CEQA CLASS 32 INFILL EXEMPTION
959 EL CAMINO REAL PROJECT

PREPARED FOR:

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Planning Division
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Millbrae, CA 94030
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Contents

Appendices

Tables

Figures

Acronyms and Abbreviations

2017 Clean Air Plan	*Spare the Air, Cool the Climate: A Blueprint for Clean Air and Climate Protection in the Bay Area*
ACM	asbestos-containing material
Air Quality Technical Report	*959 El Camino Real Air Quality Technical Report*
BAAQMD	Bay Area Air Quality Management District
BART	Bay Area Rapid Transit
bgs	below ground surface
BMP	best management practice
CALGreen	2019 California Green Building Standards Code
Caltrans	California Department of Transportation
CAP	criteria air pollutant
CCFD	Central County Fire Department
CEQA	California Environmental Quality Act
City	City of Millbrae
CMP	Congestion Management Program
CNEL	community noise equivalent level
CO	carbon monoxide
COA	Condition of Approval
CRHR	California Register of Historical Resources
dB	decibel
dBA	A-weighted decibels
DPM	diesel particulate matter
EIR	environmental impact report
EPA	U.S. Environmental Protection Agency
FAR	floor area ratio
FHWA	Federal Highway Administration
General Plan	*City of Millbrae General Plan*
gpd	gallons per day
HRA	health risk assessment
HVAC	heating, ventilation, and air conditioning
in/sec	inches per second
L_{eq}	equivalent sound level
LID	Low Impact Development
LOS	level of service
MESD	Millbrae Elementary School District
mgd	million gallons per day
MPB	Millbrae Police Bureau
MRP	Municipal Regional Stormwater National Pollutant Discharge Elimination System Permit
Noise Technical Report	959 El Camino Noise Technical Report
NO_X	nitrogen oxides
PM	particulate matter
PM_{10}	aerodynamic resistance diameters equal to or less than 10 microns
$PM_{2.5}$	aerodynamic resistance diameters equal to or less than 2.5 microns
ppd	pounds person per day

PPV	peak particle velocity
PRC	Public Resource Code
project	959 El Camino Real Mixed-Use Development Project
Regional Water Board	San Francisco Bay Regional Water Quality Control Board
ROG	reactive organic gases
SamTrans	San Mateo County Transit District
SB	Senate Bill
SFBAAB	San Francisco Bay Area Air Basin
SFO	San Francisco International Airport
SFPUC	San Francisco Public Utilities Commission
SMUHSD	San Mateo Union High School District
TAC	toxic air contaminants
TDM	Travel Demand Management
TIA	Transportation Impact Analysis Report
TK-8	transitional kindergarten through eighth grade
UWMP	Urban Water Management Plan
VMT	vehicle miles traveled
VOC	volatile organic compound
WASP	Water Shortage Allocation Plan
WPCP	Water Pollution Control Plant

Chapter 1
Project Description

1. **Project Title**
   959 El Camino Real Mixed-Use Development Project
2. **Lead Agency/Sponsor's Name and Address**
   City of Millbrae
   Planning Division
   621 Magnolia Avenue
   Millbrae, CA 94030
3. **Contact Person and Phone Number**
   Contact: Nestor Guevara, Associate Planner
   Planning Division
   621 Magnolia Avenue
   Millbrae, CA 94030
   Tel. (650) 259-2335
   nguevara@ci.millbrae.ca.us
4. **Project Location**
   959 El Camino Real, Millbrae, CA (Assessor's Parcel Number 021-364-080; see **Figure 1**)[1]
5. **Project Sponsor's Name and Address**
   High Street Residential (Trammell Crow Company)
   Attn: Brian Pianca
   415 Mission Street, 45th Floor
   San Francisco, CA 94105
6. **General Plan Designation**
   General Commercial – General Plan Land Use Map
7. **Zoning**
   Commercial "C" Zoning District
8. **Requested Approvals**
   - Design Review Permit and Conditional Use Permit to allow a Mixed-Use Development in the Commercial Zone (Millbrae Municipal Code § 10.05.1010[B])
   - State density bonus request to allow an increase in development density of up to 42.5 percent (Pursuant to State Density Bonus Law – California Government Code § 65915 *et seq.*). As part of the density bonus request, the project is seeking the following incentive/concession, waivers, and parking reductions:
     - Parking reduction to reduce the parking provided to 1.1 parking spaces per residential unit, which is allowed under the State Density Bonus law for projects with at least 11 percent very low income, within 0.5 mile of a major accessible transit stop; a concession

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[1] As addressed under Item 8, Requested Approvals, the Project Sponsor is applying a lot line adjustment with the City of Millbrae parcel at the southeast corner of the project site along Broadway.

  to reduce commercial parking requirement from five spaces per 1,000 square feet to 2.4 spaces per 1,000 square feet, as allowed under State Density Bonus Law (California Government Code § 65915); and,

  - Waiver to increase the maximum allowable building height from 40 to 84 feet to top of parapet roof (Millbrae Municipal Code § 10.05.1020[C], Development Standards).

- Lot line adjustment with the City of Millbrae parcel at the southeastern corner of the project site along Broadway (Parcel 8a, 4652-OR 490 [1952] in Figure 2)
- Vesting Tentative Map for Condominium purposes to create residential and commercial condominiums
- Master Sign Program
- Airport Land Use Commission – San Francisco International Airport Comprehensive Airport Land Use Compatibility Plan Consistency Review

1.1 Introduction

The site for the 959 El Camino Real Mixed-Use Development Project (proposed project or project) is in the City of Millbrae (City), on a parcel that covers approximately 1.86 acres (80,843 square feet]). The project site is currently occupied by a vacant, single-story commercial building, a surface parking lot, and limited landscaping. The project would demolish all existing onsite uses and construct a new, mixed-use, six-story building with 278 multi-family residential units and amenities (302,609 square feet for residential use);[2] 17,210 square feet of ground-floor commercial use, plus 80 square feet for commercial utility space; 349 vehicle parking spaces within a 105,424-square foot, two-level parking garage (one level below grade and one at grade); and 68 enclosed bicycle parking spaces, for a total building area of 425,959 square feet.

1.1.1 Existing Setting

The project site is a single parcel fronting El Camino Real within the City's downtown area, just north of the area covered by the Millbrae Station Area Specific Plan. The single-story commercial building on the site was formerly occupied by a 31,741-square foot Office Depot, which closed in 2020. Temporary commercial uses, such as a Spirit Halloween store, have occupied the building more recently. The project site is bounded by El Camino Real to the north, Meadow Glen Avenue to the west, Broadway to the south, and a surface parking lot to the east at the Millbrae Square Shopping Center.[3] In addition to the two-story Millbrae Square Shopping Center, surrounding uses include a Citibank, U-Haul Neighborhood Dealer, KFC, and Outdoor Supply Hardware. Vegetation is limited to small shrubs and trees within the islands located throughout the parking lot on the project site and along the adjacent sidewalks on El Camino Real, Meadow Glen Avenue, and Broadway. **Figure 1** depicts the project location.

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[2] Total residential use, as shown in Table 1, includes rentable area (278 units), gross area by floor, the leasing office, amenities, and residential trash, mechanical, electrical, and plumbing engineering (MEP)/utilities/bike space. It excludes open space such as the common courtyard, rooftop deck, and private patios.

[3] For purposes of describing the project site, and as shown in project figures, El Camino Real and Broadway are characterized as running in a generally east–west direction and Meadow Glen Avenue in a generally north–south direction.

1.1.2 Land Use and Zoning

The project site is designated General Commercial under the City's *General Plan Adopted 1998* (General Plan) Land Use Map[4]. It is also within Millbrae's Commercial "C" Zoning District, which permits a full range of commercial uses, including apparel and accessory stores, food stores, banks, personal and professional services, furniture stores, offices, restaurants, and other commercial establishments. Multi-family dwelling units/apartments are allowed as a conditional use.

The "C" Zoning District has a height limit of 40 feet. It allows for 100-percent lot coverage and has no limit on the floor area ratio (FAR) or residential density. Because the project site is not adjacent to an alley or any "R" district, there are no front, side, or rear setbacks. However, residential garage entrances (measured to the gate or garage door) fronting an exterior lot line may not be less than 25 feet from the lot line.

The project site is within a City General Plan Land Use Element subarea, defined as "Magnolia Avenue eastward to the railroad corridor." This area contains commercial and mixed uses, including offices, commercial businesses, and low- and high-density housing. The project site also lies within the El Camino Real Frontage Area, a special land use policy area, per the General Plan Land Use Element. Policies under the El Camino Real Frontage Area are intended to enhance the appearance, functionality, and economic vitality of the area and encourage a variety of commercial, restaurant, and office uses.

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[4] City of Millbrae. 1998. *City of Millbrae General Plan*. Available: www.ci.millbrae.ca.us/departments-services/community-development/planning-division/general-plan-adopted-1998. Date Accessed: April 12, 2022.

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Figure 1
959 El Camino Real - Project Location Map

1.2 Project Description

All existing features at the project site would be removed to allow construction of the proposed six-story, mixed-use building with one level of below-grade parking. The project would include 17,210 square feet of ground-floor commercial space along the Broadway frontage between Meadow Glen Avenue and the site's adjacent parking lot, as well as fronting this adjacent parking lot. The project would include 278 dwelling units with a mix of studio units (29), one-bedroom units (146), two-bedroom units (93), and three-bedroom units (10). The units would range in size from 538 to 1,417 square feet, with an average size of approximately 823 square feet. The project would also include a 961-square feet ground-floor residential leasing office and 13,585 square feet of residential building amenities, including a fitness center, a lobby on the ground floor, and a second-story lounge. Common open spaces totaling 17,729 square feet would be provided in ground-floor sitting and entry areas, a second-story outdoor courtyard, and a roof deck. Private open spaces would be provided by private residential balconies along with other covered spaces and would total 7,944 square feet.

Nine percent of the units (26) provided by the project would be designated affordable units available for occupancy by Very Low-Income Households. This means households with incomes no greater than 50 percent of the area median income in San Mateo County, as defined in California Health and Safety Code Section 50105 and published annually for each household size by the California Department of Housing and Community Development in California Code of Regulations Title 25, Section 6932 (or its successor provision). Therefore, the project would qualify for a 42.5 percent density bonus and two incentives or concessions pursuant to State Density Bonus Law (Government Code § 65915 *et seq*.). This 42.5 percent increase in density, as allowed under State Density Bonus Law, would equate to 84 additional units (from the base of 198 units), for a total of 282 units. However, the project is proposing construction of 278 units total.

The project would provide 307 parking spaces for the residential units, roughly 1.1 space per unit, and 42 commercial parking spaces, based on a rate of 2.4 spaces per 1,000 square feet. In addition, 68 bicycle parking spaces (more than 10 percent of the number of vehicle parking spaces), would be provided within a secure ground-floor bike locker/room. The parking spaces would be provided in basement-level and ground-level garages. The commercial parking garage would be exclusively one level, accessed with ingress and egress from El Camino Real at midblock and egress midblock onto Broadway. Residential tenant parking would be located on two levels, including one basement level. Vehicle access to the ground-level entrance would be provided from a security gate on Meadow Glen Avenue at mid-block. Vehicle access to the basement-level garage would be provided by a secured ramp within the ground-level commercial garage, with ingress and egress from El Camino Real at midblock and egress midblock onto Broadway. Both garages would provide a total of eight accessible spaces and parking for both compact and standard vehicles. In addition, both garages would provide a total of 34 spaces for electric-vehicle charging for vehicles, vans, and ambulances.

In order to improve pedestrian safety, the project also would install two offsite directional curb ramps at the El Camino Real/Meadow Glen intersection on the northwestern and southeastern corners (which connect to the project site via crosswalks), similar to the Meadow Glen Avenue/Broadway intersection curb ramps. The project will also fully resurface Meadow Glen Avenue between Broadway and El Camino Real from curb to curb.

The project would provide a total of 25,673 square feet of private and common open spaces. Common open spaces would include 17,729 square feet of ground-floor covered and uncovered open spaces.[5] In addition, the project would provide 7,944 square feet of private open space through covered and uncovered private residential balconies.

Table 1-1 shows the project features. **Figure 2** through **Figure 6** show the proposed site plan and elevations.

Table 1-1. Project Features

Feature	**Existing Conditions**	**Proposed Project**
Project Site Area	80,843 square feet	80,843 square feet
Total Residential Use	–	302,609 square feet
278 units	–	*228,802* square feet
Gross area by floor[a]	–	*54,897* square feet
Residential Leasing Office	–	*961* square feet
Amenities[b]	–	*13,585* square feet
Residential MEP, Utility Room, Bike Room	–	*4,364* square feet
Total Commercial Use	31,741 square feet	17,290 square feet
Commercial Area	–	*17,210* square feet
Commercial MEP, Trash	–	*80* sf square feet
Total Building Area	**31,741 square feet**	**319,899 square feet**
Building FAR	0.4	4.4
Parking	35,120 square feet	105,424 square feet (349 spaces)
Building Heights	1 story (38 feet with a 60-foot sign)	6 stories (84 feet)[c]
Total Building Footprint/Building Lot Coverage	31,741 square feet /39.3%	71,734 square feet /88.7%
Total Impervious Surface Area[d]	78,975 square feet	80,084 square feet
Total Excavation Volume	–	32,575 cubic yards
Maximum Excavation (below grade surface)	–	17 feet
Number of Trees	24	59
Estimated Number of Employees	6	6

[a] *Gross area by floor* includes hallways and other nonresidential areas; it is the total footprint minus net rentable area (278 units) and excludes decks.
[b] *Residential amenities* include a ground-floor lobby and gym, and a second-story lounge.
[c] 84 feet refers to the height to the top of the rooftop parapet, exclusive of antennas, chimneys, and roof equipment (MMC Section 10.05.0200 Definitions).
[d] Impervious surfaces include buildings and hardscapes.
FAR = floor area ratio; MEP = mechanical, electrical, and plumbing.

