LINES

No high power tower-mounted transmission lines were observed in close proximity to the property.

3.5.4 MICROBIAL GROWTH & MOISTURE INTRUSION

The site is currently undeveloped and vacant.

3.5.5 ENVIRONMENTAL NON-COMPLIANCE ISSUES (ENCIS)

No obvious material non-compliance issues were noted by GEOLOGICA in the course of performing the ESA.

3.5.6 WETLANDS

No evidence of the presence or potential presence of wetland areas on or immediately adjacent to the subject property.

3.5.7 ACTIVITY & USE LIMITATIONS (AULS)

No AULs are known to exist for the subject property.

4 SITE HISTORY

Information about the property's history and development are summarized below. The site history was developed based on Sanborn Insurance Maps, Aerial photographs, Topographic maps, City Directories, review of agency files and interviews with site personnel. Copies of historical Sanborn Maps, Aerial photographs, Topographic maps, and City Directories are provided in **Appendix B.**

4.1 PROPERTY HISTORY SUMMARY

According to historical sources, the subject area was previously used for agricultural purposes, and has always been vacant, and mainly used for hay production in the past. Review of topographic maps and aerial photographs dating to 1906 and 1939, respectively indicated no evidence of historic buildings or structures in the immediate area. The 26-acre subject property was part of a larger 39-acre property, and in 2010, approximately 12 of the 39-acres was developed into the Pleasanton Gateway Shopping Center with Safeway grocery store. The remaining 26-acres south of the shopping center remain vacant and undeveloped and are now planned for a residential development.

4.2 HISTORIC AERIAL PHOTOGRAPHS

Historical aerial photographs were provided by EDR and are reproduced in **Appendix B**.

Year	Source of Photo	Scale	Site & Surrounding Property Use
1939	Fairchild	1"=500'	The subject property and vicinity appears to be farm and /or agricultural in use.
1950	Aero	1"=500'	The subject property and vicinity appears to be farm and /or agricultural in use.
1958	Cartwright	1"=500'	The subject property and vicinity appears to be farm and /or agricultural in use.
1965	Cartwright	1"=500'	The subject property and vicinity appears to be farm and /or agricultural in use.
1974	NASA	1"=500'	The subject property and vicinity appears to be farm and /or agricultural in use. Highway 680 is now present.

Year	Source of Photo	Scale	Site & Surrounding Property Use
1982	USGS	1"=500'	The subject property and vicinity appears to be undeveloped land. Surrounding areas to the north have begun to be developed.
1993	EDR	1"=500'	The subject property is present and undeveloped. Surrounding areas to the north of Bernal Ave are significantly more developed.
1998	USGS	1" =500'	The subject property is present and undeveloped. Several building structures are present on the northeast portion of the subject property.
2005	EDR	1"=500'	The subject property is present and undeveloped. A residential community is now present to the northeast of the subject property.
2006	EDR	1"=500'	The subject property has not changed from the 2005 aerial photograph.

4.3 Historic Topographic Maps

Historic topographic maps were provided by EDR and are reproduced in **Appendix B**.

Year	Scale	Site & Surrounding Property Uses (Topographic Maps)
1906	1:62,500	The property is located within an undeveloped area, though minimal detail is present at the scale.
1947	1:50,000	The property is designated as agricultural or undeveloped land.
1953	1:24,000 1:62,500	The property is designated as agricultural or undeveloped land.
1961	1:24,000 1:62,500	The property is designated as agricultural or undeveloped land.
1968	1:24,000	The property is designated as agricultural or undeveloped land.
1973	1:24,000	The property is designated as agricultural or undeveloped land.
1980	1:24,000	The property is designated as agricultural or undeveloped land.

4.4 Historical Directories

There is no listings for the property address in EDR City Directory abstract.

4.5 HISTORICAL SANBORN MAPS

EDR reported "Unmapped Property" for historical Sanborn Maps.

4.6 PREVIOUS ENVIRONMENTAL INVESTIGATIONS

The following section summarizes previous site environmental investigation activities conducted in the general area. Only a portion of our Subject property is included in these investigations. Relevant documentation and selections from key reports are included in **Appendix D**.

Report Phase I Environmental Site Assessment for Pleasanton Gateway Vacant Land, APN 947-0008-017, Pleasanton, CA (Geologica, 2009)

GEOLOGICA conducted a Phase I Environmental Site Assessment in December 2009 for Comerica Bank, for 39-acres of undeveloped vacant land, designated to be used for commercial and office uses. GEOLOGICA reviewed previous Phase Is and soil investigations and determined that no organochlorine pesticides or metals were detected in soil samples at the site above the residential PGRs or regional background levels, and is not likely to represent a significant threat to human health of the environment. Furthermore, no adjacent properties pose a significant risk to the subject property. GEOLOGICA concluded that no Recognized Environmental Conditions were noted during their investigation and that no additional Phase II work was recommended.

Report Phase I Environmental Site Assessment for Redevelopment Acreage, Corner of Hwy 680 and Bernal Ave Pleasanton, CA (Geologica, 2008)

GEOLOGICA conducted a Phase I Environmental Site Assessment in March 2008 for Pleasanton Gateway LLC, for 12.5-acres of vacant land located on the northwest corner of the larger 39-acre undeveloped property. GEOLOGICA concluded that no Recognized Environmental Conditions were noted during their investigation and that no additional Phase II work was recommended.

Phase I Environmental Site Assessment Bernal Property Bernal Property Bernal Ave at Highway 680 Pleasanton, CA (LFR, 2000)

The Phase I Environmental Site Assessment for the Bernal Property was performed by Levine-Fricke (LFR) in July 2000. The Assessment was done for a larger 500-acre property located south of Bernal Avenue and on the east and west sides of Highway 680 in Pleasanton, CA. The 39-acre subject property is part of the greater 500-acre undeveloped property and is located on the east side of Highway 680. The west side of Highway 680 has since been developed into a residential community and park, however, from 1910 to 1980 this parcel of land was used for a wastewater treatment plant that included an effluent holding and aeration reservoir ("Lake Monaco"), and 12 sludge drying beds. LFR concluded that there was no evidence of adverse environmental conditions associated with the site. However, LFR did recommend that further environmental investigation be conducted due to the historical uses of the site for agricultural production, disposal of treated sanitary sewer effluent, radionuclides and chemicals of concern. The investigation subsequently confirms that historical on-site use consisted primarily of hay production. The 39-acre subject property is not reportedly related to the adjacent sanitary sewer effluent area.

Follow-up Phase II Soil Investigations by LFR (2000b) and Cehn (2000).

Soil Investigations were conducted at the 500-acre Bernal Property by LFR (2000b) on both the east and west sides of Highway 680 in Pleasanton, CA. The purpose of the investigations was to assess the presence of organochlorine pesticides and metals in soil potentially associated with previous agricultural activities at the site and potential soil impacts related to the past uses, in specific areas, of the 500-acre site for wastewater treatment and sludge disposal. Samples were collected from 58 borings from three areas: the agricultural area (of which the 39-acre subject property is a part); the former Lake Monaco area (not part of the 39-acre site); and the former sludge drying bed area (also not part of the 39-acre site).

Sampling results from within the Subject Property:

- LFR (2000b) collected a total of 48 samples in the agricultural areas for testing for organochlorine pesticides and metals from depths of 0 to 6-in and 12 to 18 in below grade including approximately 8 to 10 soil samples on the subject property and the rest (44 samples) were from off-site locations. Analytical results indicated from all the samples indicated that no concentrations of organochlorine pesticides at the site exceeded the residential PRGs and that concentrations of metals were within the published background ranges for the western United States.

Sampling results from areas outside the Subject Property:

- LFR (2000) collected 11 samples (Lake Monaco area) and 12 samples (sludge drying bed area) for testing for pesticides, PCBs, VOCs, TPH, and metals from depths of 0 to 3 ft and 6 to 9 ft. The analytical results indicated that PCBs and VOCs were not present above the analytical detection limits at the site and low concentrations of metals and organochlorine pesticides detected were well below the residential PRGs. Furthermore, low TPH as diesel concentrations detected were considered unlikely to be a significant threat to human health or the environment.

- Cehn (2000) conducted a Radiological Testing, Sampling and Analysis Program to investigate sub-surface soils for possible radiological impacts at the 500-acre Bernal property. Samples were collected from the "sludge drying area" and the "Lake Monaco" area which are both off-site from the subject property on the other side of Highway 680. Cehn (2000) concluded that the only radioactive elements detected at the site were naturally occurring radioactive potassium, radium, and thorium, and man-made radioactive cesium and plutonium-238. Cehn further concluded that the variability of the results for both natural and man-made radioactivity measured at the site was typical of variability expected in measurements made over wide areas. Therefore, no further analysis of the site with respect to radiological conditions was recommended.

5 RECORDS REVIEW

GEOLOGICA reviewed readily available records from the entities listed below. Copies of relevant documents for the property are presented in **Appendix C.**

5.1.1 PLEASANTON BUILDING / PLANNING DEPARTMENT

The Pleasanton Building / Planning Department was contacted by Mr. Romero. According to Mr. Marion Pavan, City of Pleasanton Associate Planner for the Pleasanton Gateway Project; the current project for development at the subject site is still currently under final review with the city. Mr. Pavan was unaware of any environmental concerns and confirmed that historical use at the subject property has always been vacant agricultural land.

5.1.2 PLEASANTON FIRE DEPARTMENT

The Pleasanton Fire Department was contacted by Mr. Romero. There was no files for the subject property.

5.1.3 ALAMEDA COUNTY ENVIRONMENTAL HEALTH DEPARTMENT

Alameda County Environmental Health reported no available files for the subject property.

5.1.4 DEPARTMENT OF TOXIC SUBSTANCES CONTROL (DTSC)

No file was identified for the subject property.

5.1.5 SAN FRANCISCO BAY REGIONAL WATER QUALITY CONTROL BOARD (RWQCB)

No file was identified for the subject property.

5.1.6 BAY AREA AIR QUALITY MANAGEMENT DISTRICT (BAAQMD)

No file was identified for the subject property.

5.2 EDR REPORT

The report prepared by EDR entitled The EDR Radius Map with GeoCheck Report dated December 13, 2012 contains a summary of a search of federal, state, and local governmental environmental information sources listing known or potential hazardous waste sites or landfills, and sites currently under investigation for environmental violations that might include the property or properties in the vicinity and USTs, according to prescribed search distances. A reproduction of this report is presented in **Appendix B**.

5.2.1 EDR GOVERNMENT AGENCY DATABASES SUMMARY – SUBJECT PROPERTY

The subject property was not listed in any of the databases searched by EDR.

5.2.2 EDR Government Agency Databases Summary – Surrounding Properties

The EDR report provides a listing and mapping of sites within required search radii, their distance and geographical location relative to the subject property. The EDR regulatory agency database reported numerous listings within required search radii of the property. Properties that are located nonadjacent and interpreted as hydraulically downgradient of the property are unlikely to have impacted soil and groundwater with hazardous materials at the property. Key properties are described below.

EPA RCRA-SQG – There is two (2) additional sites on this list within 0.25-miles of the subject property.

ENVIROSTOR - There are two (2) additional sites on this list within 1-mile mile of the subject property.

DRYCLEANERS – There is one (1) additional site on this list within 0.25-miles of the subject property.

Summary – Although there are some listed sites in the vicinity, based on the regulatory agency status and/or location of these facilities relative to the subject site, the potential for these sites to have impacted the subject property is considered low at this time.

6 SUMMARY OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

This section summarizes the findings and provides conclusions of the Phase I ESA, and lists recommendations to address residual environmental issues and/or concerns.

6.1 SUMMARY OF FINDINGS

The following Key Findings were identified in conjunction with the subject property:

- The 26 –acre subject property has always been vacant and undeveloped until the present day; the only changes have been residential and commercial development in the surrounding areas.

- Review of available regulatory information did not indicate direct evidence that nearby sites have significantly impacted soil or groundwater beneath the property. Thus, there is no direct evidence that the site has been environmentally impacted by nearby sites.

6.2 DATA GAPS

In the opinion of the preparers of this Phase I ESA, no significant data gaps, as defined in ASTM 1527-05, were noted during performance of this Phase I ESA.

6.3 CONCLUSIONS

We have performed a Phase I Environmental Site Assessment in conformance with the ASTM 1527-05 Scope of Work for a Phase I Environmental Site Assessment of the Pleasanton Gateway Redevelopment Property in Pleasanton, CA. No Recognized Environmental Conditions (RECs) were noted during this investigation. This assessment noted the following:

<u>On-Site</u>

- Results of a previous Phase I Environmental Site Assessments and a Soil Investigation by GEOLOGICA (2008, 2009) and LFR (2000, 2000b) concluded that there was no evidence of adverse environmental conditions associated with the property. No organochlorine pesticides or metals were detected in soil samples at the site above the residential PRGs or regional background levels, and not likely to represent a significant threat to human health or the environment.

<u>Off-Site Impacts to Subject Property</u>

- No VOCs, PCBs, TPH, organochlorine pesticides, or metals were detected in adjacent properties that were above the residential PRGs or regional background levels, and not likely to represent a significant threat to human health or the environment.

- Radiological testing was also conducted at an adjacent property to the southwest in a report by Joel I. Cehn (2000). It was concluded that the variability of the results for both natural and man-made radioactivity measured at the site was typical of variability found and expected in measurements made over wide areas. Cehn recommended that no further radiological analysis be conducted at the site.

6.4 RECOMMENDATIONS

No additional work is recommended at this time.

7 LIMITATIONS

This Phase I ESA report is subject to GEOLOGICA's Master Services Agreement with Pleasanton Gateway, LLC. The report has been prepared solely for Pleasanton Gateway in response to GEOLOGICA's proposal. Other parties may rely on the findings and conclusions of the report for informational purposes only. However, Pleasanton Gateway and other parties who may rely on the findings and conclusions of the report should recognize that this report is not a comprehensive site characterization and should not be construed as such. The findings and conclusions in this report are predicated on a site reconnaissance, a review of specified regulatory records, and a review of the historical usage of the property as presented in this report.

The information obtained is only relevant for the dates of the records reviewed or as of the date of the latest site visit. Thus, the information contained herein is only valid as of the date of the report, and will require an update to reflect recent records review/site visits. Therefore, the report should only be deemed conclusive with respect to the information obtained. No guarantee of the results of the study is made within the intent of this report or any subsequent report, correspondence or consultation, either express or implied. The services performed were conducted in accordance with the local standard of care in the geographic region at the time the services were rendered. Pleasanton Gateway and other parties should also understand that radon, lead in drinking water, and methane gas were not addressed in the scope of services of this report.

8 REFERENCES

a. ASTM Designation E1527-05, *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process*. American Society for Testing and Materials (ASTM), West Conshohocken, PA.

b. Cehn, Joel I. C.H.P (Cehn, 2000) - Radiological Testing, Sampling and Analysis Bernal Property, July 21, 2000.

c. EDR –Aerial Photo Decade Package for Pleasanton Gateway 1500-1800 Valley Ave, APN 947-8-33 in Pleasanton, CA 94566, December 17, 2012.

d. EDR –City Directory Abstract for Pleasanton Gateway 1500-1800 Valley Ave, APN 947-8-33 in Pleasanton, CA 94566, December 17, 2012.

e. EDR- The Sanborn Map Report for Pleasanton Gateway 1500-1800 Valley Ave, APN 947-8-33 in Pleasanton, CA 94566, December 14, 2012.

f. EDR- The EDR Radius Map with GeoCheck for Pleasanton Gateway 1500-1800 Valley Ave, APN 947-8-33 in Pleasanton, CA 94566, December 13, 2012.

g. EDR- The EDR Historical Topographic Map Report for Pleasanton Gateway 1500-1800 Valley Ave, APN 947-8-33 in Pleasanton, CA 94566, December 14, 2012.

h. Geologica (Geologica, 2008) – Report Phase I Environmental Site Assessment Redevelopment Acreage Corner of Hwy 680 and Bernal Ave Pleasanton, California, March 21, 2008.