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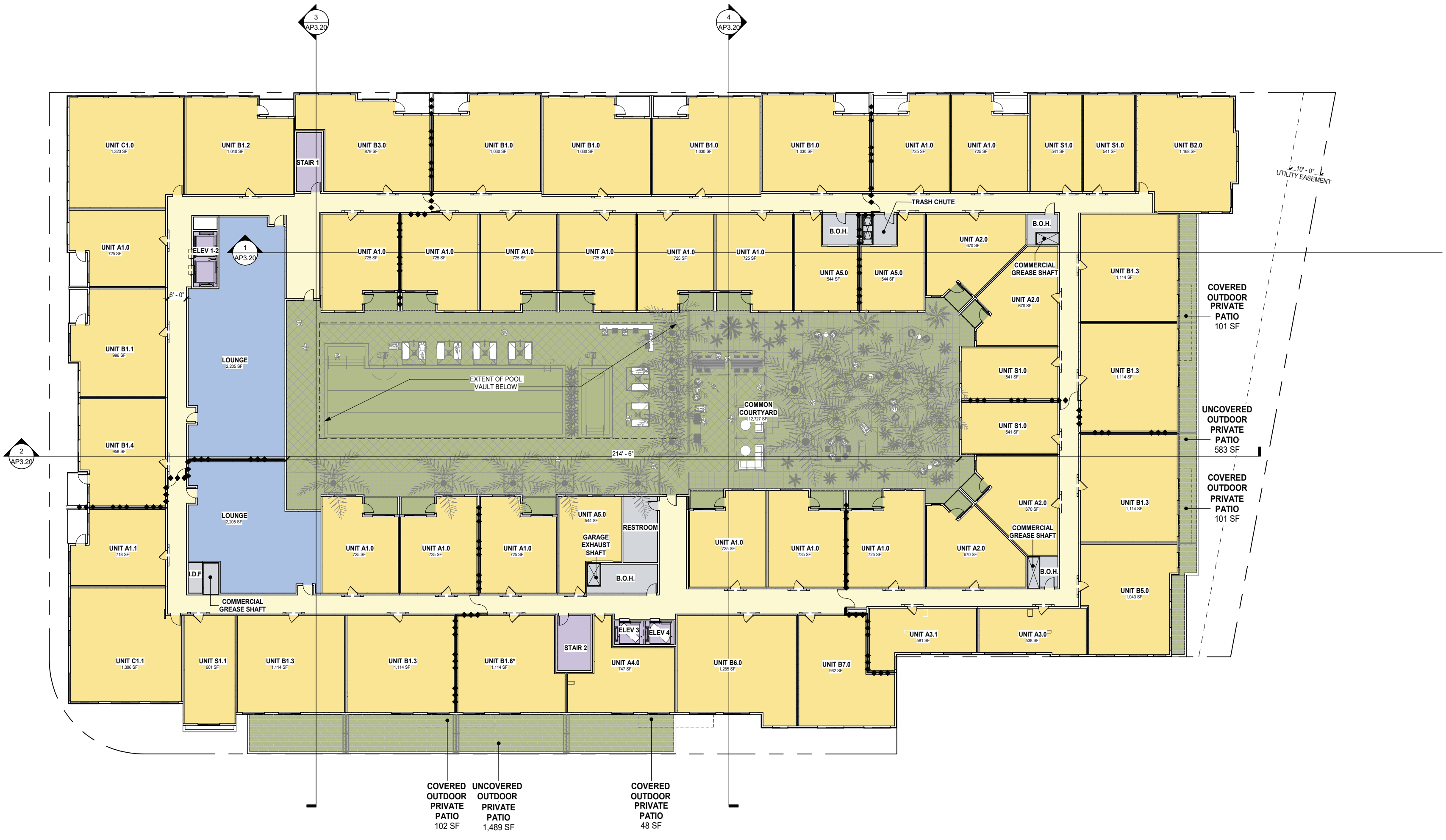
[5] Ground-floor covered and uncovered open spaces include entryways, courtyards, and seating areas along both the residential and commercial uses.

Source: BDE Architecture, 2022.

Figure 2
Site Plan – Ground Level
959 El Camino Real



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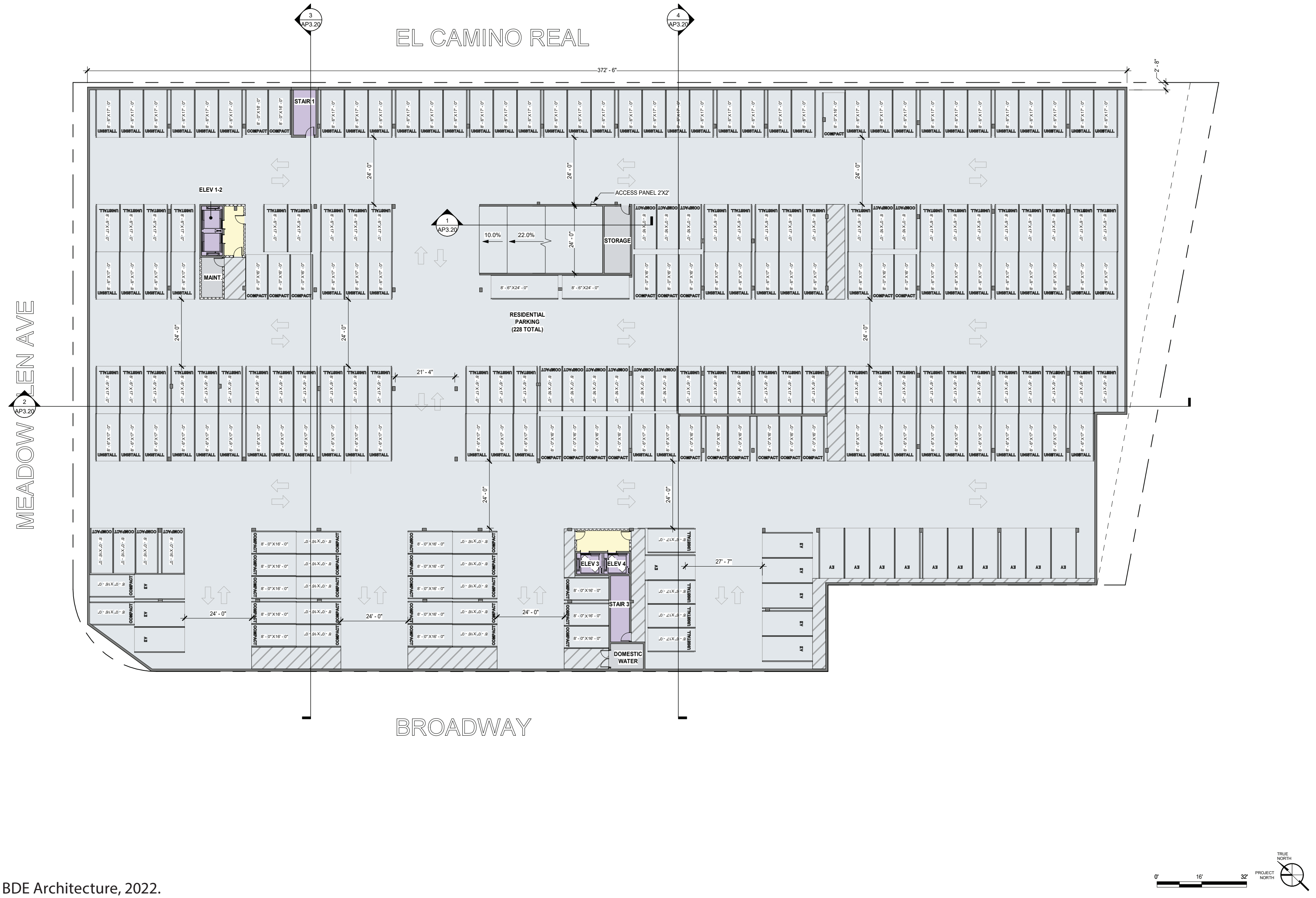
Source: BDE Architecture, 2022.

Figure 3

Site Plan – Second Level

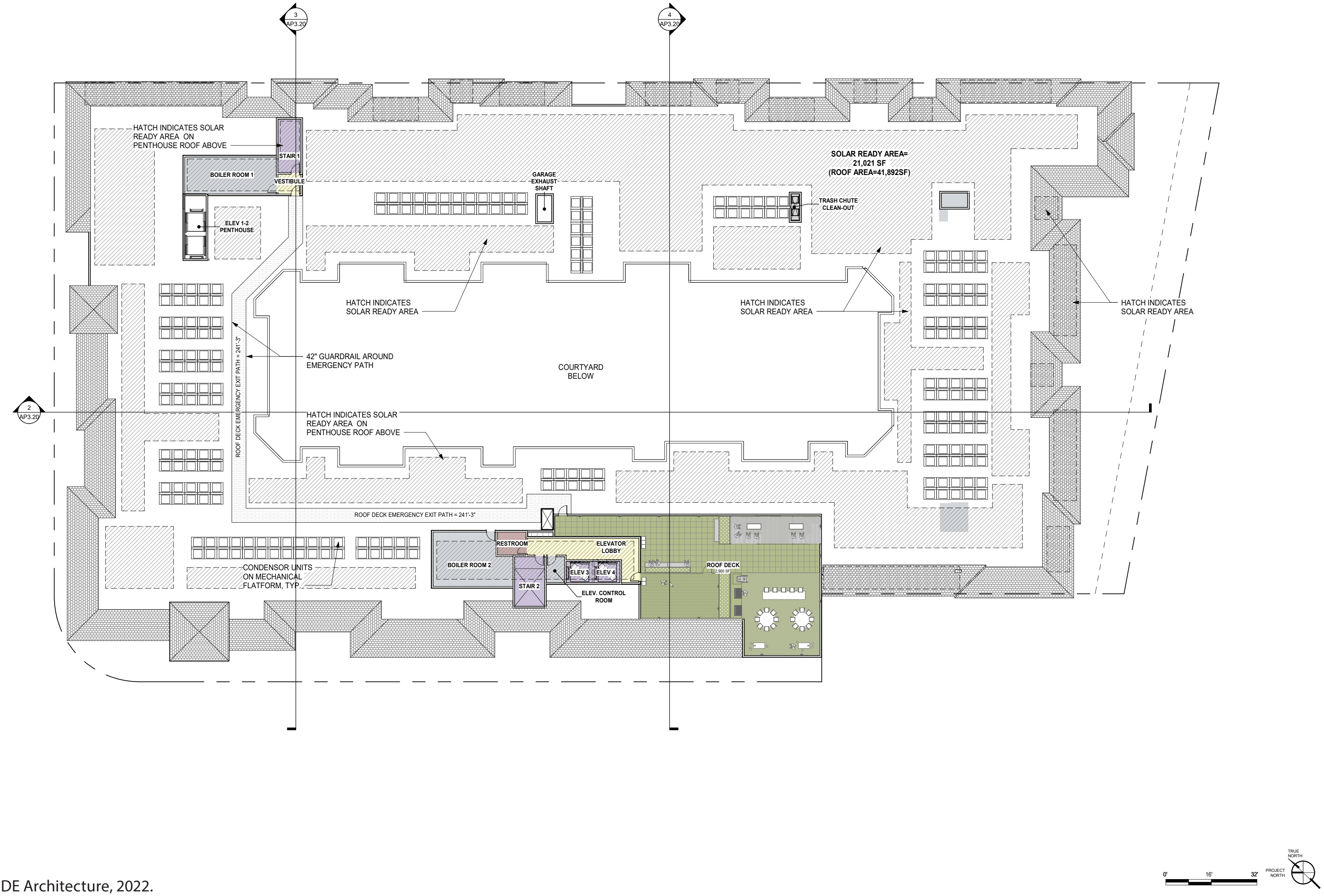
959 El Camino Real



Source: BDE Architecture, 2022.

Graphics ... 104073 (4-11-2022) JC

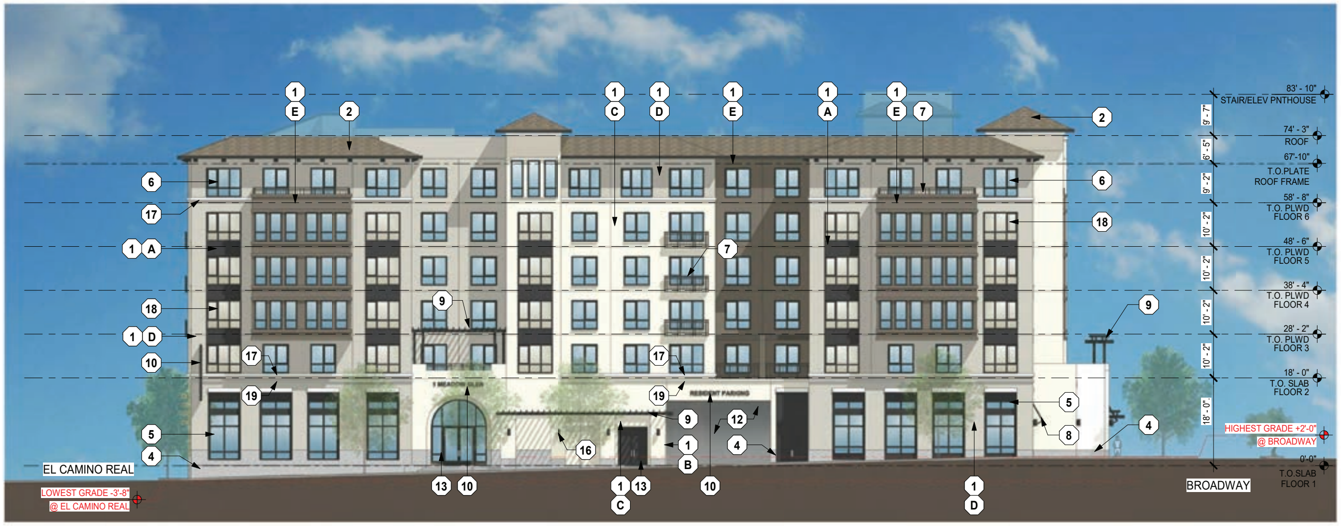
Figure 4
Site Plan – Basement Level
959 El Camino Real



Source: BDE Architecture, 2022.

Graphics ... 104073 (4-11-2022) JC

Figure 5
Site Plan – Roof Level
959 El Camino Real



ELEVATION - MEADOW GLEN 2

1/16" = 1'-0"

ELEVATION - BROADWAY 1

1/16" = 1'-0"

Source: BDE Architecture, 2022.