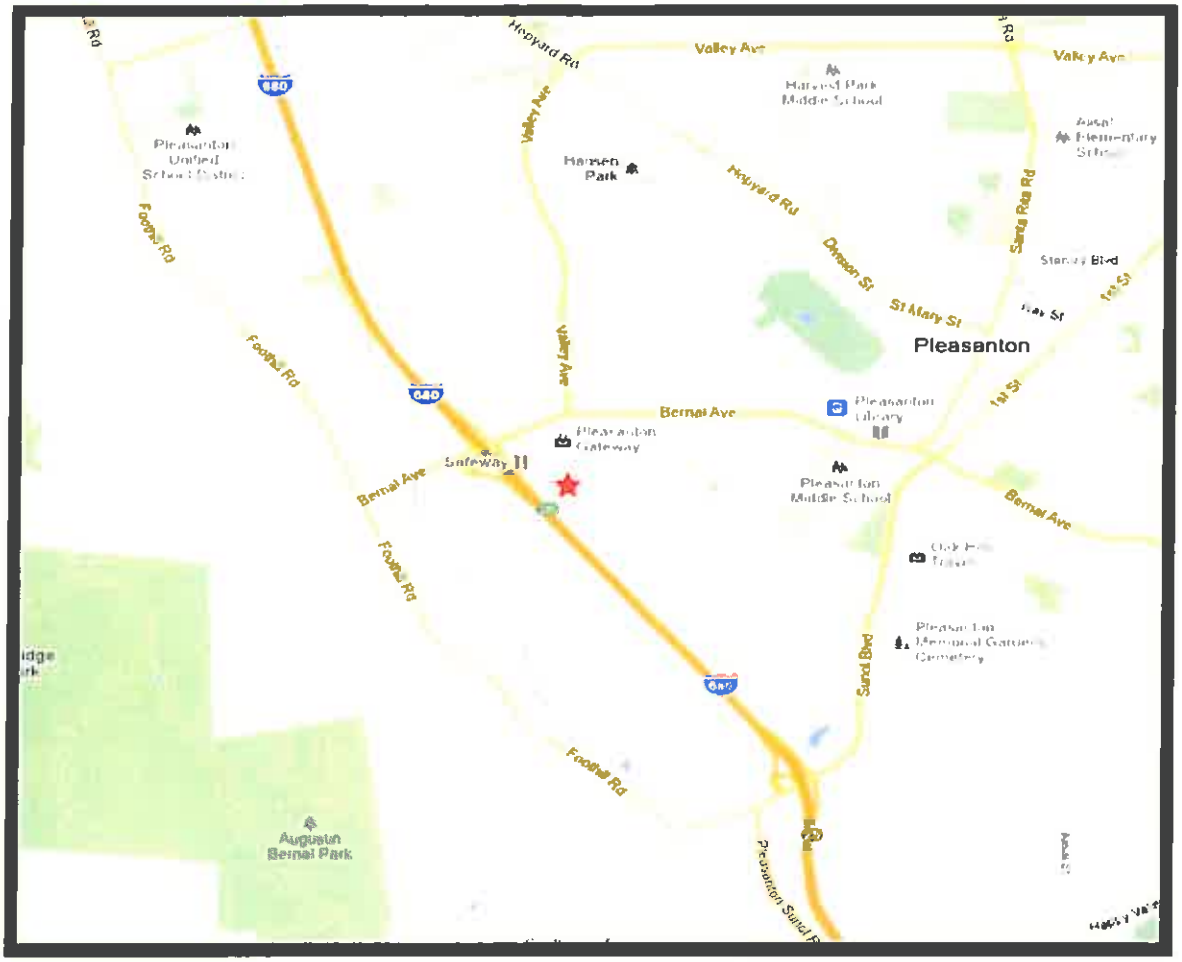
i. Geologica (Geologica, 2009) – Report Phase I Environmental Site Assessment Pleasanton Gateway Vacant Land APN 947-0008-017, Pleasanton, California, December 18, 2009

j. LFR Levine-Fricke (LFR, 2000) - Phase I Environmental Site Assessment Bernal Property Bernal Avenue at Highway 680, Pleasanton, California, July 24, 2000.

k. LFR Levine-Fricke (LFR, 2000b) - Results of Soil Investigations Bernal Property, Pleasanton, California, July 25, 2000.

Figures

Figure 1 **Site Location Map**
Figure 2 **Site Layout Map**



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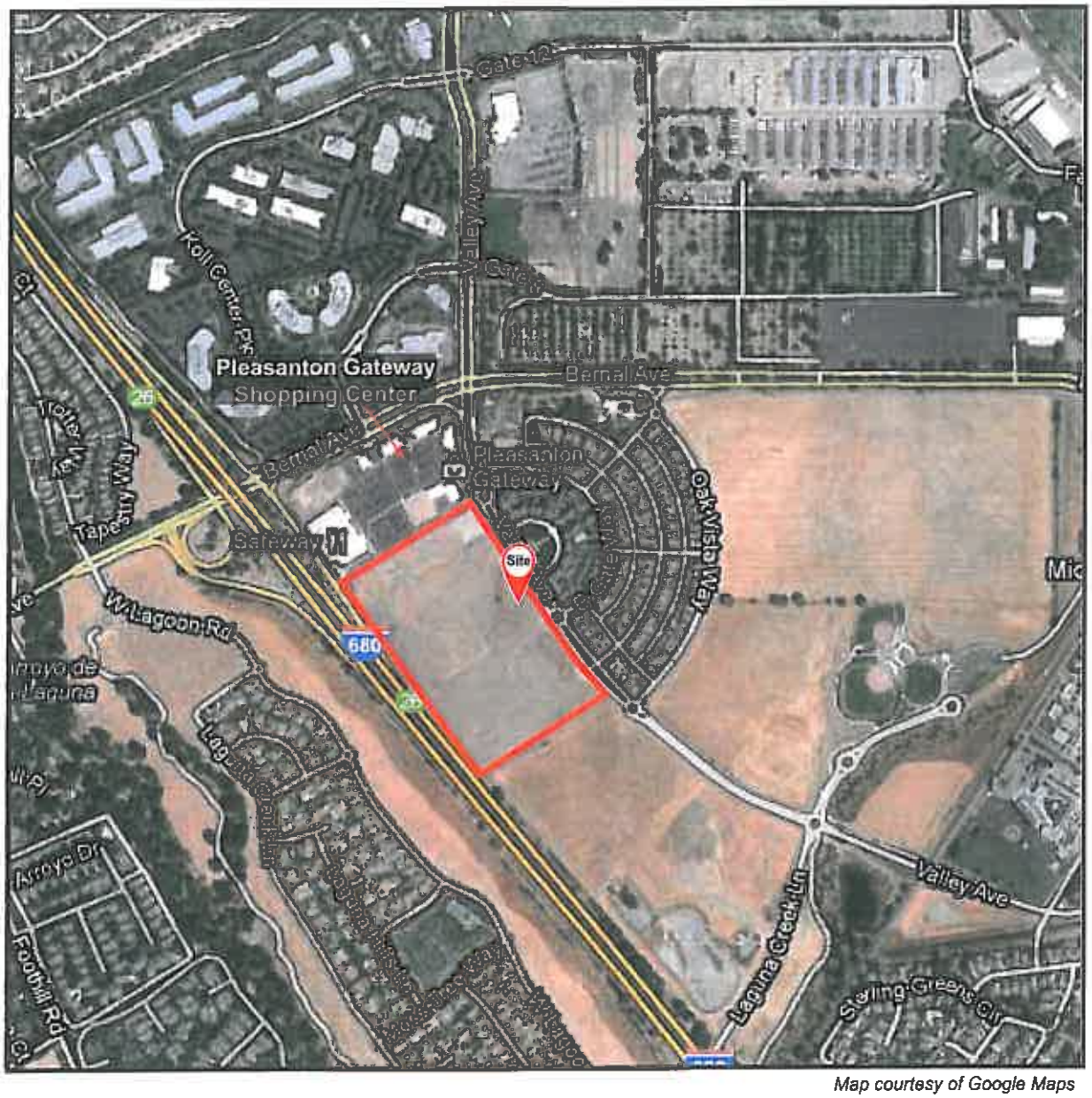
Site Location Map

Pleasanton Gateway Redevelopment Property
APN 947833
1500-1800 Valley Avenue
Pleasanton, CA

geologica
San Francisco, CA

Figure 1



Map courtesy of Google Maps

N

Approximate Scale in Feet

0' 1000'

Site Layout Map

Pleasanton Gateway Redevelopment Property
APN 947-8-33
1500 - 1800 Valley Avenue
Pleasanton, California

geologica
San Francisco, CA

Figure 2

Appendix D: Environmental Noise Assessment

The Commons at Gateway

Pleasanton, California

Environmental Noise Assessment

11 June 2013

Prepared for:

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CSA Project Number: 12-0519

Charles M. Salter
ASSOCIATES INC.

INTRODUCTION

This report summarizes our environmental noise assessment for The Commons at Gateway residential project in Pleasanton, California. The purpose of this study is to quantify the noise environment, compare it with City and State goals for environmental noise, and propose conceptual noise mitigation measures as needed based on the current site plan.

Following is a summary of our findings:

1. The project will incorporate sound-rated windows, doors and exterior walls into the building shell(s) to reduce traffic noise to DNL[1] 45 dB[2] or lower indoors. Preliminary estimates suggest that sound insulation ratings up to approximately STC[3] 39 will be sufficient for residences along Interstate 680.
2. Ventilation or air conditioning systems will be provided in apartment units so the interior noise goal will be met if occupants desire to close their windows.
3. The proposed apartment buildings, noise berm/barrier in the southern portion of the site, and selected row house yard barriers, will reduce estimated traffic noise in the central park and pool area, and single-family house yards, to between approximately DNL 60 to 65 dB.
4. Noise from mechanical equipment, such as air-conditioning equipment, must meet the Pleasanton Municipal Code limits. This should be evaluated in detail when equipment types, locations and sizes are selected.

DESCRIPTION

The project will consist of 97 detached houses and 210 rental apartment units in nine buildings on a 26.7-acre site between Interstate 680 (I-680) and Valley Avenue (see Figure 1, attached). Detached houses will consist of 62 three-story row houses and 35 two-story single-family houses, most of which will be partially shielded from I-680 by the three-story apartment buildings. Outdoor use space will include a 1.3-acre community park, and individual yards for single-family houses. Amenities associated with the community park will include a business center, conference facilities, workout area, pool, barbeque, fire pit, and tot lot.

The site is generally flat, with approximately a five foot elevation differential which ranges from about three to eight feet below the elevation of I-680. Existing residences are located across I-680 to the southwest, shielded from the freeway by an earthen berm, and across Valley Avenue to the northeast. A commercial development borders the site to the north, between the site and Bernal Avenue. Stores include Safeway and CVS, which both have loading docks adjacent to the northern portion of the site.

---

[1] Day-Night Average Sound Level (DNL) – A descriptor established by the U.S. Environmental Protection Agency to describe the average day-night level with a penalty applied to noise occurring during the nighttime hours (10 pm - 7 am) to account for the increased sensitivity of people during sleeping hours.

[2] A-Weighted sound pressure level (or noise level) represents the noisiness or loudness of a sound by weighting the amplitudes of various acoustical frequencies to correspond more closely with human hearing. A 10-dB (decibel) increase in noise level is perceived to be a doubling of loudness. A-Weighting is specified by the U.S. EPA, OSHA, Caltrans, and others for use in noise measurements. All sound levels (dB) in this document are A-weighted.

[3] Sound Transmission Class (STC) – A single-number rating derived from the sound insulation properties of a partition. Numerically, STC represents the number of decibels of speech sound reduction from one side of the partition to the other.

ACOUSTICAL CRITERIA

The Pleasanton General Plan

The Noise Element of the Pleasanton General Plan 2005-2025, adopted 21 July 2009, contains land use compatibility guidelines for environmental noise in the community. Table 1, below, summarizes these guidelines for residential land uses and park areas.

Table 1: Summary of Table 11-5: Noise and Land Use Compatibility Guidelines

DNL Value in Decibels			Compatibility Level
Detached Residential	Multi-Family Residential	Parks and Recreation Areas	
60 dB or less	65 dB or less		*Normally Acceptable* Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special insulation requirements.
60 to 75 dB	65 to 75 dB	65 to 80 dB	*Conditionally Acceptable* Specified land use may be permitted only after detailed analysis of the noise reduction requirements and needed noise insulation features included in the design.
Greater than 75 dB		Greater than 80 dB	*Unacceptable* New construction or development should generally not be undertaken because mitigation is usually not feasible to comply with noise element policies.

In addition to the land use compatibility guidelines, the Noise Element outlines the following noise level goals:

- Interior noise goal of DNL 45 dB or lower for all single and multi-family residences.
- Maximum instantaneous noise level goals indoors, when the noise source is rail activity or aircraft. The project site is located far outside both the DNL 60 dB railroad noise contour and the CNEL 60 dB airport noise contour for Livermore Municipal Airport. Therefore, this analysis assumes these instantaneous noise level goals do not apply.

The Final Supplemental EIR for General Plan Amendment and Rezoning, dated December 2011, identifies DNL 65 dB as the outdoor noise goal for residential outdoor use spaces.

Pleasanton Municipal Code

Section 9.04.030 of the Pleasanton Municipal Code limits noise levels from mechanical equipment such as air-conditioners to 60 dB at residential property lines. Section 9.04.100 limits construction noise to the levels indicated in the Construction Noise section below.

California Building Code (CBC)

The California Building Code limits indoor noise from outdoor sources to DNL 45 dB in habitable rooms of attached housing.[4] Projects exposed to an outdoor DNL greater than 60 dB require an acoustical analysis during the design phase showing that the proposed design will limit outdoor noise to the prescribed allowable interior level. Additionally, if windows must be closed to meet the interior standard, "the design for the structure must also specify a ventilation or air-conditioning system to provide a habitable interior environment."

[4] 2010 California Building Code, California Code of Regulations, Title 24, Part 2, Chapter 12, Section 1207: Sound Transmission.

NOISE ENVIRONMENT

Environmental noise at the site is primarily from vehicle traffic on I-680. To quantify the existing noise environment, two long-term monitors each continuously measured noise levels at the site between 13 and 15 January 2010, between 6 and 8 July 2011, and between 5 and 7 November 2012. In addition, short-term "spot" measurements were conducted and compared with corresponding time periods of the long-term monitors to determine how noise levels vary at different locations on-site and at different elevations. Table 2 summarizes existing noise levels at the site. Figure 1, attached, shows approximate measurement locations.

Table 2: Existing Noise Environment

Site	Location	Date / Time	DNL
LT-1	I-680 Monitor Approximately 155' NE of I-680 centerline, 12' above ground	January 2010 July 2011 and November 2012[5]	74 dB
LT-2 and LT-3	Valley Avenue Monitor Approximately 12' SW of from near lane centerline, 12' above ground		62 to 67 dB
ST-1	I-680 Spot Measurement Approximately 155' NE of I-680 centerline, 10' / 40' above ground	15:45 to 16:00 15 Jan 2010	72 / 75 dB

The Circulation Element of the Pleasanton General Plan 2025 indicates that peak-hour traffic volumes along I-680 are expected to increase by up to 14 percent in the year 2025. This corresponds with approximately a 1-decibel increase in environmental noise. The estimated future noise level at the setback of future homes along I-680, based on this increase in future traffic, is shown in Figure 1, attached.

ANALYSIS AND RECOMMENDATIONS

Environmental Noise

As indicated in Figure 1 attached, estimated future noise levels range from approximately DNL 60 to 75 dB across the site, and DNL 76 dB along the pedestrian / bike trail. This falls into the *conditionally acceptable* category for land use compatibility. The following is based on the preliminary floor plans and elevations dated 10 January 2013.

1. The project will incorporate sound-rated elements into the building shell to reduce environmental noise to DNL 45 dB or lower indoors.
   - Apartments - To provide an estimate of the extent of mitigation that may be needed, preliminary estimates assume a 12-foot by 14-foot room with approximately one-third of one or two exterior facades consisting of windows, and exterior walls consisting of 3-coat stucco over wood sheeting, insulation in stud cavities, and one layer of gypsum board on the interior (two layers on the I-680 façade). Based on these assumptions, preliminary estimates suggest that windows in rooms along I-680 will need to be in the range of STC 35 to 39, and windows in rooms perpendicular to I-680 will need to be in the range of STC 32 to 36. On the façade opposite the freeway, and in the shielded courtyards, needed sound insulation ratings are expected to be STC 30 or lower.
   - Detached Houses – Based on the preliminary site and floor plans provided, initial estimates suggest that windows and doors with sound insulation ratings up to STC 36 will be needed in the homes closest to I-680, and that STC ratings will decrease at houses located farther from the roadway and where they are shielded by barriers or other buildings.

[5] The adjacent Safeway and CVS stores appeared to be operational and open during the November 2012 measurements.

- Sound insulation will need to be determined during the design phase, when floor plans and final grading plans are known, and should include treatment for roof vents and other penetrations.

2. Window and door sound insulation ratings must be for the complete assemblies, including frames and operable sashes. Sound insulation ratings should be from tests conducted by an NVLAP accredited laboratory. For reference, standard dual-pane construction-grade windows and sliding glass doors have sound insulation ratings in the range of STC 26 to 28. Sound insulation ratings of up to STC 36 can typically be achieved using high quality insulated windows with glazing selected to meet the required ratings. Sound insulation ratings between STC 36 and 39 can be achieved by some specialty window manufacturers by using 1-inch or 1¼-inch glazing sections. Ratings above STC 39 typically require dual sash or "four track" windows.
3. Since windows of the apartment units will need to be closed to meet the interior noise criterion, the design will include "... a ventilation or air-conditioning system to provide a habitable interior environment." This will be coordinated with the project mechanical engineer so as not to compromise sound insulation of the exterior assemblies.
4. Noise levels in outdoor spaces will vary, depending on the location and orientation on site. The site plan shows the community park and pool in the center of the site, which will be mostly shielded from I-680 by the apartment buildings. As shown in Figure 1, the design will include a 16-foot tall combination earthen berm (8-foot) and noise barrier (8-foot) in the southern portion of the site, and 8-foot tall noise barriers at selected yards of detached houses. Following are initial comments that assume the site grade will not change significantly in the future.
   - Apartments – As shown in the preliminary site plan, the combined distance and shielding from the proposed apartment buildings will reduce estimated future traffic noise in the community park and pool area to approximately DNL 65 dB or lower. This is consistent with the City's goal for this space.
   - Detached Houses –
     - At the setback of the proposed houses nearest to I-680, estimated future un-shielded traffic noise (at the second and third stories), is approximately DNL 73 dB. The planned 16-foot tall earthen berm and noise barrier, and noise barriers at detached houses, will reduce traffic noise to approximately DNL 65 dB and below in shielded yards at-grade.
     - Along Valley Avenue, it is assumed that homes will front the roadway with side or rear yards. Shielding from the proposed homes will reduce estimated traffic noise to between approximately DNL 60 and 65 dB in these yards.
   - Pedestrian / Bike Trail – Estimated future traffic noise along the pedestrian / bike trail is approximately DNL 76 dB.
   - Effective noise barriers must be solid from bottom to top with no cracks or gaps, and must have a minimum surface density of approximately three pounds per square foot. Barriers may be constructed of a variety of materials including earthen berms, CMU, and plaster walls. Options include a combination of more than one material, such as a CMU wall atop an earthen berm.
5. The northern portion of the site is located adjacent to commercial businesses which include a Safeway loading dock and CVS drive-through pharmacy. The north westernmost apartment building will be located approximately 65 feet from the nearest drive isle and 145 feet from Safeway's loading dock. The nearest homes to CVS's drive-through will be approximately 150 feet away. The businesses are constrained by conditions of approval included in PUD-02-07M, dated 19 October 2010, which includes the following provisions for loading/off-loading activities and drive through activities.
   - Safeway delivery/loading/unloading hours are limited to between 6:00 AM and 12:00 PM (midnight)
   - CVS drive-through pharmacy activity is limited to pharmaceutical purchases only
   - Parking lot sweeping and garbage pick-up is limited to between 6:00 AM and 10:00 PM
   - Delivery trucks sand vendors shall access the site via Bernal Avenue

   The adjacency of the site to the retail space to the north should be disclosed to potential residents,

and they should expect to hear some noise from commercial activity, including Safeway's loading docks.

TRAFFIC NOISE ASSOCIATED WITH THE PROJECT

Project-generated traffic volumes are provided in a letter titled Trip Generation Analysis for Residential Development of Bernal Property, dated 8 November 2012, by Hexagon Transportation Consultants, Inc. The letter indicates that traffic volumes associated with the project will be less than both the previously planned and approved office project, and the recently re-designated residential use for the site. Corresponding noise levels from project-generated traffic will be less at off-site residences than they would have been with either of those projects. Further, based on the peak-hour traffic volumes included in the letter, and noise levels measure at the site, estimated traffic noise from vehicles associated with the project will increase environmental noise levels (DNL) at residence across Valley Avenue from the site by 2-decibels or less. This is generally considered a less-than-significant increase.

MECHANICAL EQUIPMENT NOISE ASSOCIATED WITH THE PROJECT

Stationary noise sources associated with the project may consist of residential air-conditioning units. Units should be selected and located to meet the City's Municipal Code limit of 60 dB at adjacent residential property lines. Mitigation for these types of sources generally consists of selecting quiet units and locating far from property lines. Details should be determined during the design phase.

CONSTRUCTION NOISE

The project shall incorporate the following guidelines to reduce the potential impact of construction noise. These guidelines are taken from Noise Mitigation Measure 4.J-1 from the Final Supplemental EIR, General Plan Amendment and Rezonings report dated December 2011.

- Comply with the applicable construction noise exposure criteria established in the Pleasanton Municipal Code, Section 9.04.100.
    - Notwithstanding any other provision of this chapter, between the hours of 8:00 a.m. and 8:00 p.m. daily, except Sunday and holidays, when the exemption shall apply between 10:00 a.m. and 6:00 p.m., construction, alteration or repair activities which are authorized by valid city permit shall be allowed if they meet at least one of the following noise limitations.
        - No individual piece of equipment shall produce a noise level exceeding 83 dB at a distance of 25 feet. If the devise is housed within a structure on the property, the measurement shall be made outside the structure at a distance as close to 25 feet from the equipment as possible; or
        - The noise level at any point outside of the property plane of the project shall not exceed 86 dB.
- Locate stationary construction equipment as far from adjacent occupied building as possible.
- Select routes for movement of construction-related vehicles and equipment so that noise-sensitive areas, including residences, and outdoor recreation areas, are avoided as much as possible. Include these routes in materials submitted to the City of Pleasanton for approval prior to the issuance of building permits.
- All site improvements and construction activities shall be limited to the hours of 8:00 a.m. to 5:00 p.m., Monday through Saturday. In addition, no construction shall be allowed on State and federal holidays. If complaints are received regarding the Saturday construction hours, the Community Development Director may modify or revoke the Saturday construction hours. The Community Development Director may allow earlier "start-times" for specific construction activities (e.g., concrete-foundation/floor pouring). If it can be demonstrated to the satisfaction of the Community

Development Director that the construction and construction traffic noise will not affect nearby residents.

- All construction equipment must meet DMV noise standards and shall be equipped with muffling devices.
- Designate a noise disturbance coordinator who will be responsible for responding to complaints about noise during construction. The telephone number of the noise disturbance coordinator shall be conspicuously posted at the construction site and shall be provided to the City of Pleasanton. Copies of the construction schedule shall also be posted at nearby noise-sensitive areas.

* * *

● INDICATES APPROXIMATE NOISE MEASUREMENT LOCATION

NOTE: DRAWING PROVIDED BY OTHERS; NO SCALE

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CHARLES M. SALTER ASSOCIATES, INC.
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THE COMMONS AT GATEWAY SITE PLAN INDICATING ESTIMATED FUTURE NOISE ENVIRONMENT

FIGURE 1

CSA PROJECT NO. 12-0519
10 JUNE 2013
JMR

Charles M Salter Associates Inc 100 West San Fernando Suite 600 San Jose California 95113 Tel: 408 295 4944 Fax: 408 295 4949

Appendix E: Transportation Assessment

FEHR PEERS

TECHNICAL MEMORANDUM

Date: July 3, 2013

To: Mike Tassano, City of Pleasanton

From: Kathrin Tellez and Sarah Nadiranto

Subject: Transportation Assessment for Commons at Gateway

WC11-2878.02

Fehr & Peers conducted a transportation assessment for the proposed Commons at Gateway (Project) in Pleasanton, California. This study evaluates peak-hour intersection and driveway operations under existing and future conditions. Recommendations to improve site access and circulation are provided. The following presents our project understanding, analysis methods, analysis results, site access and circulation, and conclusions and recommendations.

PROJECT DESCRIPTION

The Commons at Gateway is located on a 26.72 acre vacant parcel, east of Interstate 680 (I-680) and south of Bernal Avenue. The site is bound by a vacant parcel to the south, Interstate 680 to the west, the Pleasanton Gateway Shopping Center to the north, and Valley Avenue to the east, as shown on **Figure 1**.

The Project proposes to construct 307 residential units, including 210 apartment units and 97 single-family homes. Each apartment would have a 1-car private garage with additional driveway and on-street parking. The single family homes would be two- and three-story homes each with a private two-car garage. Some homes would also have driveway parking. On-street parking would also be available on the east side of Valley Avenue. The development would be oriented around a 1.3 acre community park that includes a business center, conference facilities, workout area, resort style swimming pool, media center, and spa. The community park area would also include electric vehicle charging stations. These amenities would be available to all community residents.

Access to the site would be provided by two existing roundabout intersections from Valley Avenue and an internal connection from Bernal Avenue through the Pleasanton Gateway

shopping center to the proposed Project. Along Valley Avenue, northern access would be provided at Valley Avenue at Gateway Commons intersection and southern access would be provided at the Valley Avenue and East Gate Way intersection. From Bernal Avenue, access would be provided from a signalized intersection opposite Koll Center Drive and an internal drive aisle through the retail center. A conceptual Project site plan is shown on **Figure 2**.

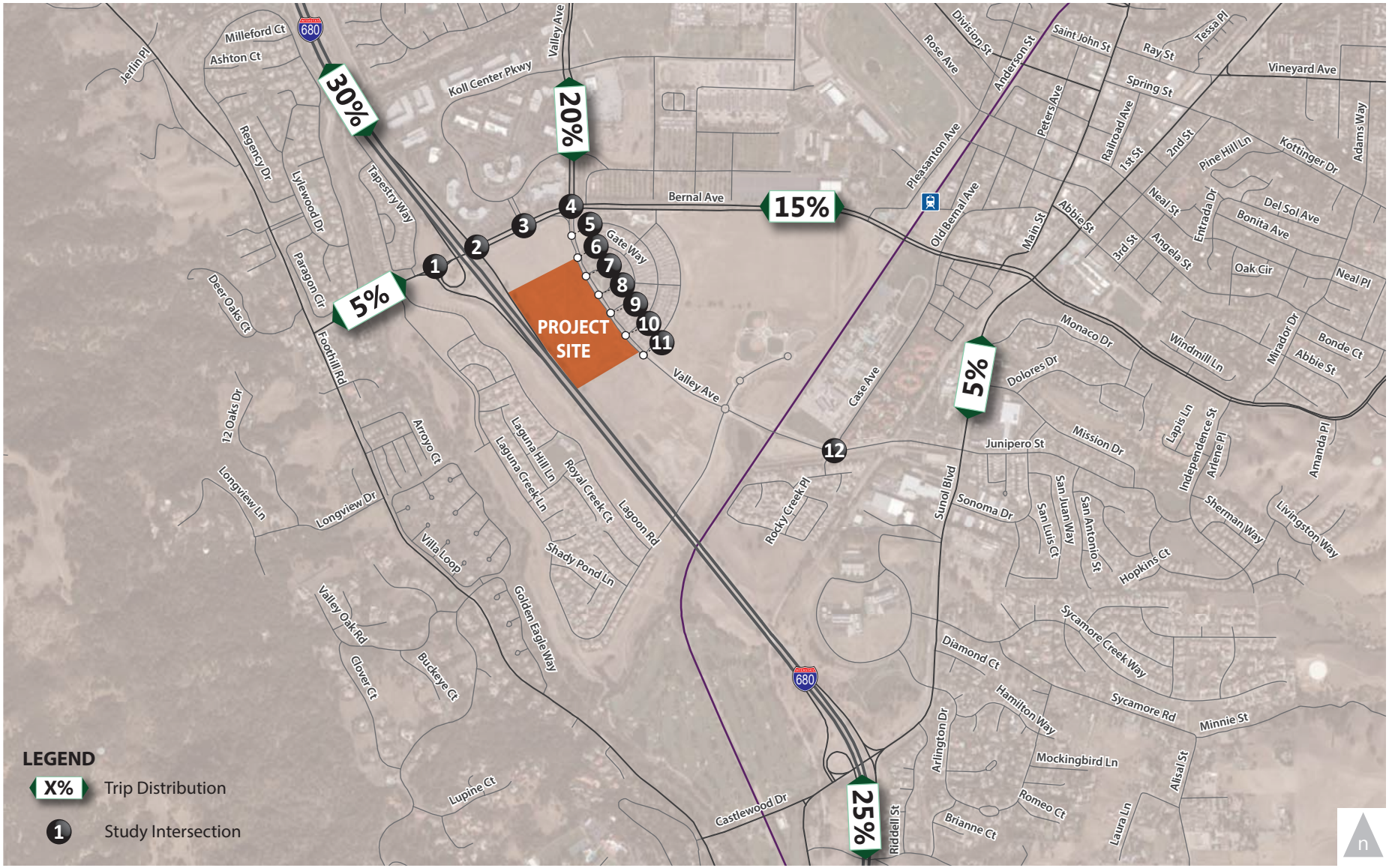
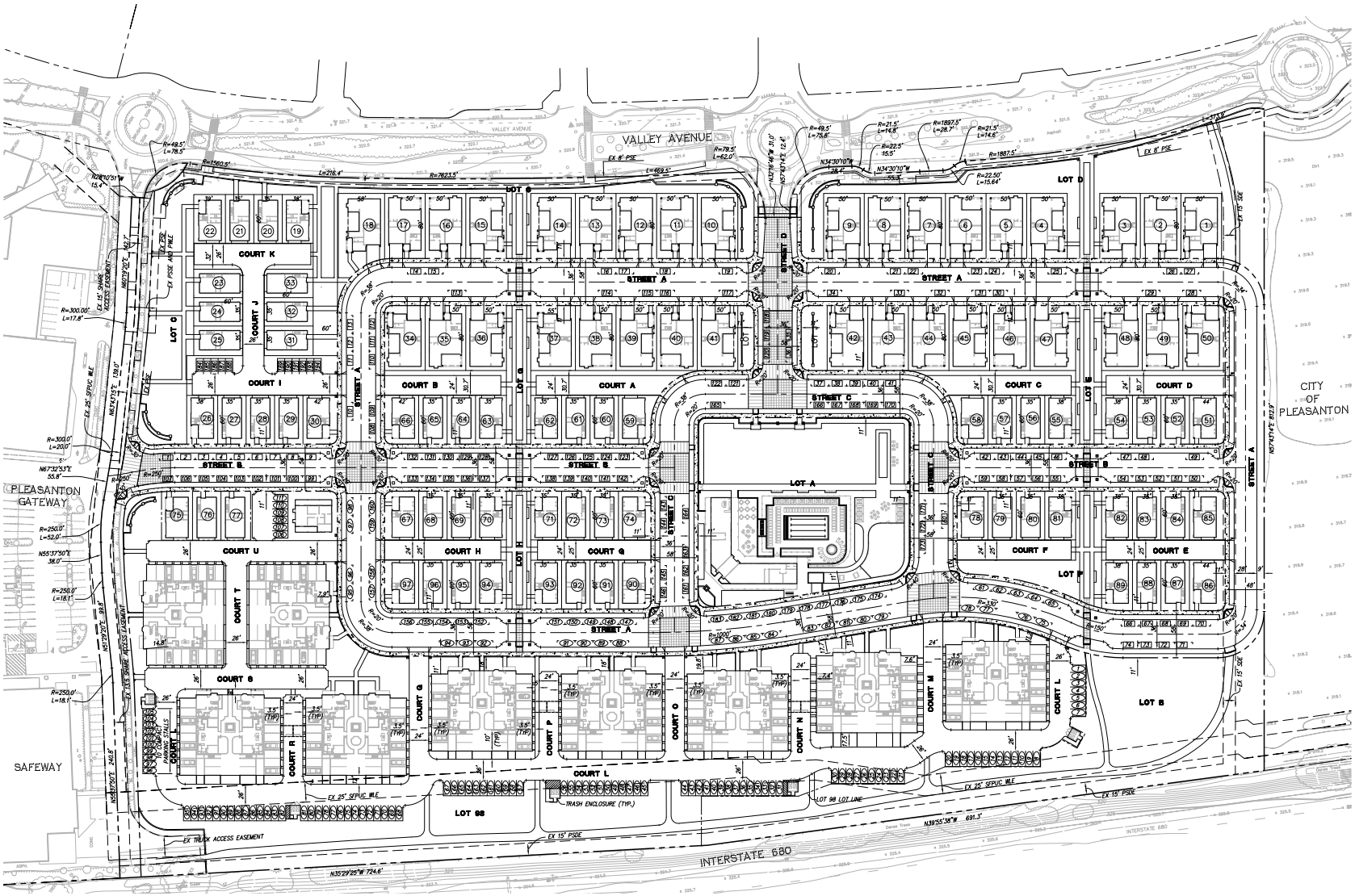


Figure 1.

Study Area and Trip Distribution

WC11-2878.02_1_StudyArea

FEHR PEERS



Source: Ruggeri-Jensen-Azar

Figure 2.

Conceptual Project Site Plan

WC11-2878.02_2_SitePlan

FEHR PEERS

ANALYSIS METHODS

Study Area and Analysis Scenarios

The following intersections were included in this assessment as they provide access to the Project site and are likely to be affected by the Project:

1. Interstate 680 Southbound Ramps at Bernal Avenue
2. Interstate 680 Northbound Ramps at Bernal Avenue
3. Koll Center Drive at Bernal Avenue
4. Valley Avenue at Bernal Avenue
5. Valley Avenue at Gateway Right-in/right-out Driveway
6. Valley Avenue at Gateway Commons
7. Valley Avenue at Wild Rose Place North
8. Valley Avenue at Wild Rose Place South
9. Valley Avenue at East Gate Way
10. Valley Avenue at Whispering Oaks Way
11. Valley Avenue at Oak Vista Way
12. Valley Avenue at Case Avenue

Study intersection operations were evaluated during the peak hour of traffic for weekday morning (7:00 to 9:00 AM) and weekday evening (4:00 to 6:00 PM) peak periods for the following scenarios:

- ***Existing*** – Existing conditions based on recent traffic counts.
- ***Existing Plus Project*** – Existing condition plus Project-related traffic.
- ***Existing Plus Approved Projects*** – Near-term conditions, which consider existing traffic plus anticipated traffic from approved developments that could affect the volumes at the study intersections.
- ***Existing Plus Approved Projects Plus Project*** – Near-term conditions plus Project-related traffic.
- ***Cumulative Without Project*** – Future forecast conditions, which considers local and regional traffic growth.
- ***Cumulative With Project*** – Future forecast conditions plus Project-related traffic.