Graphics ... 104073 (4-12-2022) JC

Figure 6
Project Elevations
959 El Camino Real

1.2.1 Utilities

Utilities for the project, including electric, gas, sewer, and water, would connect to existing utility infrastructure. Electric service would connect to an existing pole with a new underground service line in the Pacific Gas and Electric easement near the corner of El Camino Real and Meadow Glen Avenue and require use of a new utility box. Existing drain inlets for stormwater would be removed and replaced with new gutters along the sidewalks around the project site. Additionally, the existing 8-inch water line and 8-inch sewer line along Meadow Glen Avenue between Broadway and El Camino Real would be upgraded and replaced with a 12-inch sewer line and 12-inch water line.

1.2.2 Building Design and Lighting

The building exterior would include cement plaster; board-and-batten vertical siding; stone and cast stone bases; vinyl window framing; galvanized metal railings; aluminum trellises, painted to match other windows/storefronts; and asphalt shingle roofing. The exterior lighting on the site would comply with City of Millbrae Municipal Code Section 10.05.2200.

1.2.3 Landscaping and Open Space

Construction would result in the removal of existing vegetation on the project site, including 24 trees, five of which are street trees that meet the City's criteria for protected status.[6] Trees would be removed upon approval of required permits. Following construction, the project would plant 43 street trees along the perimeter of the new building and 16 trees within the second-story courtyards.

The project would improve sidewalks from El Camino Real to Meadow Glen Avenue, on Broadway, and adjacent to the Millbrae Square Shopping Center's surface parking by widening them;[7] adding new seating areas, lighting, and bicycle racks; and planting trees and vegetation in adjacent areas. In addition, a large, single, 12,686-square foot courtyard would be provided on the second story of the building for use by residents. These features would include a community table, benches around a fire pit, additional seating areas with electric barbeques/an exterior kitchen, possible pool, and landscaping. Private courtyards/terraces would be provided for each third-floor unit facing Broadway or the Millbrae Square Shopping Center's surface parking lot. A 2,900-square foot rooftop deck overlooking Broadway would include additional electric barbeques/exterior kitchen amenities, seating areas, and dining facilities.

1.2.4 Sustainability Features

The project would incorporate all applicable City- and State-mandated sustainability features, including Title 24, Part 6, California Energy Code baseline standard requirements for energy efficiency, based on the 2019 Energy Efficiency Standards requirements, and applicable building requirements set forth in the 2019 California Green Building Standards Code (CALGreen). The City also adopted requirements in Millbrae Municipal Code Title 9, Buildings and Fire Regulations, Chapter 9.50, *Energy Code*, and Chapter 9.35, *Green Building Code*, for sustainable reach standards

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[6] Street trees are protected by the Millbrae Municipal Code, Chapter 8.60, City of Millbrae Tree Protection and Urban Forestry Program.

[7] All sidewalks, apart from that those along El Camino Real, would be widened to up to 15 feet; the sidewalk along El Camino Real would remain 8 feet wide.

beyond the State Code baseline for residential and nonresidential new construction, additions, and alterations. The project design incorporates a variety of sustainability features, including the use of exclusively Energy Star all-electric appliances, the retention of Peninsula Clean Energy as the energy provider (encouraging occupants to opt for 100-percent renewable energy sources), the installation of a solar photovoltaic and solar thermal system, the availability of electric-vehicle charging stations at 34 parking spaces, and the provision of onsite recycling and composting in compliance with local regulations and Assembly Bill 1826.[8] The project would implement Model Water Efficient Landscape Ordinance and CALGreen requirements for landscaping and indoor water efficiency, including installation of water-efficient appliances and fixtures as required by City code for new construction. Although the project qualifies for the 100-percent Low Impact Development (LID) reduction credit under Provision C.3.e.ii of the Municipal Regional Stormwater National Pollutant Discharge Elimination System Permit (MRP), as a "Special Project," the project is using 89 percent of the reduction credit and would protect water quality with the management of stormwater runoff through a media filter.

1.3 Construction Schedule and Phasing

The proposed construction methods are considered conceptual and subject to City review and approval. For purposes of this environmental document, the analysis considers the construction plan described below.

Project construction is expected to commence in May 2023 and continue through September 2025. Except for concrete replacement and electric-crane erection and dismantling,[9] all project construction would occur during the hours permitted by Millbrae Municipal Code Section 9.05.040, Amendment of Section 105. The applicant potentially could apply for an exemption to conduct noise-generating construction outside of the times listed below. As stated, the hours for noise-generating construction are:

- Weekdays: 7:30 a.m.–7:00 p.m.
- Saturdays: 8:00 a.m.–6:00 p.m.
- Sunday and Holidays: 9:00 a.m.–6:00 p.m.

The project would be constructed in a single phase, but with seven key stages, starting in May 2023 and ending in September 2025. In total, it is anticipated that project construction would have a duration of approximately 27 months, as follows:

- Demolition: 20 work days
- Site Preparation: 10 work days
- Grading: 40 work days
- Water and Sewer Line Replacement: 15 work days

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[8] City of Millbrae CEAQ Greenhouse Gas Emissions Analysis Compliance Checklist, Climate Action Plan Consistency Checklist for Future Development for 959 El Camino Real Mixed Use Project.

[9] Nighttime construction may be required for erection and dismantling of the electric crane, using a separate mobile crane, as well as up to six concrete pours, which would require one concrete pump and a concrete delivery truck.

- Building Construction: 425 work days
- Paving: 10 work days
- Architectural Coating: 90 work days

1.4 Construction Equipment and Staging

Equipment used during project construction would include excavators, air compressors, generator sets, cement and mortar mixers, cranes, forklifts, graders, pavers, rollers, bulldozers, tractors, loaders, backhoes, and concrete/industrial saws. Potential construction laydown and staging areas would be located on the project site. The project sponsor has committed to ensuring that all off-road diesel-powered equipment used during construction would be equipped with U.S. Environmental Protection Agency (EPA) Tier 4 Final engines. There would be no pile driving during project construction; a mat foundation would be used for the project.[10]

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[10] Rockridge Geotechnical. 2020. *Preliminary Geotechnical Investigation, Proposed Mixed-Use Building, 959 El Camino Real, Millbrae, California.* Project No. 19-1795. Prepared for WP West Acquisitions. January 16.

Chapter 2

CEQA Exemption

Article 19 of the California Environmental Quality Act (CEQA) Guidelines, Sections 15300–15333, identifies classes of projects that do not have a significant effect on the environment and, therefore, are exempt from review under CEQA.

2.1 Class 32 (Infill Development)

Among the classes of projects that are exempt from CEQA review are those that are identified specifically as urban infill development. CEQA Guidelines Section 15332 states that the term *infill development* (or the Class 32 exemption) is applicable to projects that meet the following conditions:

(a) The project is consistent with the applicable general plan designation and all applicable general plan policies, as well as applicable zoning designations and regulations.

(b) The proposed development occurs within the city limits, on a project site that is no more than 5 acres and surrounded by urban uses.

(c) The project site has no value as habitat for endangered, rare, or threatened species.

(d) Approval of the project would not result in any significant effects related to traffic, noise, air quality, or water quality.

(e) The site can be adequately served by all required utilities and public services.

The analysis presented in the following section provides substantial evidence that the project qualifies for an exemption under CEQA Guidelines Section 15332 as a Class 32 urban infill development and would not have a significant effect on the environment.

2.2 Exemptions

Even if a project ordinarily is exempt under the potential categorical exemptions, CEQA Guidelines Section 15300.2 provides specific instances where exceptions to otherwise applicable exemptions apply. Exceptions to a categorical exemption apply in the following circumstances, effectively nullifying a CEQA categorical exemption:

(a) **Location**. Classes 3, 4, 5, 6, and 11 are qualified by consideration of where the project is to be located. A project that is ordinarily insignificant in its impact on the environment may, in a particularly sensitive environment, be significant. Therefore, these classes are considered to apply in all instances, except when the project may affect an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law by federal, state, or local agencies.

(b) **Cumulative Impact**. All exemptions for these classes are inapplicable when the cumulative impact of successive projects of the same type and in the same place over time is significant.

(c) **Significant Effect**. A categorical exemption shall not be used for an activity when there is a reasonable possibility that the activity will have a significant effect on the environment due to unusual circumstances.

(d) **Scenic Highways**. A categorical exemption shall not be used for a project that may result in damage to scenic resources, including, but not limited to, trees, historic buildings, rock outcroppings, or similar resources, within a highway that has been officially designated as a state scenic highway. This does not apply to improvements that are required as mitigation by an adopted negative declaration or certified environmental impact report (EIR).

(e) **Hazardous Waste Sites**. A categorical exemption shall not be used for a project located on a site that is included on any list compiled pursuant to Section 65962.5 of the Government Code.

(f) **Historical Resources.** A categorical exemption shall not be used for a project that may cause a substantial adverse change in the significance of a historical resource.

The analysis that follows presents substantial evidence to demonstrate that no exceptions apply to the project or its site, the project would not have a significant effect on the environment, and the Class 32 exemption remains applicable.

Chapter 3
CEQA Exemption Checklist

3.1 Introduction

The following analysis provides substantial evidence to support a conclusion that the project qualifies for an exemption under CEQA Guidelines Section 15332 as a Class 32 urban infill development and would not have a significant effect on the environment.

3.1.1 Criterion Section 15332(a): General Plan and Zoning Consistency

	Yes	No
The project is consistent with the applicable general plan designation and all applicable general plan policies as well as with applicable zoning designation and regulations.	☒	☐

For purposes of describing existing land uses throughout Millbrae, the City has been divided into four geographical areas: (1) area west of the Spur property to Interstate 280; (2) area generally eastward of the Spur property to Magnolia Avenue; (3) Magnolia Avenue eastward to the railroad corridor; and (4) eastward of the railroad corridor to the San Francisco International Airport (SFO). The project site is within Magnolia Avenue eastward to the railroad corridor. This area contains commercial and mixed uses, including offices, commercial businesses, and low- and high-density housing. The project site also lies within the El Camino Real Frontage Area, a special land use policy area, per the General Plan Land Use Element. Policies under the El Camino Real Frontage Area are intended to enhance the appearance, functionality, and economic vitality of the area and encourage a variety of commercial, restaurant, and office uses.

The project site is designated General Commercial under the General Plan Land Use Map. It is also within Millbrae's Commercial "C" Zoning District, which permits a full range of commercial uses, including apparel and accessory stores, food stores, banks, personal and professional services, furniture stores, restaurants, commercial establishments, and auto-related uses. Multi-family dwelling units/apartments are allowed as conditional uses.

The "C" Zoning District has a height limit of 40 feet, allows for 100-percent lot coverage, and has no limit on FAR or residential densities. Because the project site is not adjacent to an alley or R zoning district, there are no front, side, or rear setbacks. However, residential garage entrances (measured to the gate or garage door) fronting an exterior lot line may not be less than 25 feet from the lot line.

As described in Chapter 1, *Project Description*, the project would require a conditional use permit to allow a mixed-use multi-family development in the Commercial Zone and a waiver to increase the maximum allowable building height from 40 to 84 feet. Design review with the City would ensure that the project is consistent with the rest of the General Plan policies. Therefore, with the requested discretionary approvals, the project meets the criteria of CEQA Guidelines Section 15332(a) and is consistent with the General Plan and applicable zoning regulations for the site.

3.1.2 Criterion Section 15332(b): Project Location, Size, and Context

	Yes	No
The proposed development occurs within city limits on the project site of no more than 5 acres substantially surrounded by urban uses.	☒	☐

The project site is within the City's incorporated limits. The site comprises one parcel (Assessor's Parcel Number 021-364-080) totaling approximately 1.86 acres (80,843 square feet). The project site is currently occupied by a vacant, single-story, 31,741-square foot commercial building (previously an Office Depot), a surface parking lot, and limited landscaping. The project site is a single parcel fronting El Camino Real within the downtown area of the City, just north of the area covered by the *Millbrae Station Area Specific Plan*. The project site is bounded by El Camino Real to the north, Meadow Glen Avenue to the west, Broadway to the south, and a surface parking lot to the east at the Millbrae Square Shopping Center. CEQA defines a *qualified urban use* as "…any residential, commercial, public institutional, transit or transportation passenger facility, or retail use, or any combination of those uses." Given these facts, the project adheres to the criteria of CEQA Guidelines Section 15332(b) as a site of no more than 5 acres that is substantially surrounded by urban uses.

3.1.3 Criterion Section 15332(c): Endangered, Rare, or Threatened Species

	Yes	No
The project site has no value as habitat for endangered, rare, or threatened species.	☒	☐

The project site is a single parcel fronting El Camino Real. The single-story commercial building on the site housed a 31,741-square foot Office Depot, which recently closed (2020). Temporary commercial uses have occupied the building more recently, such as a Spirit Halloween store. The project site is in the downtown area of Millbrae, which is fully developed and not known to support habitat for any special-status species (see Appendix A, *Biological Resources Memorandum*).[11] Therefore, the vegetation onsite does not contribute to ecological communities that support habitat for endangered, rare, or threatened species. Given these facts, the project adheres to the criteria of CEQA Guidelines Section 15332(c). Although the project would require the removal of existing vegetation on the project site, including 24 trees, five of which are street trees that meet the City's criteria for protected status, the applicant would plant 43 street trees along the perimeter of the new building and 16 trees within the second-story courtyards, resulting in a net increase in the number of trees. Therefore, the impact would be *less-than-significant* because the project site has no value for endangered, rare, or threatened species.

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[11] ICF. 2022. Appendix A, Biological Resources Memorandum. April.

3.1.4 Criterion Section 15332(d): Traffic

	Yes	No
Approval of the project would not result in any significant effects related to traffic.	☒	☐

3.1.4.1 Setting

The Transportation Impact Analysis Report (TIA) prepared by Fehr & Peers Transportation Consultants in April 2022 is included in this document as Appendix B. The TIA describes existing and future conditions for transportation with and without the project. In addition, the TIA includes information about regional and local roadway networks, pedestrian and transit conditions, and transportation facilities associated with the project. For a more detailed analysis, including tables and figures, please refer to Appendix B.

Senate Bill (SB) 743, which was codified in Public Resource Code (PRC) Section 21099, resulted in changes to the CEQA Guidelines. PRC Section 21099 identifies vehicle miles traveled (VMT) as the appropriate metric for measuring transportation impacts. PRC Section 21099 also notes that level of service (LOS), or similar measures of vehicular capacity or traffic congestion, will not be considered a significant impact on the environment. Therefore, this analysis focuses on potential impacts associated with VMT.