Existing Conditions

This section describes transportation facilities in the Project study area, including the surrounding roadway network, transit, pedestrian, and bicycle facilities in the Project site vicinity.

Regional access to the Project site is provided by ***Interstate 680 (I-680)***. I-680 is a north-south freeway that is near the western boundary of the City of Pleasanton. I-680 extends from the City of Fairfield in the north to the City of San Jose in the south. In Pleasanton, three travel lanes per direction are provided and the facility carries approximately 122,000 vehicles per day, based on information provided by Caltrans. Direct access to the study area is provided by a full interchange at Bernal Avenue, while secondary access is provided at Sunol Boulevard.

Bernal Avenue is an east-west roadway in the Project vicinity. East of downtown Pleasanton, the roadway continues north-south to Stanley Boulevard where it continues as Valley Avenue. Right-turn pockets and exclusive left-turn lanes are provided at signalized intersections and major driveways. The number of travel lanes on Bernal Avenue varies between two and six and Class II bike lanes are provided on the north side of the roadway from Valley Avenue to Pleasanton Avenue and on the south side of the roadway from Oak Vista Way to Pleasanton Avenue. The bike lanes continue east after Old Bernal Avenue. Parking is not permitted along Bernal Avenue. Sidewalks are provided on both sides of the roadway near the Project. In the Project vicinity, the posted speed limit of Bernal Avenue ranges from 35 to 45 miles per hour (mph).

Valley Avenue is a two- to four-lane roadway that forms a ring road with Bernal Avenue around downtown Pleasanton. Near the Project, Valley Avenue continues south of Bernal Avenue to Sunol Boulevard, forming the eastern boundary of the Project. Valley Avenue provides two lanes of travel in both directions north of Bernal Avenue and one lane of travel in both directions south of Bernal Avenue. Right-turn pockets and exclusive left-turn lanes are provided at signalized intersections and major driveways. Between Bernal Avenue in the north and Case Avenue in the south, there are four, one-lane roundabouts along Valley Avenue. Parking pockets are provided on the east side of Valley Avenue. Parking is not permitted on the west side of Valley Avenue along the Project frontage. Class II bike lanes are provided south of Bernal Avenue. A Class III bike route is provided north of Bernal Avenue. Sidewalks are provided on the west side of the roadway north of Bernal Avenue and on the east side of the roadway south of Bernal Avenue. The posted speed limit is 35 miles per hour along the roadway and 15 miles per hour at the roundabouts.

Case Avenue is a two-lane roadway, running north-south between Valley Avenue and Bernal Avenue. The roadway provides access to Hearst Elementary School and Pleasanton Middle School, both located one mile south of the Project. Two-way, left-turn lanes are provided along Case Avenue. Dedicated left-turn lanes are provided at the signalized intersections and a right-turn pocket is provided at the entrance to the middle school. Class II bike lanes and sidewalks are provided along both sides of the street. On-street parking is permitted along most of the roadway. The posted speed limit is 25 miles per hour.

Existing Pedestrian and Bicycle Facilities

Pedestrian facilities include sidewalks, crosswalks, and pedestrian signals. Pedestrian facilities are provided on public roadways adjacent to the site. In the immediate Project vicinity, pedestrian crosswalks, push buttons and signals are provided at the signalized intersections on Bernal Avenue. At the roundabouts, crosswalks are provided along the northern and southern legs. Curb ramps are provided along the east and west legs of existing roundabouts to facilitate street crossings, but crosswalks are not striped. Sidewalks are not currently provided along the Project frontage Valley Avenue, but would be constructed with the project. Pedestrian counts at the intersections on Valley Avenue indicate that the most pedestrian activity occurs at the Valley Avenue at Oak Vista Way intersection with 23 pedestrians crossing Oak Vista Way during the morning peak hour and 8 pedestrian crossings during the afternoon peak hour.

Bicycle facilities in Pleasanton include the following:

- *Bike paths (Class I)* – Paved trails that are separated from roadways. There are also several unpaved off-street trails within Pleasanton. These facilities are typically shared with pedestrians, although bicycles must yield to pedestrians.
- *Bike lanes (Class II)* – Lanes on roadways designated for use by bicycles through striping, pavement legends, and signs. There may or may not be parking allowed on the roadway
- *Bike routes (Class III)* – Designated roadways for bicycle use by signs only; may or may not include additional pavement width for cyclists.
- *Side Paths* – An off-street facility located adjacent to a roadway that is shared with pedestrians. These paths may be paved or unpaved.

A paved trail encircles the west and north sides of the Koll Center. A trail that parallels I-680 is also provided, with access from Bernal Avenue, west of Meadowlark Drive. Class II bike lanes are provided on Valley Avenue south of Bernal Avenue, westbound Bernal Avenue east of Valley

Avenue, and Laguna Creek Lane between Valley Avenue and Lagoon Road. A side path is provided on the south side of Bernal Avenue east of Valley for pedestrians and bicyclists. A Class III bike route is provided along Valley Avenue north of Bernal Avenue. According to the 2010 Bicycle and Pedestrian Master Plan, Class II bike lanes are proposed along Valley Avenue north of Bernal Avenue.

Existing Transit Service

Transit service in the area is provided by Wheels, Pleasanton Paratransit, Altamont Commuter Express, Amtrak, and Bay Area Rapid Transit (BART). Wheels provides fixed-route and paratransit service throughout the Tri-Valley and connections to other transit service providers. Several Wheels bus routes serve the Project as described in **Table 1**.

The Altamont Commuter Express (ACE) Station is located about one mile (20 minute walk, less than 5 minute bike ride, or a short bus ride) from the Project site, as shown on Figure 2. ACE provides regional transportation connections from Stockton, through Pleasanton, down to San Jose and Santa Clara. Westbound service is provided for the morning commute with eastbound service for the afternoon and the evening commute. Train headways are approximately 60 minutes during both time periods.

Two Bay Area Rapid Transit (BART) stations are located in the City of Pleasanton. West Dublin/Pleasanton BART station is located on Stoneridge Mall Road about 4 miles (8 minute drive) from the Project site. Dublin/Pleasanton BART Station is located on Owens Drive about six miles (10 minute drive) from the Project site. BART provides regional transportation connections to much of the Bay Area and the Dublin/Pleasanton line provides direct access to San Francisco, with stops in Hayward and Oakland where connections may be made to other lines. BART train headways are 15-20 minutes from approximately 5:00 AM to 12:00 AM.

TABLE 1
WHEELS BUS ROUTES

Lines	Route	Nearest Stop	Weekday		Weekend	
			Hours	Headway	Hours	Headway
Rapid, Local, and Express Routes						
8	E. BART to Downtown Pleasanton to E. BART	Valley Ave at Wild Rose Place	6:00 AM to 7:00 PM	60 minutes	8:00 AM to 9:00 PM (Saturdays) 8:30 AM to 2:00 PM (Sundays)	60 minutes (Saturday) 30 minutes (Sunday)
53	Pleasanton ACE Station to W. BART	Pleasanton ACE Station	5:30 AM to 8:45 AM; 4:00 PM to 7:30 PM	30 minutes to 75 minutes	Weekend Service not provided	
54	Pleasanton ACE Station to Hacienda Business Park to BART	Koll Center Parkway at Valley Avenue	5:30 AM to 9:30 AM; 3:45 PM to 6:30 PM	60 minutes to 75 minutes	Weekend Service not provided	
School Routes						
602	Del Prado Park to Foothill High School	Koll Center Parkway at Valley Avenue	7:00 AM to 7:40 AM; 3:00 PM to 3:25 PM	N/A[1]	Weekend Service not provided	

Notes:
1. One bus provided in the AM. Two buses are provided during the PM; however both busses are scheduled to leave at the same time.

Source: Wheels, Livermore Amador Valley Transit Authority and Fehr & Peers, January 2013.

Existing Roadway Operations

Weekday morning (7:00 to 9:00 AM) and evening (4:00 to 6:00 PM) peak period intersection vehicle turning movement counts were conducted in March 2013 for the driveways that serve the Project site, including shared driveways that provide access to the Gateway shopping center. Traffic counts were collected after the Safeway gas station was open and operational for a few weeks and schools were in normal session. Vehicle counts for the signalized intersection were obtained from the City of Pleasanton, based on Spring 2013 data. For the study intersections, the single hour with the highest traffic volumes during the count periods was identified. Due to the different data collection sources, imbalances between the existing intersection volume counts

were observed. Volume balancing was completed for intersections along Bernal Avenue and Valley Avenue to reduce this imbalance. The peak hour volumes are presented on **Figure 3** along with the existing lane configuration and traffic control. The existing driveway traffic count data are provided in the Technical Appendix.

The operations of roadway facilities are described with the term "level of service" (LOS) in this study. **Appendix A** describes the LOS analysis methods. The City of Pleasanton has set LOS D as the level of acceptable delay at most major intersections, which are defined as intersections of two or more Arterials or one Arterial and one Collector Street. A number of intersections, referred to as Gateway and Exempted Downtown intersections, are exempt from the LOS D policy. These intersections may have a level of service below the LOS D standard if no reasonable mitigation exists or if the necessary mitigation is contrary to other goals and policies of the City. For Gateway intersections, additional vehicle capacity could encourage additional vehicle traffic that should remain on the regional transportation system and could also degrade the pedestrian experience and visual character of the intersection. Gateway intersections evaluated in this assessment include:

- Bernal Avenue at I-680 Northbound Ramp
- Bernal Avenue at I-680 Southbound Ramp
- Valley Avenue at Bernal Avenue

Although the City strives to maintain access to the roadway system from driveways and local streets, there is not a defined level of service standard for those locations.

Results of the existing conditions analysis are presented in **Table 3**, which shows that the intersections that provide access to the Project site operate at LOS D or better during both peak hours. Results of the queue assessment, presented in **Table 4** and **Table 5,** indicate that vehicle queues periodically (typically one to two times during either the AM or PM peak hours) spillback from the available storage for some travel movements.

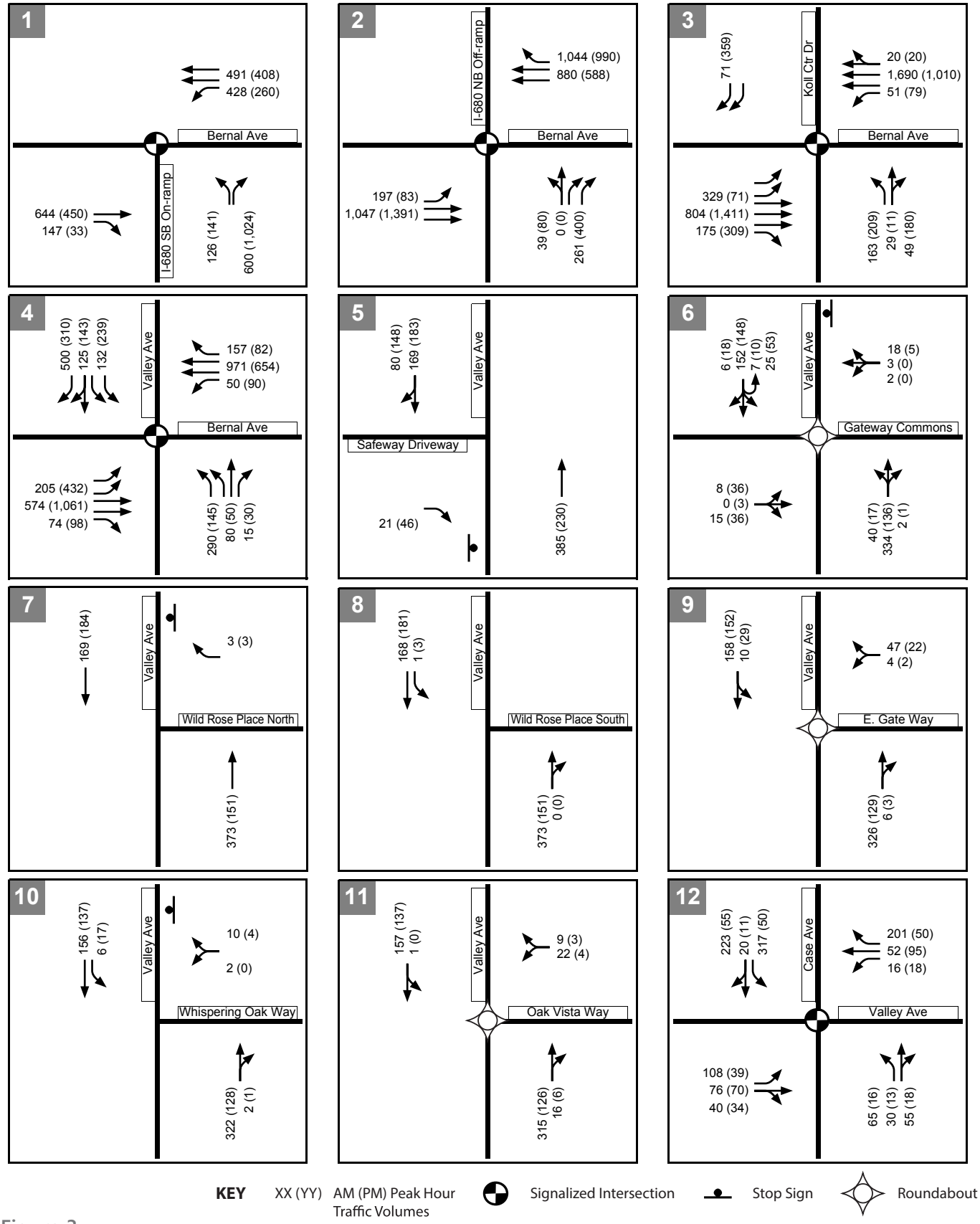


Figure 3.

Existing Peak Hour
Intersection Volumes, Traffic Control and Lane Configurations

FEHR PEERS

WC11-2878.02_3_ExVols

PROJECT TRAFFIC ESTIMATES

To estimate conditions with the Project, vehicle trips expected to be added to the roadway system were combined with existing traffic volumes through the following process:

1. ***Trip Generation*** – The *amount* of vehicle traffic entering and exiting the Project site was estimated.
2. ***Trip Distribution*** – The *direction* trips use to approach and depart the site was projected.
3. ***Trip Assignment*** – Trips were then *assigned* to specific roadway segments and intersection turning movements.

Trip Generation

Trip generation refers to the process of estimating the amount of vehicular traffic a project would add to the surrounding roadway system. Estimates are created on a daily basis and for the peak one-hour periods during the morning and evening commute periods when traffic volumes on the adjacent streets are highest. The Project trip generation was estimated using rates from the Institute of Transportation Engineers *Trip Generation* (9th Edition) land use numbers 220 (apartment) and 210 (single-family detached housing). The resulting trip generation estimates are shown in **Table 2.**

The Project is located in close proximity bound by Gateway Center, a retail center anchored by a Safeway supermarket, pharmacy, bank, and other small shops and restaurants. On the north side of Bernal Avenue, approximately ¼ of a mile from the center of the Project site, is the Koll Business Center with over one million square feet of office development. Due to the close proximity of the retail plaza and employment center, it is anticipated that some of the future site residents might chose to live in the development due to the proximity to their work place and some may choose to walk to the retail center as most of their daily needs can be met by establishments within a short walking distance.

To estimate the potential level of interaction between the Project and adjacent sites, we used a mixed-use trip (MXD) generation model to estimate the expected interaction between the various uses in the immediate vicinity of the Project site. The MXD model suggests that during the morning peak hour, approximately 5 percent of the trips generated by the Project would be to one of the adjacent destinations, with up to 10 percent of the trips to an adjacent destination during the PM peak hour and on a daily basis.

Considering the potential for non-motorized trips to adjacent uses, the Project is expected to generate approximately 2,180 daily vehicle trips, including 177 AM peak hour vehicle trips and 211 PM peak hour vehicle trips.

TABLE 2
PROJECT TRIP GENERATION ESTIMATES

Land Use	ITE Code	Units	Daily	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Apartments	220[1]	210	1,400	21	86	107	86	47	133
Single Family Detached Housing	210[2]	97	1,020	20	59	79	64	38	102
Total			*2,420*	*41*	*145*	*186*	*150*	*85*	*235*
Walk/Bike Trips to Adjacent Development [3]			-240	-2	-7	-9	-15	-9	-24
Net Vehicle Trips			***2,180***	***39***	***138***	***177***	***135***	***76***	***211***

Notes:
1. Trip generated based on Institute of Transportation Engineers (ITE), *Trip Generation* (9th Edition) equations Apartments (Land Use Code 220):
Daily: T = 6.06(X) + 123.56
AM Peak Hour: T = 0.49(X) +3.73; Enter = 20%; Exit = 80%
PM Peak Hour: T = 0.55(X) +17.65; Enter = 65%; Exit = 35%
Where T = trips generated, X = Dwelling Units
2. Trip generated based on Institute of Transportation Engineers (ITE), *Trip Generation* (9th Edition) equations for Single Family Detached Housing (Land Use Code 210):
Daily: Ln(T) = 0.92Ln(X) + 2.72
AM Peak Hour: T = 0.70(X) + 9.74; Enter = 25%; Exit = 75%
PM Peak Hour: Ln(T) = 0.90Ln(X) + 0.51; Enter = 63%; Exit = 37%
Where T = trips generated, X = Dwelling Units
3. Walk/bike trips to adjacent retail development and employment center: Daily = 10%; AM = 5%; PM = 10%.
Source: *Trip Generation* (9th Edition), ITE, 2012; Fehr & Peers, April 2013.

Trip Distribution and Assignment

Vehicle trips expected to be generated by the Project were assigned to the roadway system based on existing travel patterns, locations of complementary land uses, Project site driveway location, and location of parking fields within the site. Trip distribution percentages are presented on **Figure 1.** The net new vehicle traffic generated by the Project was then assigned to streets in the

local roadway system for the AM and PM peak hours. The resulting Project trip distribution through for each study intersection is shown on **Figure 4**.

Project intersection volumes were added to existing traffic counts, to show Existing Plus Project traffic conditions. The resulting traffic counts are shown on **Figure 5**.

TRAFFIC FORECASTS

To assess the changes in traffic flow through the City with approved and planned development, the City of Pleasanton Travel Demand model was used to assess citywide vehicular travel changes. For this Project, the near-term and cumulative forecasts developed for the Housing Element Analysis were adjusted to remove traffic forecasts associated with development of the proposed Project on the site. **Figures 6** through **9** present the Near-Term without Project, Near-Term with Project, Cumulative without Project and Cumulative with Project Peak Hour Traffic Volumes, Lane Configurations, and Traffic Control Devices. These forecasts reflect buildout of the adjacent Gateway Center.

ROADWAY NETWORK

No changes to the lane configurations at the study intersections were assumed, except for Project driveways for the Existing and Near-Term analyses. For the cumulative analyses, planned improvements to the I-680 interchange at Bernal Avenue were assumed to be in place. Planned improvements include modifications to the westbound approach at Bernal Avenue at I-680 northbound ramps to widen the on-ramp to permit the conversion of a westbound through lane to a through-right lane and to the westbound approach at the Bernal Avenue at I-680 southbound ramps to provide dual left-turn lanes and one through lane. The lane configurations assumed under each scenario are shown on the volume figures.

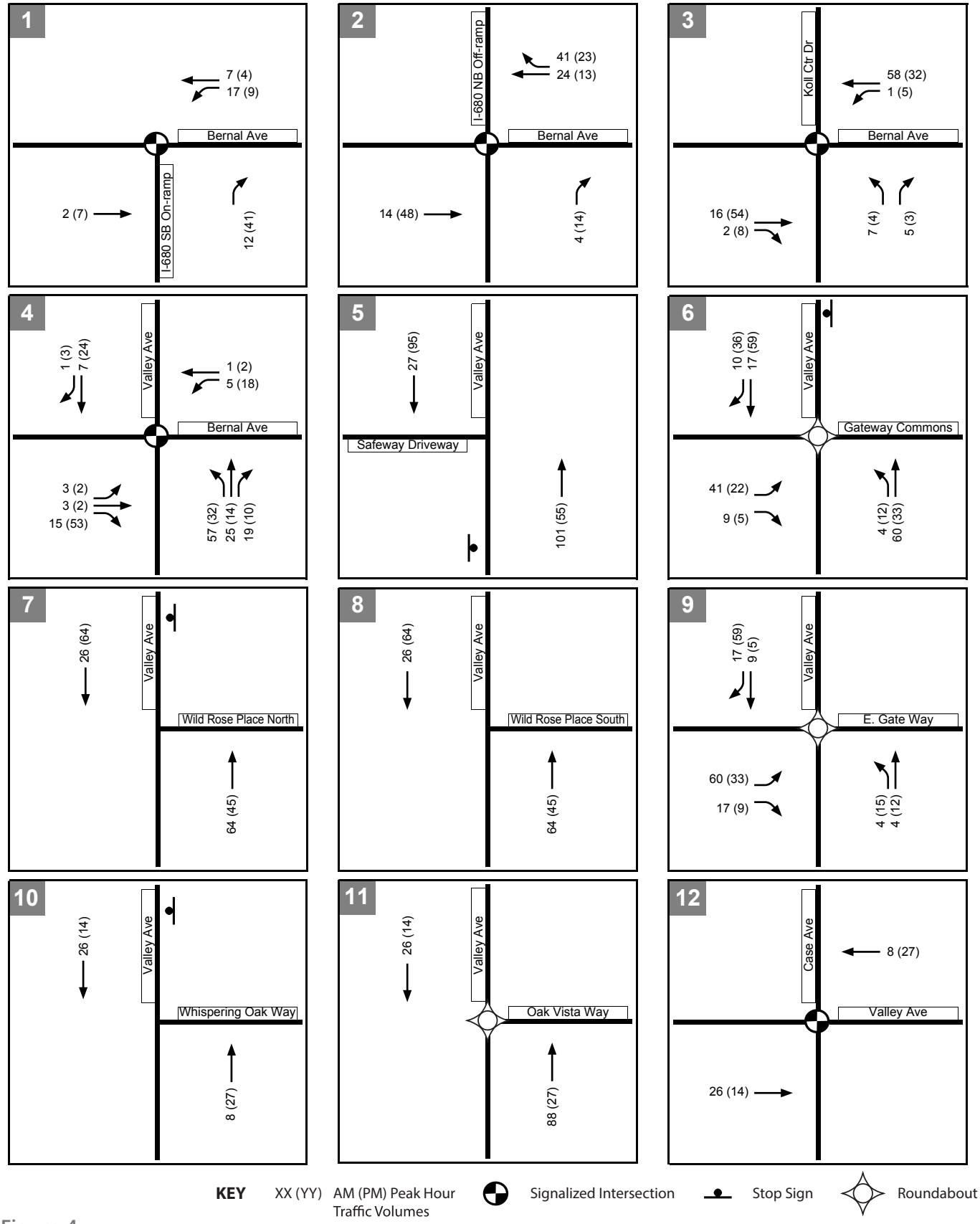


Figure 4.

Project Peak Hour Intersection Volumes and Traffic Control

WC11-2878.02_4_ProjTripVols

FEHR PEERS

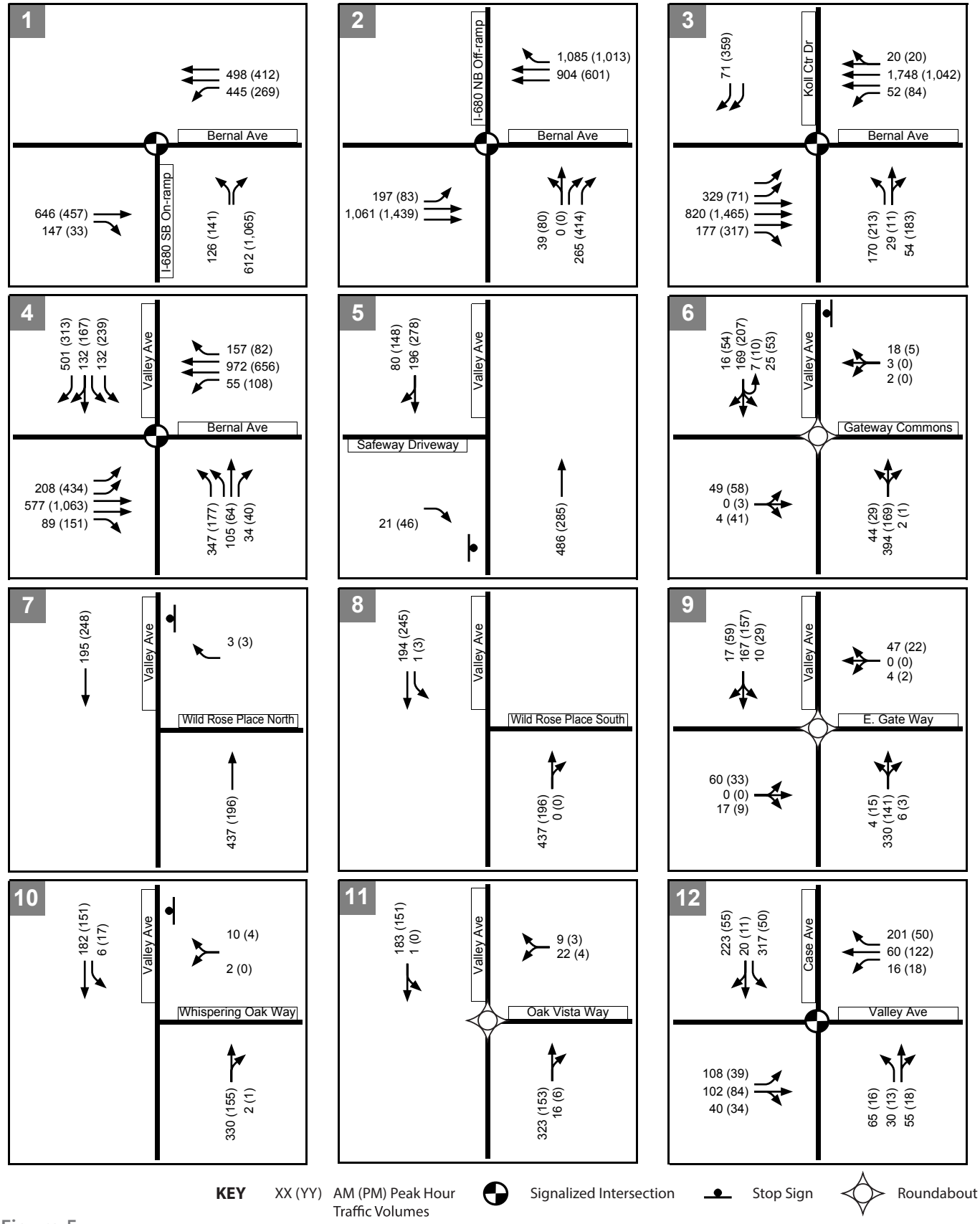


Figure 5.

Existing Plus Project Peak Hour Intersection Volumes, Traffic Control and Lane Configurations

WC11-2878.02_5_ExPlusProjVols

FEHR PEERS

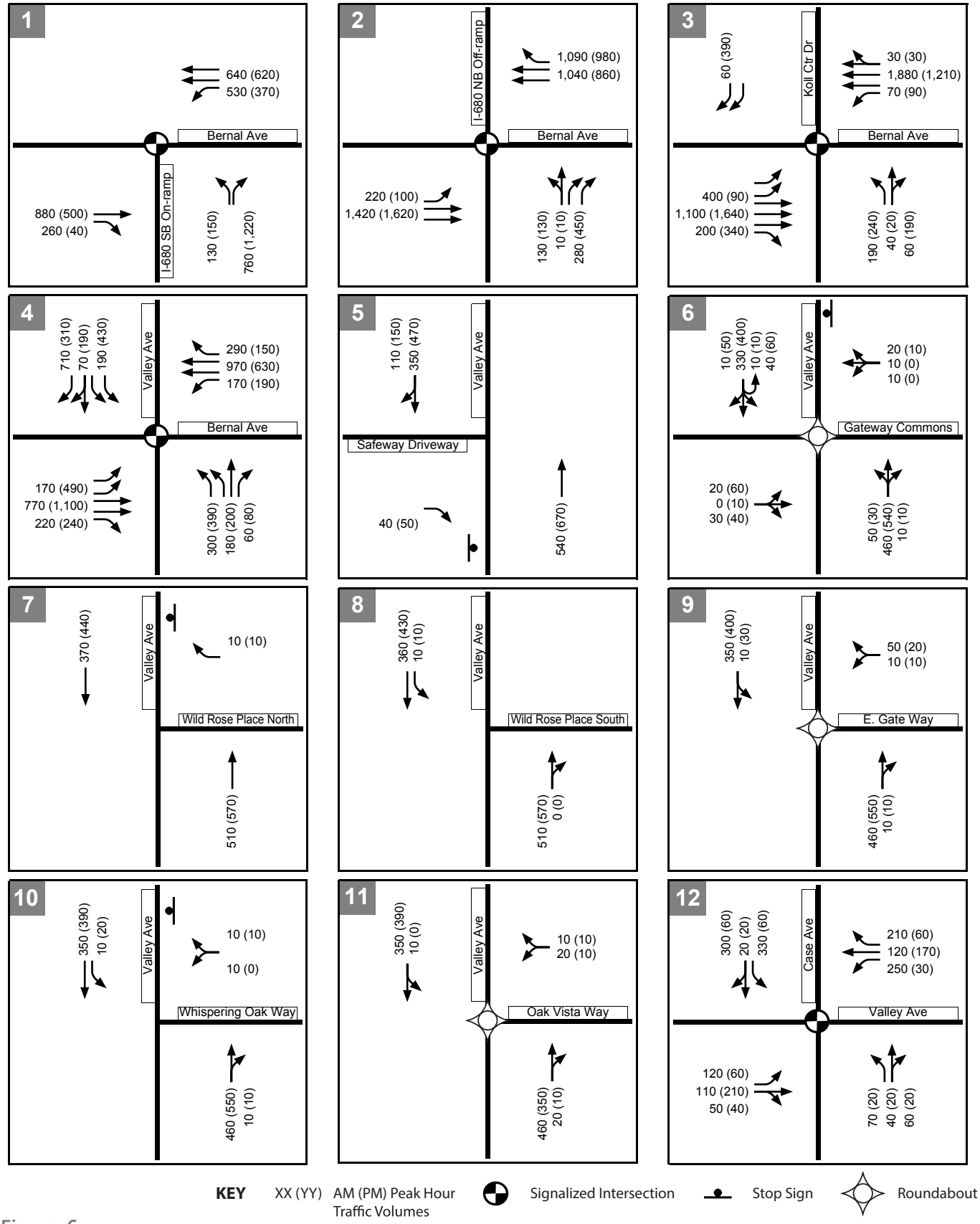


Figure 6.

Near Term No Project Peak Hour

Intersection Volumes, Traffic Control and Lane Configurations

FEHR PEERS

WC11-2878.02_6_ExPlusAppProjVols

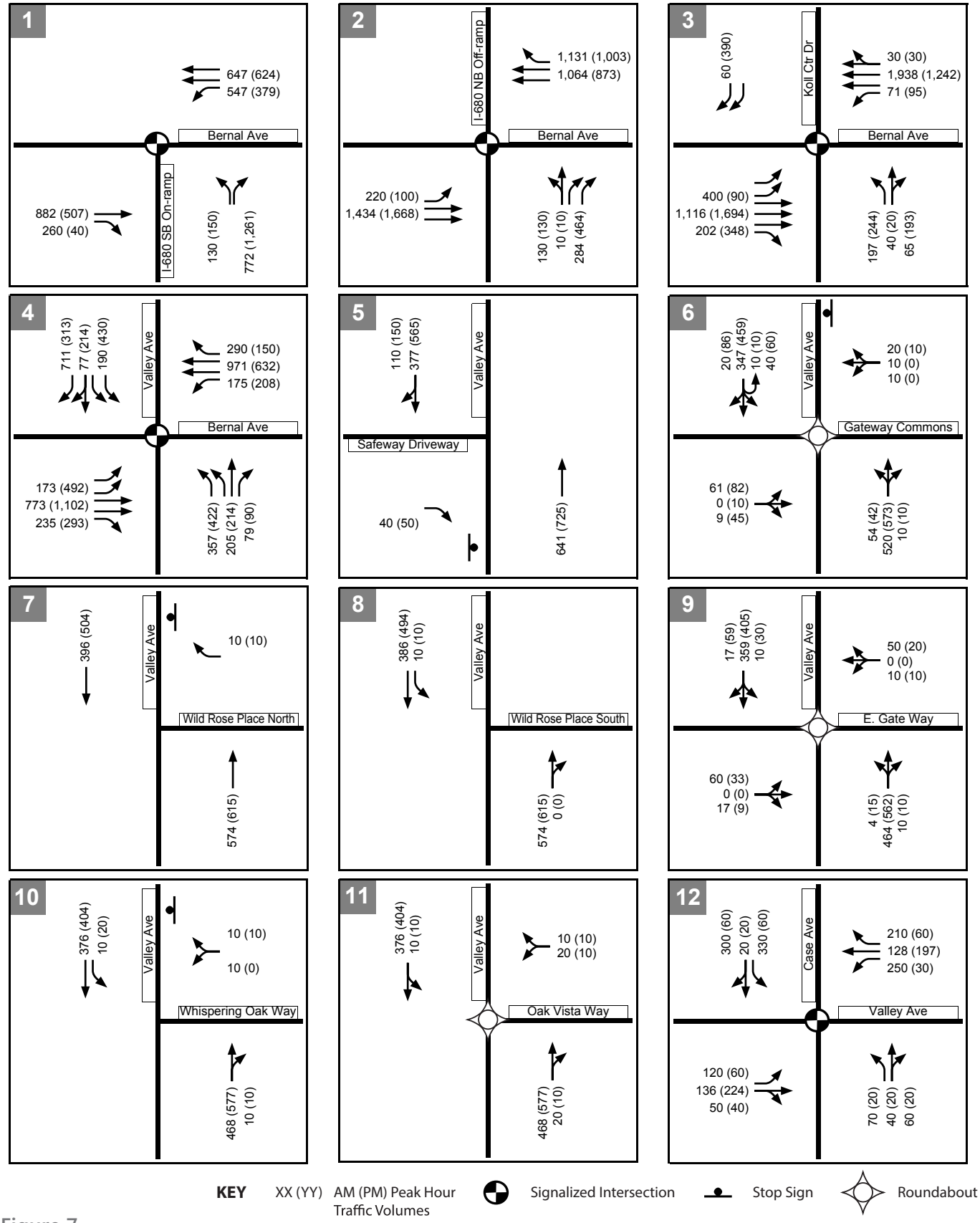


Figure 7.