3.1.4.2 Trip Generation

For analysis of the project, trip generation rates were assumed for the proposed new residential and commercial land use types at 959 El Camino Real.[12] The project would generate 871 net daily vehicle trips, with 76 net trips (18 inbound and 58 outbound) occurring during the AM peak hour and 61 net trips (37 inbound and 24 outbound) occurring during the PM peak hour.

3.1.4.3 Vehicle Miles Traveled

CEQA Guideline Section 15064.3(b)(1), states that lead agencies generally should presume that projects proposed within 0.5 mile of an existing major transit stop or an existing stop along a high-quality transit corridor will have a less-than-significant impact on VMT. The project site is directly served by an existing major transit stop for the San Mateo County Transit District (SamTrans) Route ECR at the El Camino Real frontage, and Route ECR has peak commute headways of 15 minutes, thus qualifying El Camino Real as a high-quality transit corridor. Because the project would be within 0.5 mile of a high-quality transit corridor and an existing major transit stop, the project would not conflict with CEQA Guidelines Section 15064.3(b), and impacts are presumptively ***less-than-significant***.

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[12] Standard trip generation rates typically come from an Institute of Transportation Engineers publication titled *Trip Generation Manual* (11th edition [2021]). Project trip generation was estimated by applying the appropriate trip generation rates from the *Trip Generation Manual* to the size of the development and its uses. The average trip generation rates for "Multi-Family Housing Mid-Rise" (Land Use 221) and "Strip Retail Plaza, retail <40,000 square feet" (Land Use Code 822) was applied to the project. Additionally, vehicle trip reductions/credits were applied to the project to because the *Trip Generation Manual* overestimates peak traffic generation for mixed-use development.

The project also does not meet project-specific or location-specific criteria outlined in the Governor's Office of Planning and Research Guidelines that would indicate that the project would still generate significant levels of VMT, as follows.

- Has a FAR of less than 0.75
    - The project has a FAR of about 4.5, which is substantially higher than the requirement of 0.75.
- Includes more parking for use by residents, customers, or employees of the project than required by the jurisdiction
    - The project proposes to construct up to 278 residential units and 17,210 square feet of commercial space. The City's municipal code would require the project to supply 417 residential parking spaces and 87 commercial parking spaces for a total of 504 spaces. However, because this project is eligible for a density bonus, fewer parking spaces are required. Per State Density Bonus Law (California Government Code § 65915 (p)(1):(A) and (B), the project is required to provide 330 residential spaces and 86 commercial spaces, for a total of 416 spaces. State Density Bonus law allows projects providing at least 11 percent very low–income units within 0.5 mile of an accessible major transit stop to reduce their parking requirement from 1.5 spaces per unit to 0.5 spaces per unit. The project is also eligible to request concessions under California Government Code Section 65915 and has requested to reduce the commercial parking requirement from five spaces per 1,000 square feet to 2.4 spaces per 1,000 square feet, or 86 total commercial spaces
    - The project provides 307 residential parking spaces (a rate of 1.1 parking spaces per residential unit) and 42 commercial parking spaces (a rate of 2.44 spaces per 1,000 square feet of commercial) for a total of 349 spaces.
- Is consistent with the applicable *Plan Bay Area 2050* strategies
    - The project is consistent with the applicable *Plan Bay Area 2050* strategies of incorporating affordable housing into major residential projects, building a Complete Streets network, improving the safety and accessibility of the multimodal transportation network, and implementing VMT-reducing measures in its transportation demand management plan.
- Does not replace affordable residential units with a smaller number of moderate- or high-income residential units
    - The project does not replace affordable residential units with a smaller number of moderate- or high-income residential units.

Therefore, the project meets all criteria to be presumed to have no impact on VMT and would result in a ***less-than-significant*** impact.

3.1.4.4 Roadway Segments

As the Congestion Management Agency for San Mateo County, the City/County Association of Governments is responsible for maintaining the performance and standards of the Congestion Management Program (CMP). Per CMP technical guidelines, all new developments that are estimated to add at least 100 net peak-hour trips to the CMP roadway network are required to implement Travel Demand Management (TDM) measures in accordance with the City/County Association of Governments CMP checklist. Given that the project is expected to add fewer than

100 net peak-hour vehicle trips to the CMP roadway network, implementation of TDM measures is not required. Accordingly, the project would result in ***less-than-significant*** impacts on roadway segments.

3.1.4.5 Access and Circulation

The project would have three right turn–only driveways at existing curb cuts, which would also guide the vehicle circulation flow on and off site. Meadow Glen Driveway is for residential use only, including courier services. El Camino Real Driveway provides access to commercial uses, residential uses, and trash and loading areas on the project site. The Broadway driveway is a right-turn, exit-only driveway for vehicles entering from the El Camino Real Driveway. The project also proposes to construct a bulb-out at the southeastern corner of the Meadow Glen Avenue/Broadway intersection at the project frontage to create a safer pedestrian environment along the Downtown Millbrae Broadway corridor. This bulb-out would reduce the northbound approach lane configuration at the intersection from a left-turn pocket and one shared through-right lane to one shared left through–right lane on Broadway. The lane reduction would not result in hazardous maneuvers or roadway alignment issues at the intersection. The project also plans to widen the sidewalk along the project's Meadow Glen and Broadway frontages to expand pedestrian amenities and improve the Downtown Millbrae pedestrian circulation network.

Red curbs are along the project frontage at Meadow Glen Avenue and on El Camino Real from the intersection to the project's commercial driveway that can be used by emergency vehicles to access the project site. The residential portion of the project provides vehicle aisles between 24-feet and 26-feet wide and a 24 foot–wide driveway on Meadow Glen. The commercial portion of the project provides 24 foot–wide vehicle aisles and driveway widths on El Camino Real and Broadway. These widths meet the Millbrae Municipal Code requirement of at least 20 foot–wide aisles and driveways for emergency access. The closest fire station is Fire Station 47, which is 0.4 mile away. The route for this fire station, and other emergency vehicles, would be to use Meadow Glen Avenue and El Camino Real. The project offsite transportation system modifications would not disrupt these emergency routes or pose potential hazards to emergency vehicles. Because the project will not conflict with any existing or planned vehicle system, nor emergency vehicle access, the project's impacts on access and circulation at the project site would be ***less than significant***.

3.1.4.6 Bicycle and Pedestrian Facilities

Class I bicycle routes are found along Millbrae Avenue between Magnolia Avenue and Richmond Drive. Class II bicycle lanes are provided on Broadway between Meadow Glen Avenue and Ludeman Lane and on Richmond Drive between Magnolia Avenue and the Spur Trail. Class III bicycle routes are provided along El Camino Real and Magnolia Avenue, marked with "sharrows" in each travel direction. The project frontage adjacent to the Millbrae Square Shopping Center's surface parking lot would be dedicated to a small pedestrian plaza and walkway to connect El Camino Real to Broadway. The project would also provide a secured bike storage room of about 52 spaces for residents. The bike room can be accessed through the resident lobby on Broadway. The project would not remove any bicycle facilities, nor would it conflict with any adopted plans or policies for new bicycle facilities, resulting in ***less-than-significant*** impacts.

Pedestrian facilities in the project area consist of sidewalks, crosswalks, and pedestrian signals. The project is located in Downtown Millbrae, which has a pedestrian-friendly environment. The project is expected to increase the number of pedestrians and, therefore, use of the sidewalks and crosswalks. The project frontages on El Camino Real, Meadow Glen Avenue, and Broadway provide paved sidewalks that are approximately 5-feet to 7-feet wide and connect to the existing sidewalks in the project vicinity. All intersections in the project vicinity provide marked crosswalks, and pedestrian actuated signals and pushbuttons are provided at signalized intersections. The existing pedestrian network connects the commercial uses in Downtown Millbrae and surrounding residential neighborhoods. The project proposes to improve the sidewalks along all the project frontages, including adding new seating areas, bicycle racks, street trees, and vegetation. Sidewalks along the Meadow Glen Avenue and Broadway project frontages would be widened to up to 15 feet. A bulb-out would be constructed at the southeastern corner of the Meadow Glen Avenue/Broadway intersection at the project frontage. This bulb-out is consistent with the recommended improvements in the Active Transportation Plan to create a safer pedestrian environment along the downtown Millbrae Broadway corridor. This bulb-out would give pedestrians more space to wait to cross the street and would make them more visible to the drivers. The project frontage adjacent to the Millbrae Square Shopping Center's surface parking lot would also be dedicated to a small pedestrian plaza and walkway to connect El Camino Real to Broadway creating more pedestrian friendly spaces. The overall network of sidewalks and crosswalks in the vicinity of the project site has adequate connectivity, providing pedestrians with safe routes to transit services and points of interest. The project would not remove any pedestrian facilities or conflict with any adopted plans or policies for new pedestrian facilities, resulting in ***less-than-significant*** impacts.

3.1.4.7 Transit

The project area is served by regional rail services and local fixed-route bus service. The Millbrae Intermodal Transit Station is located 0.8 mile southeast of the project site and provides regional rail access to the Bay Area Rapid Transit (BART) system, Caltrain, and SamTrans local fixed-route bus services provided. SamTrans Route ECR currently has ample capacity, and it is unlikely that the project would generate a large enough quantity of new riders that it would exceed capacity for the transit services and facilities that serve the area. Furthermore, the Governor's Office of Planning and Research Technical Advisory states that lead agencies should not treat the addition of new transit users as an adverse impact. The project is not expected to conflict with existing transit facilities or adopted plans or policies and is compatible with future transit plans in the area. The project would not remove any transit facilities, nor would it conflict with any adopted plans or policies associated with new transit facilities, resulting in ***less-than-significant*** impacts

3.1.4.8 Intersection Levels of Service

PRC Section 21099 notes that LOS, and other similar metrics, generally no longer constitutes a significant environmental effect under CEQA. Therefore, LOS analysis is not included. The project's potential impact on VMT is identified above. Information on LOS can be founded in the TIA (Appendix B).

3.1.5 Criterion Section 15332(d): Noise

	Yes	No
Approval of the project would not result in any significant effects related to noise.	☐	☒

3.1.5.1 Introduction

In April 2022, ICF prepared the *959 El Camino Noise Technical Report* (Noise Technical Report) (Appendix C). The Noise Technical Report describes the noise and vibrational effects associated with construction and operation of the project. The attachments to the Noise Technical Report provide the field measurement data and noise modeling results that support the technical analysis.

3.1.5.2 Overview of Noise and Sound

Noise is commonly defined as unwanted sound that annoys or disturbs people and potentially causes an adverse psychological or physiological effect on human health. Because noise is an environmental pollutant that can interfere with human activities, an evaluation of noise is necessary when considering the environmental impacts of a project.

Sound is characterized by various parameters, including the rate of oscillation of sound waves (*frequency*), the speed of propagation, and the pressure level or energy content (*amplitude*). In particular, the sound pressure level is the most common descriptor used to characterize the loudness of an ambient (existing) sound level. Although the decibel scale, a logarithmic scale, is used to quantify sound intensity, it does not accurately describe how sound intensity is perceived by human hearing. The human ear is not equally sensitive to all frequencies in the entire spectrum; therefore, noise measurements are weighted more heavily toward frequencies to which humans are sensitive through a process referred to as *A-weighting*.

Human sound perception, in general, is such that a change in sound level of 1 decibel (dB) cannot typically be perceived by the human ear, a change in sound level of 3 dB is just noticeable, a change of 5 dB is clearly noticeable, and a change of 10 dB is perceived as doubling or halving the sound level. A doubling of actual sound energy is required to result in a 3-dB (i.e., barely noticeable) increase in noise; in practice, for example, this means that the volume of traffic on a roadway would typically need to double to result in a noticeable increase in noise.13

The decibel level of a sound decreases (or *attenuates*) exponentially as the distance from the source of that sound increases. For a point source, such as a stationary compressor or construction equipment, sound attenuates at a rate of 6 dB per doubling of distance. For a line source, such as free-flowing traffic on a freeway, sound attenuates at a rate of 3 dB per doubling of distance. Atmospheric conditions, including wind, temperature gradients, and humidity, can change how sound propagates over distance and affect the level of sound received at a given location. The degree to which the ground surface absorbs acoustical energy also affects sound propagation. Sound that travels over an acoustically absorptive surface, such as grass, attenuates at a greater rate than sound that travels over a hard surface, such as pavement. The increased attenuation typically is in the range of 1 to 2 dB per doubling of distance. Barriers, such as buildings and topography that blocks the line of sight between a source and receiver, also increase the attenuation of sound over distance.

In urban environments, simultaneous noise from multiple sources may occur. Because sound pressure levels, in decibels, are based on a logarithmic scale, they cannot be added or subtracted in the usual arithmetical way. Adding a new noise source to an existing noise source, with both producing noise at the same level, will not double the noise level. If the difference between two noise sources is 10 A-weighted decibels (dBA) or more, the higher noise source will dominate, and

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[13] California Department of Transportation. 2013. *Technical Noise Supplement to the Traffic Noise Analysis Protocol*. September. Available: www.dot.ca.gov/hq/env/noise/pub/TeNS_Sept_2013A.pdf.

the resultant noise level will be equal to the noise level of the higher noise source. In general, if the difference between two noise sources is 0 to 1 dBA, the resultant noise level will be 3 dBA higher than the higher noise source, or both sources if the sources are equal. If the difference between two noise sources is 2 to 3 dBA, the resultant noise level will be 2 dBA above the higher noise source. If the difference between two noise sources is 4 to 10 dBA, the resultant noise level will be 1 dBA higher than the higher noise source.

Community noise environments generally are perceived as *quiet* when the 24-hour average noise level is below 45 dBA, *moderate* in the 45 to 60 dBA range, and *loud* above 60 dBA. Very noisy urban residential areas are usually around 70 dBA, community noise equivalent level (CNEL). Along major thoroughfares, roadside noise levels are typically between 65 and 75 dBA CNEL. Incremental increases of 3 to 5 dB to the existing 1-hour equivalent sound level (L_{eq}), or to the CNEL, are common thresholds for an adverse community reaction to a noise increase. However, there is evidence that incremental thresholds in this range may not be adequately protective in areas where noise-sensitive uses are located and the CNEL is already high (i.e., above 60 dBA). In these areas, limiting noise increases to 3 dB or less is recommended.[14] Noise intrusions that cause short-term interior levels to rise above 45 dBA at night can disrupt sleep. Exposure to noise levels greater than 85 dBA for 8 hours or longer can cause permanent hearing damage.