Near Term Plus Project Peak Hour

Intersection Volumes, Traffic Control and Lane Configurations

FEHR PEERS

WC11-2878.02_7_ExPlusProjPlusAppVols

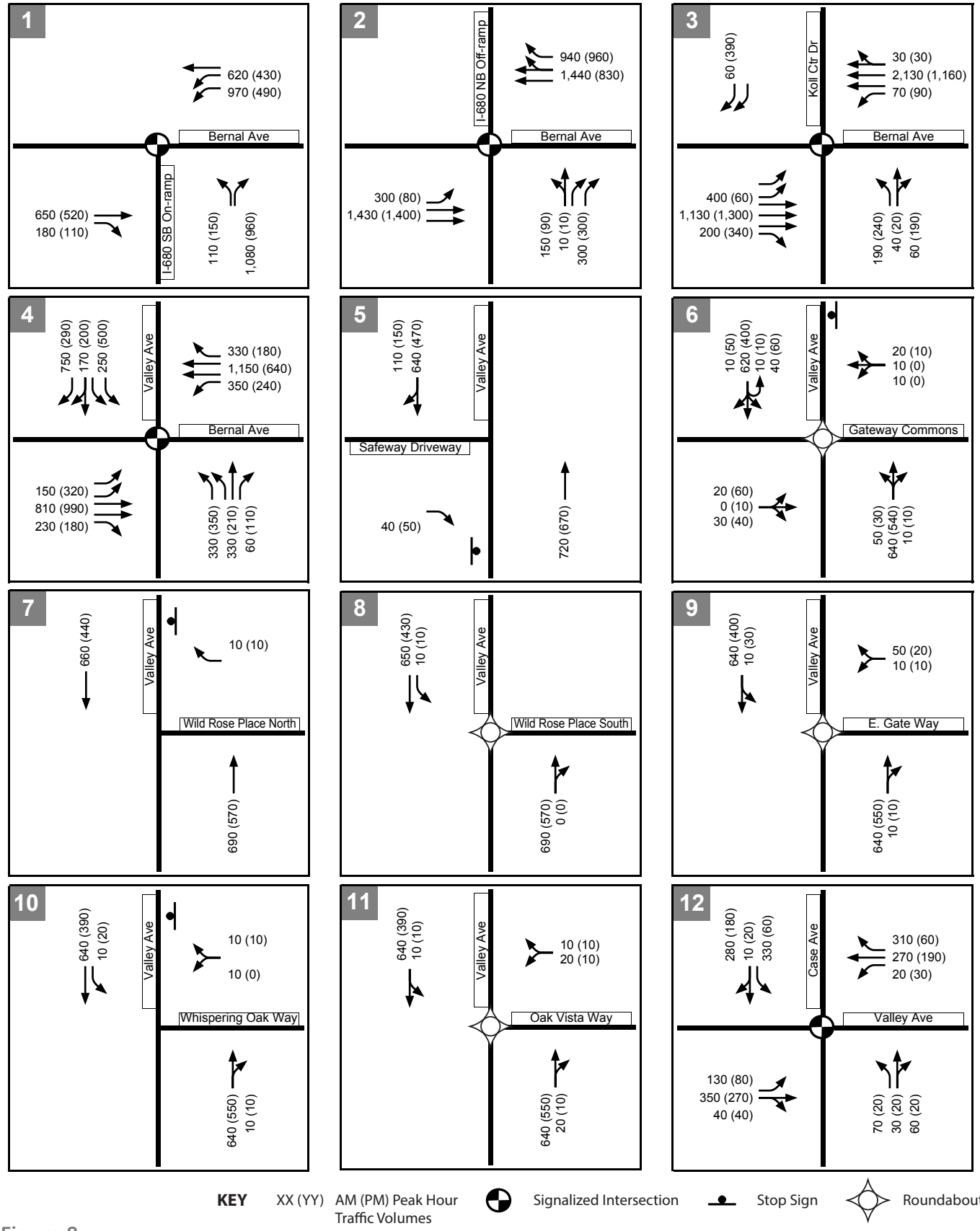


Figure 8.

Cumulative No Project Peak Hour Intersection Volumes, Traffic Control and Lane Configurations

WC11-2878.02_8_CumuNPVols

FEHR PEERS

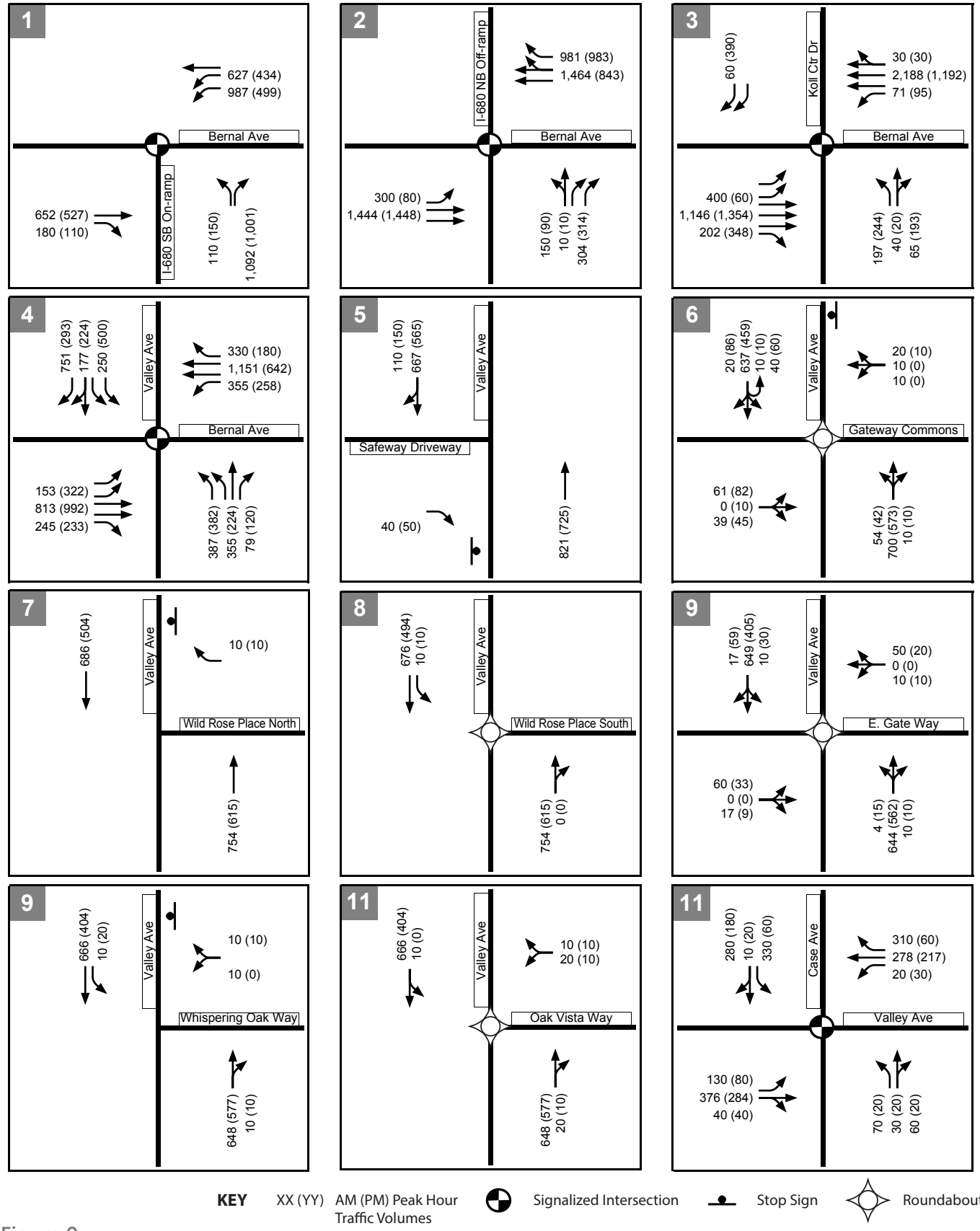


Figure 9.

Cumulative Plus Project Peak Hour Intersection Volumes, Traffic Control and Lane Configurations

WC11-2878.02_9_CumuPlusProjVols

FEHR PEERS

ANALYSIS RESULTS

Intersection Operations

Signalized and unsignalized intersections were evaluated using Synchro software, and roundabouts were evaluated using SIDRA software for the weekday AM and PM peak hours for analysis scenarios listed previously, based on the analysis methods outlined in Attachment A. **Table 3** presents level of service (LOS) operations at study intersections for the AM and PM peak hours.

As presented in Table 3, the driveways and intersections that provide access to the site from regional transportation system currently operate at LOS D or better during the morning and evening peak hours. With the addition of project traffic, intersections are expected to continue to operate at LOS D or better.

In the near-term and cumulative conditions, intersections would continue to operate at acceptable service levels during both the morning and evening peak hours with the addition of traffic from the Project.

A typical single-lane roundabout has a capacity of up to 2,000 vehicles per hour or 20,000 vehicles per day. Roundabouts operating below capacity have lower average delay and queue lengths than stop controlled and signalized intersections because all approaches are yield controlled. The yield control permits vehicles to advance through the intersection slowly, thereby allowing for a constant flow of vehicles through the intersection rather than requiring vehicles to come to a complete stop. Roundabouts require traffic on Valley Avenue to slow down approaching the intersection, improving access from the side street without requiring Valley Avenue traffic to come to a complete stop. Based on the peak hour traffic volume forecasts, the expected near-term and cumulative volumes would not exceed capacity of the roundabouts; therefore, the roundabouts are expected to operate at acceptable levels of service through the future as shown in Table 3. Additionally, off-peak delay would be significantly less when conflicting traffic volumes are much lower and vehicles are not required to stop.

TABLE 3
PEAK HOUR INTERSECTION LEVELS OF SERVICE

Intersection	Control[1]	Peak Hour	Existing		Existing Plus Project		Near-Term Without Project		Near-Term With Project		Cumulative Without Project		Cumulative With Project	
			Delay[2]	LOS[3]	Delay[2]	LOS[3]	Delay[2]	LOS[3]	Delay[2]	LOS[3]	Delay[2]	LOS[3]	Delay[2]	LOS[3]
1. I-680 Southbound Ramps at Bernal Avenue	Signal	AM PM	16 9	B A	17 9	B A	49 11	D B	50 11	D B	15 10	B A	15 10	B A
2. I-680 Northbound Ramps at Bernal Avenue	Signal	AM PM	17 12	B B	21 13	C B	30 15	C B	36 16	D B	24 10	C B	26 11	C B
3. Koll Center Drive at Bernal Avenue	Signal	AM PM	18 16	B B	18 17	B B	21 18	C B	21 19	C B	21 18	C B	21 18	C B
4. Valley Avenue at Bernal Avenue	Signal	AM PM	32 30	C C	34 32	C C	33 45	C D	36 50	D D	49 44	D D	53 47	D D
5. Valley Avenue at Gateway Right-in/Right-out Driveway	SSSC	AM PM	1 (10) 1 (10)	A (A) A (A)	1 (10) 1 (11)	A (A) A (B)	1 (12) 1 (12)	A (B) A (B)	1 (12) 1 (14)	A (B) A (B)	1 (16) 1 (12)	A (C) A (B)	1 (17) 1 (14)	A (C) A (B)
6. Valley Avenue at Gateway Commons	Round-about	AM PM	1 1	A A	1 1	A A	1 2	A A	2 2	A A	2 2	A A	3 2	A A
7. Valley Avenue at Wild Rose Place (north intersection)	SSSC	AM PM	1 (11) 1 (10)	A (B) A (A)	1 (12) 1 (9)	A (B) A (A)	1 (12) 1 (13)	A (B) A (B)	1 (13) 1 (13)	A (B) A (B)	1 (15) 1 (13)	A (B) A (B)	1 (16) 1 (13)	A (C) A (B)

TABLE 3
PEAK HOUR INTERSECTION LEVELS OF SERVICE

Intersection	Control[1]	Peak Hour	Existing		Existing Plus Project		Near-Term Without Project		Near-Term With Project		Cumulative Without Project		Cumulative With Project	
			Delay[2]	LOS[3]	Delay[2]	LOS[3]	Delay[2]	LOS[3]	Delay[2]	LOS[3]	Delay[2]	LOS[3]	Delay[2]	LOS[3]
8. Valley Avenue at Wild Rose Place (south intersection)	SSSC	AM	0 (0)	A (A)	0 (0)	A (A)	1 (1)	A (A)	1 (1)	A (A)	1 (1)	A (A)	1 (1)	A (A)
		PM	1 (1)	A (A)	1 (1)	A (A)	1 (1)	A (A)	1 (1)	A (A)	1 (1)	A (A)	1 (1)	A (A)
9. Valley Avenue at East Gate Way	Round-about	AM	6	A	6	A	8	A	9	A	14	B	16	C
		PM	5	A	5	A	10	A	11	B	10	A	11	B
10. Valley Avenue at Whispering Oaks Way	SSSC	AM	1 (11)	A (B)	1 (11)	A (B)	1 (16)	A (C)	1 (16)	A (C)	1 (27)	A (D)	1 (28)	A (D)
		PM	1 (9)	A (A)	1 (9)	A (A)	1 (13)	A (B)	1 (13)	A (B)	1 (13)	A (B)	1 (13)	A (B)
11. Valley Avenue at Oak Vista Way	Round-about	AM	6	A	6	A	8	A	9	A	14	B	15	C
		PM	5	A	5	A	10	A	10	A	10	A	11	B
12. Valley Avenue at Case Avenue	Signal	AM	27	C	27	C	31	C	31	C	32	C	33	C
		PM	14	B	14	B	16	B	16	B	16	B	17	B

Notes: **Bold** text indicates unacceptable operations based on City's level of service policy.
1. Signal = Signalized Intersection; SSSC = Side-street stop-controlled intersections, traffic from the major roadway does not stop; Roundabout = Roundabout control
2. Delay presented in seconds per vehicle; for side-street stop-controlled intersections, delay presented as intersection average (worst approach)
3. LOS = Level of Service.

Source: Fehr & Peers, April 2013.

Vehicle Queues

The average and 95th percentile Vehicle queues were evaluated for vehicle movements where the project is expected to have an effect on traffic volumes, including intersections along Bernal Avenue and project Driveway intersections on Valley Avenue at Gateway Commons, and Valley Avenue at East Gate Way, as summarized in **Table 4** for the 50th percentile queue and **Table 5** for the 95th percentile queue. The 50th percentile queue is an estimated value from the analysis software which represents the average queue length during the peak hour. The 95th percentile vehicle queue is an estimated value from the analysis software that represents the 95th highest queue out of 100 calculations. For the signalized intersections along Bernal Avenue, there are approximately 35 queue observation periods per hour based on the typical cycle length, so the 50th percentile queue as shown in Table 4 is expected to occur 15 to 20 times per peak hour, whereas the 95th percentile queue as shown in Table 5 is expected to occur 1 to 2 times per peak hour. When 95th percentile vehicle queues that exceed the available storage length coincide with poor service levels, it may take several cycles for vehicle queues to clear. However, when intersections are operating within the expected capacity range, queues tend to clear quickly and do not cause long-term disruptions to the transportation network.

Results of the queuing analysis indicate that vehicles traveling westbound on Bernal Avenue accessing northbound I-680 create queues through the Koll Center Driveway during both the morning and evening peak hours. Vehicle queues also extend beyond the available storage at the I-680 southbound on-ramp from westbound Bernal Avenue. The Project would add traffic to these movements, but is not expected to increase vehicle queues by more than one vehicle.

> ***Recommendation:*** The Project applicant shall pay their fair share towards planned improvements at the I-680 at Bernal Avenue interchange through the payment of applicable local and regional traffic impact fees. Improvements are planned for both the northbound and southbound ramps.

Vehicle queues periodically spillback from turn-pockets by approximately 5 to 10 vehicles, at the Bernal Avenue at Valley Avenue intersection in the existing and future conditions. As shown in Table 4, the average queue is within the available storage for all scenarios with exception to the future AM peak hour at the westbound left turn pocket. However, traffic from the Project does not increase queues by more than one vehicle during either the AM or PM peak hour.

Vehicle queues spillback in the westbound direction of the Bernal Avenue at I-680 Southbound intersection for existing and future conditions. As shown in Table 4, the average queue for the

westbound left turn movement exceeds the available storage length. However, traffic from the Project does not increase queues by more than one vehicle during either the AM or PM peak hour. As depicted in Table 3, the intersection is anticipated to operate at acceptable levels so vehicle queues are expected to clear quickly.

Vehicle queues at the intersections on Valley Avenue are projected to be minimal in the existing and near-term conditions with the addition of Project traffic. In the cumulative condition with additional through traffic on Valley Avenue, northbound and southbound vehicle queues on Valley Avenue at the Gateway Commons intersection could extend to the adjacent right-in/right-out intersections; however, the southbound vehicle queue is not expected to extend to Bernal Avenue, nor is the northbound queue expected to block access to the southern Wile Rose Place. As the intersection is projected to operate at acceptable levels, the vehicle queues are expected to clear quickly.

> ***Recommendation:*** Periodically monitor the operation of the Valley Avenue at Gateway Commons intersection as the study area is developed over time and traffic volumes increase.

TABLE 4
50TH PERCENTILE VEHICLE QUEUES IN FEET[1]

Intersection	Movement	Available Storage[2]	Existing		Existing With Project		Near-Term Without Project		Near-Term With Project		Cumulative Without Project		Cumulative With Project	
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
I-680 Southbound Ramps at Bernal Avenue	Westbound Left	210	**210**	90	**225**	95	**285**	155	**300**	160	**275**	85	**280**	90
	Westbound Thru	475	25	20	25	20	35	35	40	35	85	50	85	50
	Eastbound Thru	400	315	145	325	150	**700**	200	**710**	205	330	165	340	170
I-680 Northbound Ramps at Bernal Avenue	Westbound Right	560	115	30	155	40	370	45	410	55	60	0	70	0
	Westbound Thru	560	120	25	125	80	185	145	195	150	**600**	180	**645**	190
	Northbound Right	350	10	60	10	65	40	85	40	95	70	35	75	40
	Eastbound Left	150	70	30	70	30	90	40	90	45	**200**	25	**200**	30
	Eastbound Thru	475	55	135	55	150	125	215	130	245	160	105	165	115
Koll Center Drive at Bernal Avenue	Westbound Thru	520	250	115	270	125	335	170	360	180	400	165	420	170
	Westbound Left	195	25	30	25	30	45	40	45	45	45	40	45	45
	Northbound Left	380	75	70	85	75	115	100	115	100	115	100	125	100
	Northbound Thru/Right	380	15	5	15	10	20	20	20	20	20	15	25	15
	Eastbound Left	280	80	10	85	10	125	15	125	15	125	10	130	10
	Eastbound Thru	560	75	150	80	160	120	200	125	215	120	145	125	160
Valley Avenue at Bernal Avenue	Westbound Thru	700	305	195	310	200	305	210	315	210	410	205	410	205
	Westbound Left	175	35	55	35	65	110	130	120	145	**285**	160	**295**	**175**
	Northbound Left	280	100	45	125	55	105	145	130	175	125	120	160	135
	Northbound Thru	450	45	25	55	35	105	125	125	135	220	130	240	140
	Northbound Right	170	--	--	--	--	--	--	--	--	--	--	5	--
	Eastbound Left	510	70	120	70	130	55	150	60	155	55	90	55	90
	Eastbound Thru	510	145	295	150	315	235	370	245	375	290	300	290	305
	Southbound Left	200	45	70	45	75	65	155	65	155	90	190	90	195
	Southbound Thru	500	180	130	190	150	155	170	175	185	315	165	325	175
	Southbound Right	200	65	0	65	7	115	15	125	15	170	5	170	10

TABLE 4
50TH PERCENTILE VEHICLE QUEUES IN FEET[1]

Intersection	Movement	Available Storage[2]	Existing		Existing With Project		Near-Term Without Project		Near-Term With Project		Cumulative Without Project		Cumulative With Project	
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Valley Avenue at Gateway Commons	Eastbound	360	--	--	--	--	5	--	5	--	5	--	10	--
	Southbound	170	25	10	35	10	45	55	60	70	80	55	125	70
	Northbound	180	10	10	15	20	30	35	35	50	75	35	85	50
Valley Avenue at East Gate Way	Eastbound	110	5	--	5	--	5	--	5	--	5	--	5	--
	Southbound	210	20	5	20	5	35	45	35	50	75	45	80	50
	Northbound	250	5	10	10	10	20	25	25	35	75	25	85	35

Notes: **BOLD** indicates 95th percentile queue could exceed storage length.

1. 95th Percentile Vehicle queue (in feet) as calculated by Synchro. Bold indicates vehicle queues will extend beyond the available storage space.
2. Vehicle storage presented in feet, not accounting for the bay taper. Where two numbers are presented, the first number represents vehicle storage without the Project and the second number represented vehicle storage with the Project.

Source: Fehr & Peers, April 2013.

TABLE 5
95TH PERCENTILE VEHICLE QUEUES IN FEET[1]

Intersection	Movement	Available Storage[2]	Existing		Existing With Project		Near-Term Without Project		Near-Term With Project		Cumulative Without Project		Cumulative With Project	
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
I-680 Southbound Ramps at Bernal Avenue	Westbound Left	210	**320**	190	**340**	195	**460**	**270**	**490**	**280**	**385**	150	**370**	155
	Westbound Thru	475	40	30	40	30	50	50	50	50	120	80	125	80
	Eastbound Thru	400	**615**	270	**620**	280	**940**	370	**945**	385	**530**	295	**545**	300
I-680 Northbound Ramps at Bernal Avenue	Westbound Right	560	**570**	**570**	**580**	**580**	**680**	**580**	**730**	**560**	260	55	280	60
	Westbound Thru	560	215	140	225	150	330	270	340	280	**915**	330	**960**	390
	Northbound Right	350	45	115	45	130	85	85	40	195	120	70	125	80
	Eastbound Left	150	135	74	135	70	165	110	165	115	**325**	65	**325**	65
	Eastbound Thru	475	100	241	100	270	220	410	225	455	265	180	265	205
Koll Center Drive at Bernal Avenue	Westbound Thru	520	**530**	265	**555**	270	**670**	325	**705**	335	**700**	315	**760**	325
	Westbound Left	195	85	100	85	110	110	120	110	135	110	120	110	135
	Northbound Left	380	160	165	170	165	190	200	195	215	185	205	190	210
	Northbound Thru/Right	380	55	57	55	60	65	80	65	85	65	70	65	75
	Eastbound Left	280	180	40	175	40	215	50	215	50	230	35	230	35
	Eastbound Thru	560	165	315	170	330	240	380	240	400	235	285	240	300
Valley Avenue at Bernal Avenue	Westbound Thru	700	470	305	470	305	470	295	470	295	600	290	600	290
	Westbound Left	175	80	125	85	145	**240**	**280**	**250**	**320**	**515**	**370**	**525**	**400**
	Northbound Left	280	200	95	260	110	210	**300**	265	**330**	230	250	**285**	**280**
	Northbound Thru	450	85	60	110	70	175	195	200	210	315	200	365	210
	Northbound Right	170	15	25	25	30	30	35	35	40	30	40	45	45
	Eastbound Left	510	125	280	130	280	105	330	110	330	95	175	95	175
	Eastbound Thru	510	250	**600**	255	**600**	365	**635**	365	**640**	400	495	400	**510**
	Southbound Left	200	85	140	85	140	115	315	115	315	145	**365**	140	**365**
	Southbound Thru	500	320	250	335	270	315	285	345	310	**590**	275	**600**	295
	Southbound Right	200	145	40	145	50	**215**	60	**225**	70	**285**	50	**285**	60

TABLE 5
95TH PERCENTILE VEHICLE QUEUES IN FEET[1]

Intersection	Movement	Available Storage[2]	Existing		Existing With Project		Near-Term Without Project		Near-Term With Project		Cumulative Without Project		Cumulative With Project	
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Valley Avenue at Gateway Commons	Eastbound	360	5	12	10	15	10	25	25	35	20	25	40	35
	Southbound	170	25	25	30	45	70	85	80	125	**185**	85	**315**	125
	Northbound	180	60	20	85	30	110	135	155	175	**195**	135	**315**	175
Valley Avenue at East Gate Way	Eastbound	110	--	--	5	5	--	--	10	5	--	--	15	5
	Southbound	210	20	20	20	30	50	65	60	80	180	65	205	80
	Northbound	250	45	15	45	15	85	110	90	125	180	110	200	125

Notes: **BOLD** indicates 95th percentile queue could exceed storage length.

3. 95th Percentile Vehicle queue (in feet) as calculated by Synchro. Bold indicates vehicle queues will extend beyond the available storage space.
4. Vehicle storage presented in feet, not accounting for the bay taper. Where two numbers are presented, the first number represents vehicle storage without the Project and the second number represented vehicle storage with the Project.

Source: Fehr & Peers, April 2013.

SITE ACCESS AND ON-SITE CIRCULATION

This section discusses site access and internal circulation for vehicles, pedestrians, bicycles, and emergency vehicles based on the site plan presented previously on Figure 2. A parking assessment was also conducted. Site recommendations are presented on **Figure 10**.

Vehicle Access

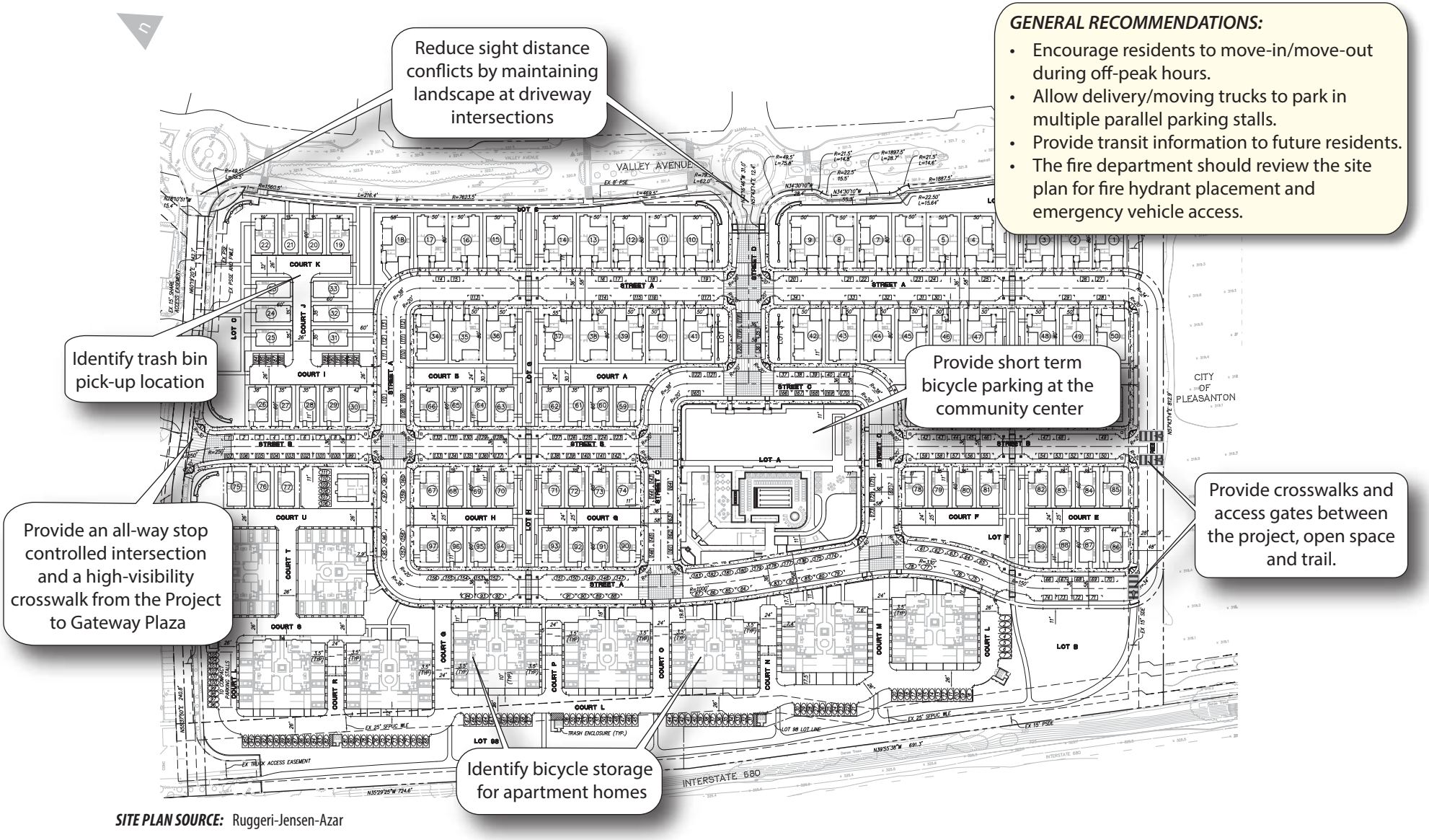
Vehicular access to the site would be provided from a connection to Gateway Commons and a new roadway connecting to Valley Avenue at East Gate Way. Both driveways would provide full access and are projected to operate acceptably during peak hours as shown in Table 3. Provision of a vehicle connection to Whispering Oaks Way would not be necessary to provide acceptable vehicle operations on Valley Avenue.

> ***Recommendation:*** Install all-way stop-control at the Street B/Gateway Commons intersection.

The full access driveway on Valley Avenue would align with the existing roundabout on E. Gate Way.

> ***Recommendation:*** Maintain landscaping on the northwest corner of the intersection to avoid sight distance conflicts (shrubs should not be higher than approximately 30 inches and tree canopies should be approximately six feet from the ground).

Proposed streets providing the main connections through the site and limited driveway access are proposed to be 36 feet wide with parallel parking on both sides. Courts would provide garage access to most of the single-family homes with a width of 24 feet without parking, or 26 feet if perpendicular parking is provided on one side of the street.



SITE PLAN SOURCE: Ruggeri-Jensen-Azar

Figure 10.

Consultant Site Plan Recommendations

WC11-2878.02_10_SitePlanRecs.ai

FEHR PEERS

Emergency Vehicles

A fire station is located on Bernal Avenue approximately 1/4-mile from the Project site. Emergency vehicles have multiple ways of accessing the site from Bernal Avenue and Valley Avenue so if one entrance is blocked, alternative access would be available. An AutoTurn assessment indicates that a large fire truck would enter into the opposite travel lane when navigating through the site. Large emergency vehicles may have difficulty accessing homes on Courts J and K.

> ***Recommendation:*** The fire department should review the site plan for fire hydrant placement and emergency vehicle access. Results of the AutoTurn assessment are shown on **Figure 11** for their use in reviewing site access and circulation.

Pedestrian

As part of the Project, new pedestrian paths could be constructed within the Project site and connect to the existing pedestrian facilities on Valley Avenue. Curb extensions and high visibility crosswalks at intersections would alert drivers to expect pedestrian traffic. Pedestrian paths and plazas would be constructed to facilitate walking throughout the site. Most internal roadways provide sidewalks on both sides of the street with exception to some of the Court frontage. External roadways on Valley Avenue and Gateway Commons provide sidewalk along both sides of the street.