Overview of Ground-borne Vibration

Ground-borne vibration is an oscillatory motion of the soil with respect to the equilibrium position. It can be quantified in terms of velocity or acceleration. Variations in geology and distance result in different vibrational levels, including different frequencies and displacements. In all cases, vibration amplitudes decrease with increased distance.

Operation of heavy construction equipment creates seismic waves that radiate along the surface of and downward into the ground. These surface waves can be felt as ground vibration. Vibration from the operation of construction equipment can result in effects that range from annoyance for people to damage to structures. Perceptible ground-borne vibration generally is limited to areas within a few hundred feet of construction activities. As seismic waves travel outward from a vibration source, they cause rock and soil particles to oscillate. The actual distance that these particles move is usually only a few ten-thousandths to a few thousandths of an inch. The rate or velocity (in inches per second [in/sec]) at which these particles move is the commonly accepted descriptor of vibration amplitude, referred to as *peak particle velocity* (PPV).

Vibration amplitude attenuates (or decreases) over distance. This attenuation is a complex function of how energy is imparted into the ground, as well as the soil or rock conditions through which the vibration is traveling (variations in geology can result in different vibration levels). The following equation is used to estimate the vibration level at a given distance for typical soil conditions. PPV_{ref} is the reference PPV at 25 feet.

$$\text{PPV} = \text{PPV}_{\text{ref}} \times (25/\text{distance})^{1.5}$$

Table 3-1 summarizes typical vibrational levels generated by construction equipment at a reference distance of 25 feet and other distances, as determined with use of the attenuation equation above.

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[14] Federal Transit Administration. 2018. *Transit Noise and Vibration Impact Assessment*. FTA-VA-90-1003-06. Office of Planning and Environment. Available: www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf.

Table 3-1. Vibration Source Levels for Construction Equipment

Equipment	PPV (in/sec) at 25 feet	PPV (in/sec) at 50 feet	PPV (in/sec) at 75 feet	PPV (in/sec) at 100 feet	PPV (in/sec) at 175 feet
Caisson or Auger Drill	0.089	0.0315	0.0171	0.0111	0.0048
Large Bulldozer	0.089	0.0315	0.0171	0.0111	0.0048
Loaded Trucks	0.076	0.0269	0.0146	0.0095	0.0041
Jackhammer	0.035	0.0124	0.0067	0.0044	0.0019
Small Bulldozer	0.003	0.0011	0.0006	0.0004	0.0002

Source: Federal Transit Administration 2006. *Transit Noise and Vibration Impact Assessment*. FTA-VA-90-1003-06. Office of Planning and Environment. Available: www.transit.dot.gov/sites/fta.dot.gov/files/docs/FTA_Noise_and_Vibration_Manual.pdf. Accessed: April 26, 2022.
In/sec = inches per second; PPV = peak particle velocity.

3.1.5.3 Regulatory Setting

State

California Department of Transportation

As discussed in the Noise Technical Report (Appendix C), the California Department of Transportation's (Caltrans) widely referenced *Transportation and Construction Vibration Guidance Manual*[15] provides guidance for two types of potential impact: (1) damage to structures; and (2) annoyance to people. Guideline criteria for each are provided in **Table 3-2** and **Table 3-3**.

Table 3-2. Caltrans Guideline Vibration Damage Criteria

	Maximum PPV (in/s)	
Structure and Condition	**Transient Sources**	**Continuous/Frequent Intermittent Sources**
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.20	0.10
Historic and some old buildings	0.50	0.25
Older residential structures	0.50	0.30
New residential structures	1.00	0.50
Modern industrial/commercial buildings	2.00	0.50

Source: California Department of Transportation. 2020. *Transportation and Construction Vibration Guidance Manual*. April. Available: dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tcvgm-apr2020-a11y.pdf. Accessed: April 26, 2022.
Note: Transient sources create a single, isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include pile drivers (impact and vibratory), crack-and-seat equipment, and vibratory compaction equipment.
in/s = inches per second; PPV = peak particle velocity.

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[15] California Department of Transportation. 2020. *Transportation and Construction Vibration Guidance Manual*. April. Available: dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tcvgm-apr2020-a11y.pdf. Accessed: April 26, 2022.

Table 3-3. Caltrans Guideline Vibration Annoyance Criteria

	Maximum PPV (in/s)	
Human Response	**Transient Sources**	**Continuous/Frequent Intermittent Sources**
Barely perceptible	0.04	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.90	0.10
Severe	2.00	0.40

Source: California Department of Transportation. 2020. *Transportation and Construction Vibration Guidance Manual*. April. Available: dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tcvgm-apr2020-a11y.pdf. Accessed: April 26, 2022.

Note: Transient sources create a single, isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include pile drivers (impact and vibratory), crack-and-seat equipment, and vibratory compaction equipment.

Caltrans = California Department of Transportation; in/s = inches per second; PPV = peak particle velocity.

Local

City of Millbrae General Plan

The City is in the process of updating its General Plan; at the time of this analysis, the General Plan Update has not yet been adopted. Therefore, the 1998 General Plan is used in this analysis. The General Plan Noise Element includes land use compatibility standards that outline acceptable outdoor noise environment standards for various land use categories. In general, the intent of land use compatibility standards is to guide jurisdictions with respect to existing ambient noise levels in a community and whether those levels are compatible for a particular type of land use. The compatibility standards are used to determine whether newly developed land use would be exposed to ambient noise levels greater than what would be considered acceptable. Refer to Policy NS 2.1 (Table 5-3 of the Noise Technical Report [Appendix C], and **Table 3-4**, below) for the General Plan land use compatibility guidelines for all land uses in the city.[16] In addition, the Noise Technical Report includes a list of the General Plan goals and policies related to noise.[17]

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[16] City of Millbrae. 1998. *City of Millbrae General Plan*. Available: www.ci.millbrae.ca.us/departments-services/community-development/planning-division/general-plan-adopted-1998. Date Accessed: April 12, 2022.

[17] Ibid.

Table 3-4. Short-Term Noise Level Measurements in and around the Project Site

Site	Site Description	Measurement Start Time	L_{eq}	L_{max}	L_{min}	Dominant Noise Source
ST-1	Northeast corner of 959 El Camino Real	09/15/2021, 12:00 p.m.	67.0	80.9	50.1	Roadway traffic noise primarily from El Camino Real
ST-2	Southeast corner of Broadway and Meadow Glen Avenue (979 Broadway)	09/15/2021, 11:32 a.m.	61.9	81.1	50.6	Vehicle traffic at intersection

Note: See Appendix C, *Noise Technical Report*, for data. All noise levels are reported in A-weighted decibels (dBA).
L_{eq} = equivalent sound level; L_{max} = maximum sound level; L_{min} = minimum sound level; ST = long-term (15-minute) ambient noise measurement.

Table 3-5. Long-Term Noise Level Measurements in and around the Project Site

Site	Site Description	Time Period	Day 1 L_{dn}	Day 2 L_{dn}	Lowest Hour L_{eq}[a] Time	Peak L_{eq}[b] Time	12-Hour L_{eq} Day 1	12-Hour L_{eq} Day 2	Day 1 CNEL	Day 2 CNEL	Primary Noise Sources
LT-1	850 El Camino Real	09/14/2021–09/16/2021	76.7	77.5	63.1 09/15/2021, 5:00 a.m.	77.6 09/15/2021, 7:00 a.m.	74.8	73.8	77.2	78.0	Roadway traffic
LT-2	North Corner of 1001 Broadway	09/14/2021–09/16/2021	65.9	64.0	49.7 09/14/2021, 3:00 a.m.	66.3 09/15/2021, 6:00 a.m.	62.9	62.6	66.3	64.4	Roadway traffic
LT-3	East Corner of 1010 Magnolia Avenue	09/14/2021–09/16/2021	65.1	65.7	51.7 09/14/2021, 3:00 a.m.	71.4 09/14/2021, 8:00 a.m.	65.9	64.3	65.6	66.0	Roadway traffic

Note: See Appendix C, *Noise Technical Report*, for data.
[a] Lowest Hour L_{eq} is the lowest calculated L_{eq} level during a 48-hour period.
[b] Peak L_{eq} is the highest calculated L_{eq} level during a 48-hour period.
CNEL = community noise equivalent levels; L_{dn} = day-night sound level; L_{eq} = equivalent sound level; LT = long-term (48-hour) ambient noise measurement.

City of Millbrae Municipal Code

The City's Municipal Code contains noise regulations to protect the community from excessive noise and specifies how noise will be measured and regulated. Specifically, the City Municipal Code addresses noise issues and protects the community from disruptive noise sources, such as construction activity, animals, amplified sound, and stationary equipment.

Regarding noise from construction and demolition activities, Section 105.8 from Chapter 9.05 (Building Code) of the Municipal Code restricts the hours of construction activity to the hours of 7:30 a.m. and 7:00 p.m., Monday through Friday. Construction is permitted between 8:00 a.m. and 6:00 p.m. on Saturdays and between 9:00 a.m. and 6:00 p.m. on Sundays and holidays. Any work outside these hours is prohibited without prior written permission from the City. During these permitted hours, the Municipal Code does not include noise limits that apply to construction noise.

Municipal Code Section 10.25.120(O) requires that all permanent mechanical equipment (e.g., motors, compressors, pumps, and compactors) be structurally isolated when the City's building official identifies the equipment as a source for structural vibration or structure-borne noise. In addition, Municipal Code Section 10.25.120(P) specifies that greater consideration will be given to independent systems for heating, ventilation, and air conditioning (HVAC), allowing each unit's occupant to control the temperature.

City of Millbrae Environmental Conditions of Approval for Noise

In addition to the regulations and guidelines contained in the City Municipal Code and General Plan, Millbrae has prepared and adopted standard Environmental Conditions of Approval (COAs) for Noise that apply to all projects in the City.[18] The Environmental COAs relevant to the proposed project are detailed below.

17. **Construction Days/Hours.** For all projects involving construction, the applicant shall comply with the following restrictions concerning construction days and hours:

    a. Construction activities are limited to between 7:30 a.m. and 7:00 p.m. Monday through Friday.

    b. Construction activities are limited to between 8:00 a.m. and 6:00 p.m. on Saturdays.

    c. Construction activities are limited to between 9:00 a.m. and 6:00 p.m. on Sundays and federal holidays.

    Construction activities include, but are not limited to, truck idling, moving equipment or materials, deliveries, and construction meetings held on-site in a non-enclosed area. In order to proceed with instances of nighttime construction activities for projects, the Project Sponsor must obtain approval from the City Building Official to conduct work outside of the standard daytime hours noted above. Work outside of these hours may be approved by the Building Official when requested, in writing, a minimum of 48 hours in advance. If approval is not received, nighttime construction shall not occur.

    <u>When Required:</u> At all times during the construction phase of the project. Approval for nighttime construction shall be submitted to the Building Official with a minimum of 48 hours in advance.

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[18] City of Millbrae. 2022. Standard Environmental Conditions of Approval. May.

Conformance Approval: Community Development Department (Building Division)

Monitoring/Inspection Responsible Party: Community Development Department (Building Division)

18. **Construction Best Management Noise Practices.** For all projects involving construction, the following conditions of approval indicate best management practices to be implemented by the applicant during project construction:

    a. All construction equipment and vehicles shall utilize the best available noise control techniques (e.g., manufacturer-approved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures, and noise-attenuating shields or shrouds), wherever feasible.

    b. All mobile or fixed construction equipment that is regulated for noise output by a governmental agency shall comply with such regulation.

    c. Prohibit unnecessary idling of internal combustion engines.

    d. All construction equipment shall be operated only when necessary and shall be switched off when not in use.

    e. Locate stationary noise-generating equipment as far as possible from sensitive receptors that adjoin construction sites.

    f. Construction employees shall be trained in the proper operation and use of the equipment to avoid careless or improper operation of equipment that could increase noise levels.

    g. Construction site speed limits of 20 mph or less shall be established, posted as necessary, and enforced during the construction period.

    h. To the maximum extent feasible, route construction-related traffic along major roadways and away from sensitive receptors.

    i. The use of noise-producing signals, including horns, whistles, alarms, and bells, shall be for safety warning purposes only.

    When Required: At all times during the construction phase of the project

    Conformance Approval: Community Development Department (Building Division)

    Monitoring/Inspection Responsible Party: Community Development Department (Building Division)

20. **Commercial and Industrial Stationary Noise.** Noise created by commercial or industrial sources associated with new projects shall be controlled by the applicant so as not to exceed the exterior noise compatibility standards set forth in the contemporaneous City of Millbrae General Plan, as measured at any affected residential land use. If noise levels exceed these standards, the activity causing the noise shall be abated until appropriate noise reduction measures have been installed and compliance verified by the City.

    When Required: At all times that the building or use authorized by the planning approval occupies the subject property

    Conformance Approval: Community Development Department (Building Division)

<u>Monitoring/Inspection Responsible Party:</u> Community Development Department (Building Division

3.1.5.4 Existing Noise Levels

Existing ambient noise levels in the project vicinity are dominated by vehicle traffic on major roadways in the area, such as El Camino Real. Other major noise sources affecting the ambient noise environment include Caltrain, BART, and freight rail noise; aircraft arriving and departing at SFO; and commercial/industrial activities, such as truck loading, and stationary equipment. Noise is often measured to characterize the ambient noise levels in the vicinity of a project site. To characterize the existing ambient noise environment near the site, long-term (48-hour) and short-term (15-minute) ambient noise measurements were conducted between Tuesday, September 14, 2021, and Thursday, September 16, 2021.

Two monitoring locations in and around the project vicinity were selected to collect short-term ambient noise data, and three locations throughout the project vicinity were selected to collect long-term ambient noise data, as shown in Figure 7. Refer to the Noise Technical Report (Appendix C) for more details regarding the noise measurement survey. Refer to Appendix A of the Noise Technical Report, *Noise and Vibration Modeling Results*, for the complete dataset of measured noise levels.

Noise-Sensitive Land Uses

Noise-sensitive land uses are the locations most likely to be adversely affected by excessive noise levels, as well as places where quiet is an essential element of their intended purpose. As defined in the General Plan, examples of sensitive interior spaces include, but are not limited to, residences, schools, hospitals, libraries, churches, and convalescent homes.[19] In the project area, single-family residences are located approximately 930 feet south of the site and west of El Camino Real. Single-family homes are also located 150 feet east of the site (and east of El Camino Real). Multi-family housing buildings are also present in the area, the closest of which are located approximately 250 feet west of the site on Magnolia Avenue. Saint Dunstan school, a private grade school, is located approximately 950 feet northwest of the site.

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[19] City of Millbrae. 1998. *City of Millbrae General Plan*. Available: www.ci.millbrae.ca.us/departments-services/community-development/planning-division/general-plan-adopted-1998. Date Accessed: April 12, 2022

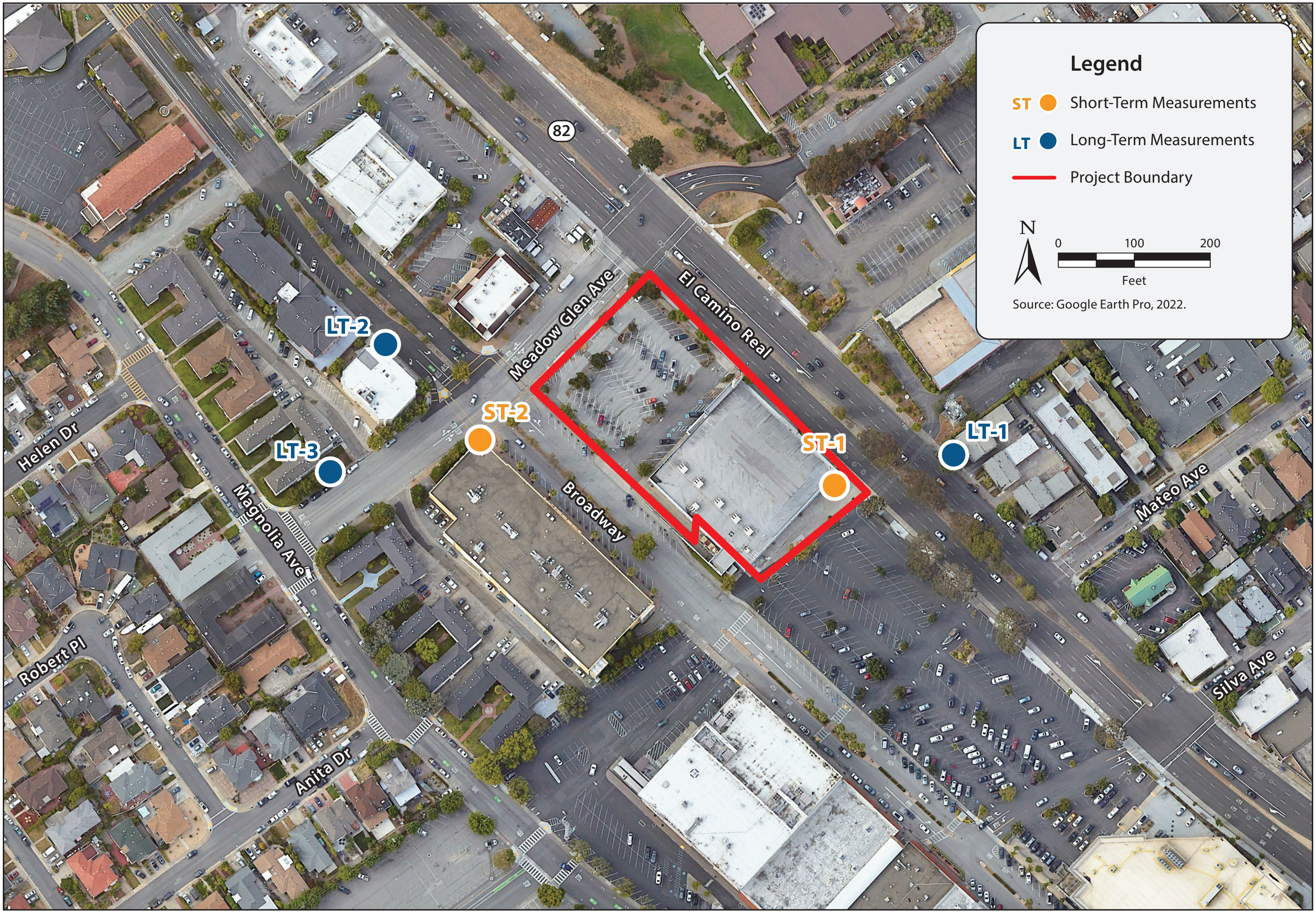

Figure 7
Noise Measurement Locations

3.1.5.5 Noise Effects

Daytime Construction Noise. As discussed in the Noise Technical Report (Appendix C), the project would consist of six key construction stages, or *subphases*, taking place over approximately 27 months: Demolition, Site Preparation, Grading, Building Construction, Paving, and Architectural Coating. City Municipal Code Chapter 9.05 (Building Code) states that construction activities may occur between the hours of 7:30 a.m. and 7:00 p.m., Monday through Friday; 8:00 a.m. to 6:00 p.m. on Saturday; and 9:00 a.m. to 6:00 p.m. on Sunday.

Typical construction work hours would be between 7:30 a.m. to 7:00 p.m., Monday through Friday, in accordance with the allowable hours for construction activity in the city. Up to six instances of nighttime concrete pours may be required; in addition, the erection and dismantling of the proposed electric crane may occur during nighttime hours.

Equipment proposed for use on the main site during construction includes concrete saws, excavators, dozers, tractors, loaders, backhoes, graders, cranes, generators, welders, pavers, rollers, air compressors, concrete pump trucks, and concrete mixer trucks. Utility construction on Meadow Glen Avenue is expected to use equipment such as a backhoe, excavator, skid steer, dump truck, and roller.

Estimated combined construction noise levels for a reasonable worst-case day were estimated for each construction subphase for both on- and offsite activities (e.g., utility work). This analysis assumed that the three loudest pieces of equipment expected to be used during a given phase of construction would be operating simultaneously and close to one another on the site. As described in the Noise Technical Report, the construction phase expected to result in worst-case noise would be Demolition. Combining the noise level from the three loudest pieces of equipment, and assuming they are all operating very close to one another and near the closest offsite sensitive receptor, results in a reasonably conservative worst-case combined noise level. This is the approach recommended by the Federal Transit Administration.[20] Refer to **Table 3-6** for the construction noise modeling results for the demolition subphase.

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[20] Federal Transit Administration. 2018. *Transit Noise and Vibration Impact Assessment*. FTA Report No. 0123. Available: www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf. Accessed: April 26, 2022.

Table 3-6. Daytime Combined Construction Noise for Onsite Demolition Activities

Source Data:	**Maximum Sound Level (dBA)**	**Utilization Factor**	**L_{eq} Sound Level (dBA)**
Construction Condition: Demolition			
Source 1: Concrete saw – Sound level (dBA) at 50 feet =	90	20%	83.0
Source 2: Dozer – Sound level (dBA) at 50 feet =	82	40%	78.0
Source 3: Dozer – Sound level (dBA) at 50 feet =	82	40%	78.0
Calculated Data			
All Sources Combined – L_{max} sound level (dBA) at 50 feet =			91 L_{max}
All Sources Combined – L_{eq} sound level (dBA) at 50 feet =			85 L_{eq}

Distance between Source and Receiver (feet)	*Geometric Attenuation (dB)*	*Calculated L_{max} Sound Level (dBA)*	*Calculated L_{eq} Sound Level (dBA)*
50	0	91	85
100	-6	85	79
150	**-10**	**82**	**76**
250	**-14**	**77**	**71**
280	**-15**	**76**	**70**
500	-20	71	65
600	-22	70	64
850	-25	67	61
1,000	-26	65	59
1,200	-28	64	58

Source: Federal Highway Administration. 2006. *FHWA Roadway Construction Noise Model User's Guide*. FHWA-HEP-05-054. January. Available: www.fhwa.dot.gov/ENVIRonment/noise/construction_noise/rcnm/rcnm.pdf. Accessed: April 26, 2022.

Notes:

- Geometric attenuation is based on 6 dB per doubling of distance.
- This calculation does not include the effects, if any, of local shielding or ground attenuation from walls, topography, or other barriers that may reduce sound levels further.
- Noise levels are based on source noise levels from the FHWA Roadway Construction Noise Model.
- **Bold** denotes distance and sound levels from the Site to the nearest sensitive receivers.

dB = decibels; dBA = A=weighted decibels; L_{eq} = sound equivalent level; L_{max} = maximum sound level.

As shown in **Table 3-6**, demolition could result in noise levels of approximately 76 dBA L_{eq} at the nearest noise-sensitive use (150 feet east of the project site, across El Camino Real) during daytime hours. Multi-family residential land uses are also located in relatively close proximity to the project, at distances of approximately 250 and 280 feet northwest of the project site. At these distances, noise levels from demolition could result in approximate noise levels of up to 71 and 70 dBA L_{eq}.

With regard to the in-street utility construction, construction activities could occur as close as 150 feet from the nearest sensitive land uses, which are multi-family residences located northwest of the proposed utility lines, north of Meadow Glen Avenue along Broadway. Modeling results for utility construction activities are shown in **Table 3-7**.

Table 3-7. Daytime Construction Noise from Offsite Utility Construction

Source Data:	**Maximum Sound Level (dBA)**	**Utilization Factor**	**L_{eq} Sound Level (dBA)**
Construction Condition: Utility Construction			
Source 1: Excavator – Sound level (dBA) at 50 feet =	81	40%	77.0
Source 2: Front end loader – Sound level (dBA) at 50 feet =	79	40%	75.0
Source 3: Roller – Sound level (dBA) at 50 feet =	80	20%	73.0
Calculated Data			
All Sources Combined – L_{max} sound level (dBA) at 50 feet =			85 L_{max}
All Sources Combined – L_{eq} sound level (dBA) at 50 feet =			80 L_{eq}
Distance between Source and Receiver (feet)	*Geometric Attenuation (dB)*	*Calculated L_{max} Sound Level (dBA)*	*Calculated L_{eq} Sound Level (dBA)*
50	0	85	80
100	-6	79	74
150	**-10**	**75**	**71**
250	-14	71	66
280	-15	70	65
500	-20	65	60
600	-22	63	59
850	-25	60	55
1,000	-26	59	54
1,200	-28	57	52

Source: Federal Highway Administration. 2006. *FHWA Roadway Construction Noise Model User's Guide*. FHWA-HEP-05-054. January. Available: www.fhwa.dot.gov/ENVIRonment/noise/construction_noise/rcnm/rcnm.pdf. Accessed: April 26, 2022.

Notes:

- Geometric attenuation is based on 6 dB per doubling of distance.
- This calculation does not include the effects, if any, of local shielding or ground attenuation from walls, topography, or other barriers that may reduce sound levels further.
- Noise levels are based on source noise levels from the FHWA Roadway Construction Noise Model.
- **Bold** denotes distance and sound levels from the waterline construction to the nearest noise-sensitive receiver (multi-family residential land uses, in this case).

dB = decibels; dBA = A=weighted decibels; L_{eq} = sound equivalent level; L_{max} = maximum sound level.

Based on the modeling results shown in **Table 3-7**, noise from utility construction could be up to 71 dBA L_{eq} at a distance of 150 feet (the distance to the nearest residential land use). Although construction noise from the utility work may reach this noise level at the nearest residences, utility construction would be linear in nature and move along Meadow Glen Avenue, along the proposed utility alignment. Therefore, utility construction would not be taking place 150 feet from the nearest residences for the duration of the Construction subphase.

Proposed construction activities, both on and off site, are expected to take place between the hours of 7:30 a.m. and 7:00 p.m., Monday through Friday. Based on the modeling results presented above, onsite construction activities could result in a noise level of up to 76 dBA L_{eq} at the nearest residence during daytime hours, and utility construction could result in a noise level of up to 71 dBA L_{eq} at the nearest sensitive residence. Although temporary noise increases during daytime hours would occur during project construction, construction noise would be limited to the City's allowable daytime hours, during which time no specific numerical thresholds apply to construction noise. In addition, implementation of City's Environmental COAs, *Construction Day/Hours* and *Construction Best Management Noise Practices,* would help reduce noise levels during construction. Specifically, noise-producing construction activities would generally be limited to the daytime hours defined in the COAs. Furthermore, measures described in the *Construction Best Management Noise Practices* Environmental COA, such as ensuring equipment mufflers are installed, limiting the use of noise-producing signals, prohibiting unnecessary idling, and others, would be implemented and help reduce noise levels during construction. For the reasons described above, daytime construction noise for the project would be in compliance with local applicable thresholds. Impacts related to project construction during daytime hours would be ***less than significant***.

Nighttime Construction Noise. Although the vast majority of project construction would take place during daytime hours, as described above, up to six instances of nighttime concrete pours, one instance of nighttime crane erection at the start of construction, and one night of crane dismantling at the end of construction may take place during nighttime hours. When nighttime work is needed, it is expected to commence at 9:00 p.m. and continue until 7:00 a.m. Overall, nighttime construction work would be rare, occurring only 6 to 8 nights during the 27-month construction duration. In addition, work would not take place on back-to back nights; there would always be at least 2 weeks (and often much longer) between instances of nighttime construction work.

Nighttime concrete pours would require more equipment than crane assembly and disassembly, and associated noise levels would likely be higher; therefore, concrete pours are the focus of the nighttime construction noise analysis. Refer to **Table 3-8** for the nighttime concrete pour noise modeling results. Based on the modeling results shown above, concrete pour activities could result in a noise level of up to 70 dBA L_{eq} at the nearest residential land uses (single-family residential), located about 150 feet from the project site (east of El Camino Real). Noise from nighttime concrete pour activities may be up to 66 dBA L_{eq} at a distance of 250 feet, the distance to the nearest multi-family residential land uses. The lowest 1-hour L_{eq} noise level recorded during the noise measurement survey at the nearest residential land use (150 feet from the project site, east of El Camino Real) was 63.1 dBA L_{eq}.[21] At the nearest multi-family residences (located 250 feet or more northwest of the project site), the lowest 1-hour L_{eq} noise level recorded was 49.7 dBA L_{eq}.[22] Therefore, estimated noise levels from nighttime construction could be approximately 7 to 16 dB louder than the measured lowest 1-hour L_{eq} noise levels at nearby noise-sensitive uses.