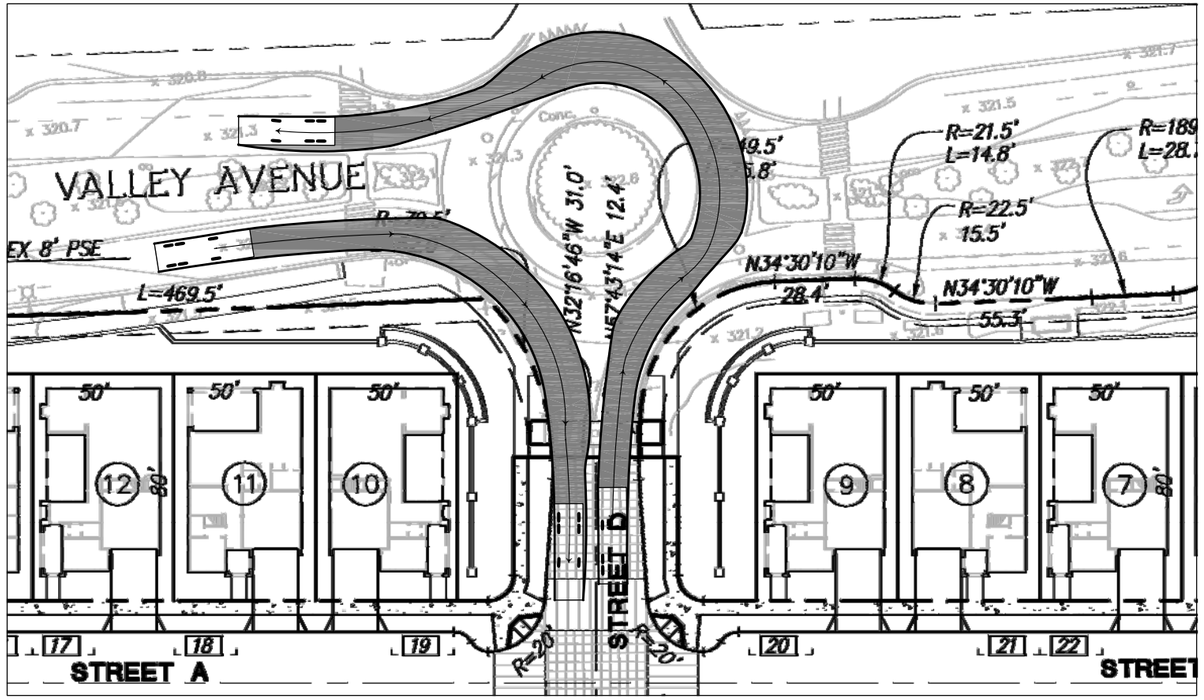
> ***Recommendation:*** Provide a high-visibility crosswalk from the Project to the Gateway shopping center on the east leg of Gateway Commons and Street B, to enhance pedestrian connectivity.

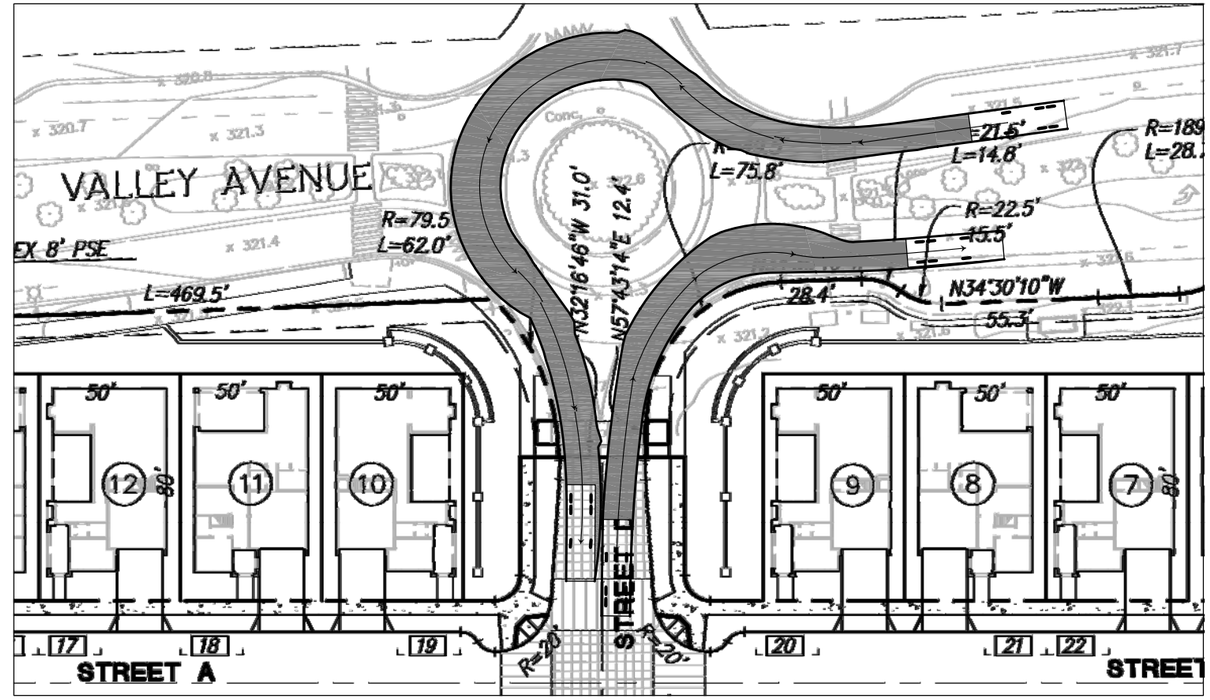
Bicycle

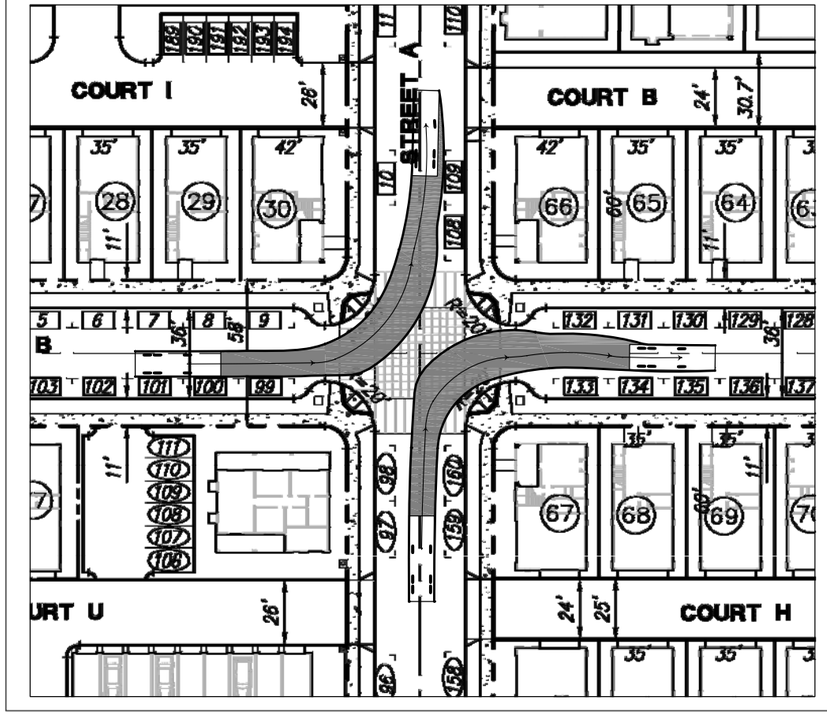
Class II bicycle facilities (bike lanes) are currently provided on Valley Avenue along the Project frontage. The Project proposes a trail connection on the south-west side of the Project to a proposed Regional class III trail which parallels I-680. The Project would connect to the proposed trail from Street A and Street B.

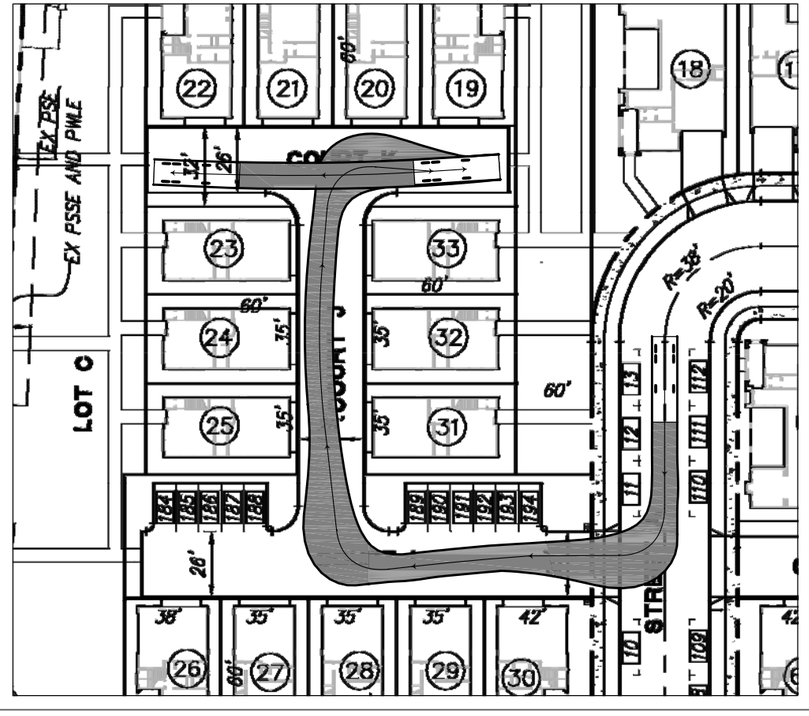
> ***Recommendation:*** Provide a pedestrian crosswalk across Street A to connect the Project to the trail entrances.

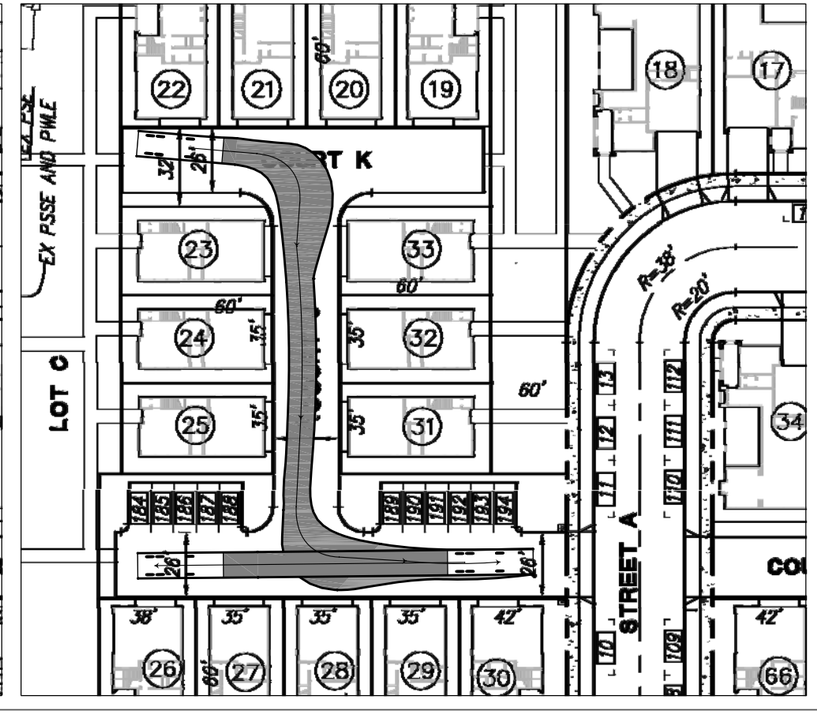
> ***Recommendation:*** Provide access gates between the open space, trail and the Project along Street A to encourage residents to use the trail and open space.











FEHR & PEERS

EMERGENCY VEHICLES
AUTOTURN ASSESSMENT

FIGURE 11

Apr 19, 2013
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Bicycles would be permitted within the Project vehicular travel way. Bicycle parking is not shown on the site plan, but it is anticipated that future residents of the single family homes would be able to store bicycles within their private garages.

For the multi-family portion of the site 0.8 secure and weather protected bicycle parking spaces per unit are required, resulting in a requirement of 168 long-term bicycle parking spaces for the 210 apartment units. As each apartment unit would be provided a private garage, the garages should be large enough for storage of a bicycle and a vehicle or bicycle storage rooms should be provided throughout the apartment community. Additionally, short term bicycle parking should be provided at the community center.

> ***Recommendation:*** Identify bicycle storage for the apartment homes and provide short term bicycle parking at the community center.

Transit

Wheels currently serve the Project area with stops along Valley Avenue, Bernal Avenue, and Case Avenue. No changes to the number of transit stops or level of transit service are proposed as part of the Project. Additional transit facilities are located in the Project area such as the ACE and BART station located approximately 1 mile and 5 miles away, respectively.

> ***Recommendation:*** Provide information to new residents regarding transit service provided in the area.

Delivery Vehicle Access

Access to the site by moving trucks, furniture delivery, and trash collection vehicles are expected to occur on a regular basis. No designated loading areas are shown on the site plan. For the majority of single family homes, delivery/moving vehicles would be able to park on the street in close proximity to the destination. For some homes on Courts J and K, internal access may be constrained and delivery vehicles may stop on Valley Avenue or Gateway Commons, which should not be allowed. For deliveries/moving in the apartment home area, trucks may park on the internal drive aisle temporarily blocking two-way travel on some of the Court Streets.

> ***Recommendation:*** Encourage residents to conduct move-in/move-out large vehicle maneuvers during off-peak hours, such as mid-day or weekends, to minimize potential internal vehicle conflicts. Allow delivery moving trucks/delivery vehicles to park in parallel

parking stall(s) on the designated Streets within the development to maintain two-way travel on internal roadways.

Trash collection areas are shown throughout apartment home area and it is assumed that each single family home would have their own private trash containers to be set at the curb on designated collection days. Trash collection vehicles may have difficulty accessing private garbage containers from homes Court J and K and trash containers may need to be picked up from Street A. Should all ten homes from Courts J and K place trash containers on Street A and when on-street parking supplies are at a high level of occupancy, there may not be sufficient curb space for 20 trash containers (assuming one trash and one recycle container per unit)

Recommendation: Review trash collection procedures for the site with Pleasanton Garbage Service to ensure all homes within the development can be served.

Parking

City of Pleasanton requirements for parking were reviewed. For apartment uses, 1.5 to 2 spaces are required for each unit with an additional 1 guest space for each 7 units, resulting in a parking code requirement of 351 spaces for the apartment potion of the project, as shown in **Table 6**. For the single family units, each unit is required two provide 2 spaces per unit, a total requirement of 194 spaces. The apartment portion of the project proposes to provide 216 private garage spaces and 111 off-street parking spaces, for a total off-street parking supply of 327 spaces, a deficit of 24 spaces as compared to code requirements. Each single family home would have a private two car garage and approximately 81 units would have a driveway of sufficient length to accommodate a parked vehicle, satisfying parking code requirements.

On-street parking is also provided, with approximately 183 spaces dispersed throughout the development. Although on-street parking cannot be counted towards the code required parking, as sufficient private reserved parking is provided and guest parking demand would be accommodated by the on-street parking, provision of additional off-street parking is not recommended.

TABLE 6
CITY CODE AUTOMOBILE PARKING REQUIREMENTS

Land Use	Size	Parking Code Requirement	Parking Spaces Required	Private Garage Spaces	Off-Street Spaces[1]	Total
Apartments – First Four 1-2 Bedrooms	4 units	2 per unit	8	216	111	327
Apartments –1-2 Bedrooms	198 units	1.5 per unit	297			
Apartments – 3+ Bedrooms	8 units	2 per unit	16			
Apartment Guests	210 units	1 per 7 units	30			
Single Family Detached Housing	97 units	2 per unit	194	194	81	275
Total	***307 units***	***~2.55 per unit***	***545***	***410***	***192***	***602***

Notes:
1. Off-street spaces measured by number of single family dwelling unit driveways

Source: City of Pleasanton Municipal Code Section 18.88.030.

Americans with Disability Act parking requirements for apartments were calculated. ADA requires 2 percent accessible parking per assigned garage parking, 2 percent accessible per assigned on-street parking, and 5 percent accessible per unassigned and visitor parking, resulting in an accessible parking requirement of approximately 10 spaces. The Project proposes to include 11 accessible spaces.

CONCLUSIONS AND RECOMMENDATIONS

With construction of the Project, vehicular traffic to the site is expected to operate at acceptable levels of service and even with projected growth in the City, intersections along Bernal Avenue are projected to operate at LOS D or better during the weekday morning and evening peak hours evaluated for this study. With the expected growth, the City should monitor gateway intersections and provide appropriate improvements to minimize poor operations and spillback to adjacent intersections. The Near-term analysis recommends improvements for Bernal Avenue at the I-680 intersections before the Cumulative year.

Based on our site plan review, the following are recommended for consideration in development of the final site plan:

- Reduce sight distance conflicts by restricting parking on Gateway Commons, approaching Valley Avenue and maintain landscaping at the Valley Avenue at Gateway Commons intersection
- Review trash collection procedures for the site with Pleasanton Garbage Service to ensure all homes within the development can be served.
- Encourage residents to conduct move-in/move-out large vehicle maneuvers during off-peak hours, such as mid-day or weekends, to minimize potential internal vehicle conflicts. Allow delivery moving trucks/delivery vehicles to park in parallel parking stall(s) on the designated Streets within the development to maintain two-way travel on internal roadways.
- Provide information to new residents regarding transit service provided in the area.
- Identify bicycle storage for the apartment homes and provide short term bicycle parking at the community center.
- The fire department should review the site plan for fire hydrant placement and emergency vehicle access.

Technical Attachments:

A – Intersection Level of Service (LOS) Methods

B – Existing (2013) Traffic Count Sheets

C – Level of Service Reports

D – Signalized Intersection Queuing Reports