In the City, and per City Municipal Code Chapter 9.05 (Building Code) Section 105.8, noise-generating construction activities are generally limited to the hours of 7:30 a.m. to 7:00 p.m. Monday through Friday, 8:00 a.m. to 6:00 p.m. Saturdays, and 9:00 a.m. to 6:00 p.m. on Sundays and holidays. In addition, the Municipal Code also states that work outside these hours may be approved by the City Building Official when requested, in writing, a minimum of 48 hours in advance. In order to proceed with 6 to 8 instances of nighttime construction activities for the proposed project, the Project Sponsor must obtain approval from the City Building Official to conduct work outside the standard daytime hours of 7:30 a.m. to 7:00 p.m. weekdays (the project's proposed hours for typical daytime construction). Should approval not be received, nighttime construction would not occur. Because the project applicant must request an exemption to the allowable daytime hours defined in the City Code in order to conduct nighttime work, and because nighttime construction would be infrequent (only 6 to 8 nights during a 27-month construction duration) and intermittent (not occurring on back-to-back nights), any temporary increases in the ambient noise level during

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[21] Refer to Table 3-5 for Lowest Hour L_{eq} ambient noise levels near this location.

[22] Ibid.

infrequent nighttime construction activities would not be considered substantial. In addition, implementation of the City's Environmental COA, *Construction Best Management Noise Practices,* would help reduce noise levels during construction. Specifically, measures such as ensuring equipment mufflers are installed, limiting the use of noise-producing signals, prohibiting unnecessary idling, and others, would be implemented, and would help reduce noise levels during construction. For the reasons described above, impacts related to temporary nighttime construction noise would be ***less than significant.***

Table 3-8. Nighttime Construction Noise, Concrete Pours

Source Data:	**Maximum Sound Level (dBA)**	**Utilization Factor**	**L_{eq} Sound Level (dBA)**
Construction Condition: Concrete Pouring			
Source 1: Concrete pump truck – Sound level (dBA) at 50 feet =	81	20%	74.0
Source 2: Concrete mixer truck – Sound level (dBA) at 50 feet =	79	40%	75.0
Source 3: Concrete mixer truck – Sound level (dBA) at 50 feet =	79	40%	75.0
Calculated Data			
All Sources Combined – L_{max} sound level (dBA) at 50 feet =			85.0 L_{max}
All Sources Combined – L_{eq} sound level (dBA) at 50 feet =			79.0 L_{eq}
Distance between Source and Receiver (feet)	*Geometric Attenuation (dB)*	*Calculated L_{max} Sound Level (dBA)*	*Calculated L_{eq} Sound Level (dBA)*
50	0	85	79
100	**-6**	**79**	**73**
150	**-10**	**75**	**70**
250	**-14**	**71**	**66**
280	-15	70	65
500	-20	63	58
600	-22	60	55
850	-25	60	55
1,000	-26	59	53

Source: Federal Highway Administration. 2006. *FHWA Roadway Construction Noise Model User's Guide*. FHWA-HEP-05-054. January. Available: www.fhwa.dot.gov/ENVIRonment/noise/construction_noise/rcnm/rcnm.pdf. Accessed: April 26, 2022.

Notes:

- Geometric attenuation is based on 6 dB per doubling of distance.
- This calculation does not include the effects, if any, of local shielding or ground attenuation from walls, topography, or other barriers that may reduce sound levels further.
- Noise levels are based on source noise levels from the FHWA Roadway Construction Noise Model.
- **Bold** denotes distance and sound levels from the project site to the nearest sensitive receiver.

dB = decibels; dBA = A=weighted decibels; L_{eq} = sound equivalent level; L_{max} = maximum sound level.

Construction Haul Truck Noise. As discussed in the Noise Technical Report (Appendix C), the temporary addition of haul trucks on the local roadway network could result in temporary increases in noise at nearby sensitive land uses. Based on the expected material export required for the project, and on information provided by the Project Sponsor, project construction would involve up to 106 one-way haul-truck trips on a worst-case day (noting that during many construction days there would be fewer truck trips than 106). The temporary addition of a worst-case 106 haul-truck trips per day on nearby roadway segments was evaluated in the Noise Technical Report to determine if hauling activity would result in substantial increases (i.e., a 3-dB increase, or a barely perceptible increase) to the ambient noise levels at nearby noise-sensitive land uses. Noise modeling was conducted, and modeling results for Existing and Existing plus Project haul-truck conditions were compared. Refer to Table 6-4 of the Noise Technical Report (Appendix C) for estimated traffic noise levels along the roadway segments under Existing and Existing plus Project haul-truck conditions based on the assumptions described above. As shown in this table, noise increases due to haul-truck activity would not be expected to result in a greater than 3-dB (i.e., barely perceptible) increase in traffic noise along any of the analyzed segments. The greatest increase in noise from hauling activity was modeled to be 1.4 dB. In addition, the distance to the nearest residential land use along most segments is greater than the 50-foot screening distance utilized in this assessment; therefore, actual haul-truck noise levels likely would be lower. Because project haul truck activity would result in less than a 3-dB increase in noise along all analyzed segments, project haul-truck noise impacts would be ***less than significant*****.**

Operational Traffic. Once operational, the project would result in an increase in traffic in the vicinity of the project. Project-specific traffic data, including average daily traffic volumes, roadway speeds, and vehicle mix percentages (i.e., the proportion of automobiles, trucks, buses, and other vehicles) were provided by Fehr & Peers. Modeling was conducted using a spreadsheet based on the Federal Highway Administration (FHWA) Traffic Noise Model, version 2.5, for Existing and Existing plus Project conditions to assess potential traffic noise impacts. As discussed in the Noise Technical Report, when assessing traffic noise impacts, an increase of more than 5 dBA is considered a significant traffic noise increase, regardless of the existing ambient noise level. In addition, in places where the existing or resulting noise environment is conditionally acceptable, normally unacceptable, or clearly unacceptable, based on the City Land Use Compatibility Guidelines, any noise increase greater than 3 dBA is considered a significant traffic noise increase. Refer to **Table 3-9** for the traffic noise modeling results.

As shown in **Table 3-9**, traffic noise levels along the project site's adjacent roadway segments would increase by a maximum of 0.3 dB as a result of project implementation. The expected traffic noise increases would not constitute a significant increase in noise along any roadway segment, regardless of the existing noise environment. Therefore, traffic noise impacts resulting from project implementation would be ***less than significant*****.**

Table 3-9. Modeled Traffic Noise Levels

Roadway	Segment Location	Existing L_{dn}	Existing plus Project L_{dn}	Change (dB)
El Camino Real	North of Meadow Glen	68.9	68.9	0.0
El Camino Real	South of Meadow Glen	68.7	68.8	0.1
Broadway	North of Meadow Glen	56.3	56.5	0.2
Broadway	South of Meadow Glen	59.3	59.5	0.2
Magnolia	North of Meadow Glen	57.5	57.7	0.2
Magnolia	South of Meadow Glen	57.8	57.8	0.0
Meadow Glen	East of Broadway	59.8	60.1	0.3
Meadow Glen	West of Broadway	59.3	59.5	0.2
Meadow Glen	East of El Camino Real	51.3	51.3	0.0

Refer to Appendix A for the complete traffic noise modeling results, including modeling results for Cumulative No Project, and Cumulative Plus Project conditions (which are not used in this analysis).
dB = decibels; L_{dn} = day–night sound level.

Roof Top Mechanical Equipment. The project would involve the use of HVAC systems and equipment. The roof of the building would consist of two boilers, one garage exhaust fan, and 283 air-conditioning compressors (one associated with each of the 278 individual apartment heating and cooling systems, and five for ground-floor commercial usage). The air conditioning units for individual apartments most likely would be split system units; however, final makes and models for these units have not yet been selected. All the equipment above would be located behind a solid wall taller than the equipment, which would help reduce noise. This solid wall would result in at least 10 dB of noise reduction. Boilers can produce noise levels of approximately 67 dBA at 50 feet.[23] Exhaust/ ventilation fans can generate noise levels at 50 feet of approximately 79 dBA.[24] Air-handling units and standard HVAC package units, such as the 283 air condensers proposed for the project, can produce sound levels in the range of about 70 to 75 dBA at 50 feet,[25] depending on the size of the unit. Based on these source noise levels, and as discussed in more detail in the Noise Technical Report, combined noise from two boilers, one exhaust fan, and 283 air-condensing units at a distance of 50 feet could be up to 84.7 dBA when accounting for 10 dB of attenuation from the solid parapet wall, assuming all equipment was operational simultaneously and relatively close to one another. The nearest offsite land use to the site is a single-family residence approximately 150 from the project site across El Camino Real. Based on project designs (including a 25-foot setback along the southeastern perimeter of the site), mechanical equipment would be located approximately 250 horizonal feet from the nearest residence. The estimated noise level from this equipment at a distance of 250 feet would be approximately 70.7 dBA L_{eq}. At the closest multi-family residences, approximately 300 feet from the aforementioned mechanical equipment, mechanical equipment noise would be approximately 69.1 dBA L_{eq}.

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[23] Hoover and Keith. 2000. *Noise Control for Buildings, Manufacturing Plants, Equipment, and Products*. Houston, TX.

[24] Federal Highway Administration. 2006. *FHWA Roadway Construction Noise Model User's Guide*. FHWA-HEP-05-054. January. Available: www.gsweventcenter.com/Draft_SEIR_References/2006_01_Roadway Construction_Noise_Model_User_Guide_FHWA.pdf. Accessed: April 26, 2022.

[25] Hoover and Keith. 2000. *Noise Control for Buildings, Manufacturing Plants, Equipment, and Products*. Houston, TX.

The General Plan contains numerous policies that would apply to the proposed project. Policy NS 2.4 (Commercial or Industrial Source Noise) would be required because the mixed-use project building would contain commercial uses. Under this policy, noise created by commercial or industrial sources associated with new projects of developments "shall be controlled so as not to exceed the noise level standards set forth in the Noise Technical Report (see Appendix C, Table 5-4, Maximum Allowable Noise Exposure for Stationary Noise Sources). According to this policy, maximum hourly L_{eq} noise levels are limited to 55 dBA during daytime hours and 45 dBA during nighttime hours at the property line of the receiving land use. Allowable levels will be raised to the ambient noise levels where the ambient levels exceed the allowable levels.

As discussed in the Noise Technical Report (Appendix C), because the project would be required to comply with Policy NS 2.4 as a condition of receiving building permits, compliance with the maximum allowable noise levels from Policy NS 2.4 must be demonstrated prior to the commencement of project construction. This compliance can be achieved through the incorporation of attenuation features, such as selecting quieter equipment or enclosing equipment, among other options. In addition, Policy NS 1.3 (Noise Source Control) requires property owners to control noise at its source, maintaining existing noise levels and ensuring that noise levels do not exceed acceptable noise standards as established in the Noise and Land Use Compatibility Guidelines. Furthermore, according to General Plan Policy NS 2.6 (Noise Reduction Techniques), projects must include design features (as appropriate, based on design, use, site layout, and other considerations) to reduce noise impacts on adjacent properties as a condition of development approval. Finally, implementation of the City's Environmental COA *Commercial and Industrial Stationary Noise,* which requires that noise associated with new commercial projects be controlled so as not to exceed the City noise level standards, would ensure that project rooftop equipment would not result in noise levels in excess of thresholds. Refer to the Noise Technical Report (Appendix C) for more details on these noise-reduction techniques.

Implementation of required policies under the General Plan, along with the City's Environmental COA pertaining to Commercial and Industrial Stationary Noise, would ensure that noise levels from equipment are reduced to the allowable limits as a condition of development approval. Impacts related to mechanical equipment noise would be ***less than significant*** with implementation of required General Plan policies.

Loading Dock Noise. With regard to loading dock and activity noise, the project loading dock would be located in the project parking garage. All loading would take place internally. An estimated one to five truck deliveries would occur per day for commercial land uses, with up to 278 annual loading activities for residential move in or move out activities. The infrequent truck loading and unloading activities in the project garage would not be expected to result in a substantial increase in ambient noise levels external to the project buildings. Noise impacts from loading activity would be ***less than significant.***

3.1.5.6 Vibration Effects

Damage to Structures. Construction of the project would involve the use of construction equipment that could generate groundborne vibration. The most vibration-intensive equipment proposed for use during project construction are vibratory rollers, excavators, and rubber-tired dozers; no pile driving is proposed for the project. As discussed in the Noise Technical Report, the nearest offsite structures to the site are two commercial buildings, approximately 85 feet to the northwest, across Meadow Glen Avenue, and to the southwest, across Broadway from the project site. The nearest single-family residences are located approximately 150 feet to the east of the project site, across El Camino Real, and the nearest multi-family residences are located approximately 250 feet to the northwest of the project site, across Meadow Glen Avenue. Estimated vibrational levels associated construction equipment proposed for use under the project at a reference distance of 25 feet, and other distances, are shown in **Table 3-10**.

Table 3-10. Vibration Source Levels for Construction Equipment

Equipment	PPV at 25 feet	PPV at 50 feet	PPV at 85 feet	PPV at 150 feet	PPV at 250 feet
Vibratory Roller	**0.210**	0.074	**0.033**	**0.014**	0.007
Large Dozer[a]	**0.089**	0.031	0.014	0.006	0.003
Small Dozer[b]	**0.003**	0.001	0.000	**0.000**	0.000

Source: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment*, FTA Report No. 0123, 2018, www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf, accessed April 26, 2022.
Note: **Bold** values are discussed in the analysis.
[a] Representative of an excavator and rubber-tired dozer.
[b] Representative of a backhoe, front-end loader, and concrete mixer truck.
PPV = peak particle velocity.

As discussed in the Noise Technical Report, construction at the project site would result in vibrational levels below the applicable damage criteria at nearby structures. Specifically, construction activities on the project site could result in a maximum vibration level of 0.03 PPV in/sec at a distance of 85 feet (the nearest offsite commercial structures). This is below the Caltrans allowable 0.5 PPV in/sec threshold for damage to these types of structures. In addition, project site construction could result in a vibration level of 0.014 PPV in/sec at a distance of 150 feet (the distance to the nearest residence). This is below the 0.3 PPV in/sec Caltrans threshold for older residential structures.

Regarding offsite construction within Meadow Glen Avenue, construction equipment expected to be used for this activity are a backhoe, excavator, loader, dump truck, and a roller. The most vibration-intensive equipment that would be required for this work is a vibratory roller. The nearest existing structure to the proposed utility construction area would be the Citibank commercial building, approximately 25 feet from the nearest utility work area, at the northwestern corner of Meadow Glen Avenue and Broadway. At a distance of 25 feet, a vibratory roller would result in an estimated vibration level of 0.21 PPV in/sec, which is below the 0.5 PPV in/sec Caltrans threshold for this type of structure. All other construction equipment would result in even lower vibration levels, as shown in **Table 3-10**.

Because the estimated ground vibration levels at the nearest structures would be below the applicable Caltrans damage criteria during both on- and offsite construction, vibration-related damage impacts from project construction would be ***less than significant***.

Vibration-Related Annoyance. Regarding annoyance-related vibration impacts, and as described in the Noise Technical Report (Appendix C), a significant vibration impact related to sleep disturbance could occur if nighttime construction activities generate prolonged vibration levels that are strongly perceptible (i.e., PPV of 0.01 in/sec) at locations where people sleep. Construction for the project would typically occur during the City's daytime allowable hours of 7:30 a.m. to 7:00 p.m., Monday through Friday; 8:00 a.m. and 6:00 p.m. on Saturdays; and between 9:00 a.m. and 6:00 p.m. on Sundays and holidays, with limited instances of nighttime construction for major concrete pours and crane erection and dismantling. Specifically, 1 night of crane erection, 1 night of crane dismantling, and up to 6 nights of concrete pours may take place over the project construction period.

The construction activity proposed for nighttime hours with the greatest potential to result in vibration-related annoyance impacts would be the concrete pours. Concrete mixer trucks and concrete pumps typically generate vibration levels similar to, or lower than, that of a small bulldozer. At a reference distance of 25 feet, a small bulldozer could produce vibration levels as high as 0.003 PPV in/sec. The specific staging areas for nighttime concrete pours are not known at this time, so it is conservatively assumed that concrete pours could take place anywhere on the site. At the nearest sensitive land use (e.g., place where people sleep), the single-family residence located 150 feet east of the project across El Camino Real, the vibration level from a small dozer (representative of concrete pump and mixer trucks) would be approximately 0.0002 PPV in/sec. This vibration level is well below the Caltrans "strongly perceptible" criterion for vibration-related annoyance of 0.1 PPV in/sec.[26] Nighttime concrete pours would typically take place even farther from nearby residential land uses, resulting in even lower vibration levels. Because nighttime project construction would not exceed this criterion, vibration impacts related to annoyance would be ***less than significant***.

Aircraft Noise Impacts. As discussed in the Noise Technical Report (Appendix C), the closest airport to the project site is SFO (with the nearest runway located approximately 0.7 mile to the northeast of the project site). This airport is within a 2-mile radius of the project, but the site is approximately 1,400 feet outside of the 65-dB noise contour line of SFO. Based on the *Comprehensive Airport Land Use Compatibility Plan for the Environs of San Francisco International Airport*,[27] residential land uses located outside of the 65-dB CNEL contour are considered compatible with the airport-related noise. As such, the project would not expose people working or residing in the project area to excessive noise levels resulting from either a public or public use airport or private airstrip. There would be ***no impact*** related to aircraft noise from private airstrips or public use airports.

3.1.6 Criterion Section 15332(d): Air Quality

	Yes	No
Approval of the project would not result in any significant effects related to air quality.	☒	☐

3.1.6.1 Introduction

In April 2022, ICF prepared the draft *959 El Camino Real Air Quality Technical Report* (Air Quality Technical Report) (Appendix D). The Air Quality Technical Report describes the air quality impacts associated with construction and operation of the project. It estimates air pollutant emissions, concentrations, and corresponding potential health risk impacts on nearby sensitive receptors. The

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[26] California Department of Transportation. 2020 (April). *Transportation and Construction Vibration Guidance Manual*. Sacramento, CA: Noise, Division of Environmental Analysis. Available: dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tcvgm-apr2020-a11y.pdf. Accessed: April 26, 2022. Page 38.

[27] City/County Association of Governments of San Mateo County. 2012. Comprehensive Airport Land Use Compatibility Plan for the Environs of San Francisco International Airport. Available: https://ccag.ca.gov/wp-content/uploads/2014/10/Consolidated_CCAG_ALUCP_November-20121.pdf. Accessed: April 26, 2022.

attachments to the Air Quality Technical Report provide a compendium of the modeling results that support the technical analysis.

3.1.6.2 Regulatory Setting

The project site is in the San Francisco Bay Area Air Basin (SFBAAB), which is under the jurisdiction of the Bay Area Air Quality Management District (BAAQMD). BAAQMD adopted thresholds of significance to assist lead agencies in the evaluation and mitigation of air quality impacts under CEQA. The BAAQMD thresholds, which are incorporated in the 2017 *CEQA Air Quality Guidelines,*[28] establish the levels at which emissions of ozone precursors (reactive organic gases [ROG] and nitrogen oxides [NO_X]), particulate matter (PM), local carbon monoxide (CO), and toxic air contaminants (TACs) would cause significant air quality impacts. The regulation of two fractions of PM emissions is based on aerodynamic resistance diameters equal to or less than 10 microns (PM_{10}) and 2.5 microns ($PM_{2.5}$). The air quality analysis below uses the 2017 BAAQMD thresholds to evaluate the potential impacts of the project.

3.1.6.3 Consistency with BAAQMD Clean Air Plan

As described in detail in Appendix D, the project would support the primary goals of BAAQMD's *Spare the Air, Cool the Climate: A Blueprint for Clean Air and Climate Protection in the Bay Area* (2017 Clean Air Plan),[29] and the plan's identified applicable control measures and implementation, and, thus, would not conflict with the 2017 Clean Air Plan control measures.

3.1.6.4 Operational Emissions

Operational criteria pollutant emissions would be generated primarily from mobile sources (i.e., vehicle trips). Other sources of emissions include energy use (e.g., natural gas), consumer products, architectural coatings, and landscaping equipment.

BAAQMD provides screening-level sizes for land use projects in Table 3-1 of its CEQA Guidelines. As stated in the guidelines, "if a project meets the screening criteria in Table 3-1, a project would not result in the generation of operational-related criteria air pollutants and/or precursors that exceed the thresholds of significance."[30] If a project meets the criteria, then a detailed analysis of operational criteria air pollutants (CAPs) is not required. The screening-level sizes for operational CAPs at mid-rise apartments[31] and regional shopping centers are 494 dwelling units and 99,000 gross square feet, respectively. Because the project would develop 278 dwelling units and 17,210 gross square feet of commercial space, it would meet the screening criteria. Although a detailed analysis is not required, operational criteria pollutants were quantified in Appendix D, *Air Quality Technical Report*, and are provided here in **Table 3-11** for informational purposes.

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[28] Bay Area Air Quality Management District. 2017. *California Environmental Quality Act Air Quality Guidelines.* May. Available: www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en. Accessed: April 26, 2022.

[29] Bay Area Air Quality Management District. 2017. *Spare the Air, Cool the Climate: A Blueprint for Clean Air and Climate Protection in the Bay Area*. Final 2017 Clean Air Plan. April. Available: https://www.baaqmd.gov/~/media/files/planning-and-research/plans/2017-clean-air-plan/attachment-a_-proposed-final-cap-vol-1-pdf.pdf?la=en. Accessed: April 26, 2022.

[30] Ibid.

[31] According to the CalEEMod User's Guide, "mid-rise apartments are units located in rental buildings that have between three and 10 levels." The project would have six levels of residences; therefore, it would be considered a mid-rise apartment.

Table 3-11. Average Daily Criteria Pollutant Emissions during Operation (pounds/day)

Source	ROG	NO_X	CO	PM_{10}	$PM_{2.5}$
Area Sources	6	< 1	17	< 1	< 1
Energy Sources	< 1	< 1	< 1	< 1	< 1
Mobile Sources	13	7	80	7	2
Total [a]	**20**	**7**	**98**	**7**	**2**
BAAQMD Threshold	54	54	None	82	54
Exceed Threshold?	No	No	N/A	No	No

Source: Appendix D.

[a] Values may not add up because of rounding.

BAAQMD = Bay Area Air Quality Management District; BMPs = best management practices; NO_X = nitrogen oxide; CO = carbon monoxide; PM_{10} = particulate matter no more than 10 microns in diameter; $PM_{2.5}$ = particulate matter no more than 2.5 microns in diameter; ROG = reactive organic gases.

As shown in **Table 3-11**, the project would not result in the generation of operational CAPs and/or precursors that would exceed BAAQMD's thresholds of significance. The project would have a ***less-than-significant*** impact on air quality during operation and would not contribute a significant level of air pollution that would degrade regional air quality within the SFBAAB.

Because operations would not involve PM emissions-intensive sources (e.g., haul trucks, generators, process boilers, on- and off-road equipment), an operational health risk assessment (HRA) to analyze health risks from operational activities was not required.

3.1.6.5 Construction Emissions

Construction associated with the project would result in the temporary generation of ozone precursors (ROG, NO_X), CO, and PM emissions that could result in short-term impacts on ambient air quality in the vicinity of the site. Emissions would originate from construction equipment exhaust, employee and haul-truck vehicle exhaust, land clearing, architectural coatings, and asphalt paving. Additionally, demolition and earthmoving activities would generate fugitive dust. Construction-related emissions would vary substantially, depending on the level of activity, length of the construction period, specific construction operations, types of equipment, number of personnel, wind and precipitation conditions, and soil moisture content.

Construction-related emissions for the project were quantified using CalEEMod, version 2020.4.0.[32] CalEEMod is the accepted modeling tool for air quality analyses throughout California because it generates reasonable and conservative assumptions, including those related to construction equipment for land use development projects. BAAQMD's CEQA Guidelines consider fugitive dust impacts to be potentially significant without application of BMPs.[33] To avoid this, the project applicant would implement BAAQMD's construction dust BMPs (listed in Table 8-2 of its CEQA Guidelines[34]), which includes watering of exposed surfaces two times per day and limiting vehicle speeds to 15 miles per hour. The project applicant has also committed to using low-volatile organic

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[32] California Air Pollution Control Officers Association. 2022. CalEEMod. Version 2020.4.0. Available: www.caleemod.com/. Accessed: April 7, 2022.

[33] Bay Area Air Quality Management District. 2017. *California Environmental Quality Act Air Quality Guidelines.* May. Available: www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en. Accessed: April 26, 2022.

[34] Ibid.

compound (VOC) coatings and ensuring that all off-road diesel-powered equipment used during construction would be equipped with EPA Tier 4 Final engines. The reduction in emissions as a result of these dust BMPs and project applicant commitments is accounted for in the project emission calculations summarized in Table 3-12. Emissions are reported by year in which construction would occur, and each year is compared individually to the applicable BAAQMD threshold.

Table 3-12. Criteria Pollutant Emissions from Project Construction (pounds per day)

				PM_{10}		$PM_{2.5}$	
Construction Year	**ROG**	**NO_X**	**CO**	**Dust**	**Exhaust**	**Dust**	**Exhaust**
2023	1	19	24	9	< 1	5	< 1
2024	18	6	34	1	< 1	< 1	< 1
2025	18	< 1	2	< 1	< 1	< 1	< 1
BAAQMD Threshold	*54*	*54*	–	*BMPs*	*82*	*BMPs*	*54*
Exceed Threshold?	*No*	*No*	–	–	*No*	–	*No*

Source: Air Quality Technical Report (Appendix D)
Notes:
The project includes design features, such as the use of clean diesel-powered equipment and implementation of feasible control measures, as project commitments. Emissions presented in this table include incorporation of the design features (e.g., Tier 4 Final engines, low-VOC architectural coatings, watering twice a day, onsite speed limits of 15 mph).
BAAQMD = Bay Area Air Quality Management District; BMPs = best management practices; CO = carbon monoxide; NO_X = nitrogen oxide; $PM_{2.5}$ = particulate matter no more than 2.5 microns in diameter; PM_{10} = particulate matter no more than 10 microns in diameter; ROG = reactive organic gases = VOC = volatile organic compounds.

As shown in **Table 3-12**, construction of the project would not generate emissions in excess of BAAQMD's significance threshold and, therefore, would not be expected to contribute a significant level of air pollution such that air quality within the SFBAAB would be degraded. The impact from construction-generated criteria pollutant emissions would be ***less than significant***.

Generation of Toxic Air Contaminants

The project could expose sensitive populations to substantial pollutant concentrations from the generation of TACs during construction and operation. Construction of the project would emit TACs in the form of asbestos and diesel particulate matter (DPM) from heavy-duty vehicles and construction equipment.

Structure demolition could disperse particulates that contain asbestos-containing material (ACM) adjacent to the locations of sensitive receptors. ACMs were commonly used as fireproofing and insulating agents prior to the 1970s. The U.S. Consumer Product Safety Commission banned the use of most ACMs in 1977 due to their link to mesothelioma. However, the building to be demolished may have been constructed prior to 1977 and, therefore, may have used ACM that could expose receptors to asbestos, which may become airborne with other particulates during demolition. If asbestos is present at the existing facilities, all demolition activities would be subject to EPA's asbestos National Emission Standards for Hazardous Air Pollutants (NESHAP).[35] The asbestos

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[35] U.S. Environmental Protection Agency. 2022. N*ational Emission Standards for Hazardous Air Pollutants Compliance Monitoring*. Available: www.epa.gov/compliance/national-emission-standards-hazardous-air-pollutants-compliance-monitoring. Accessed: April 26, 2022.

NESHAP regulations protect the public by minimizing the release of asbestos fibers during activities involving the processing, handling, and disposal of ACM. Asbestos NESHAP regulations for demolition and renovation are outlined in BAAQMD Regulation 11, Rule 2.[36] In addition to demolition and renovation measures, BAAQMD Regulation 11, Rule 2, also includes measures to address ACM during haul-truck transport. More specifically, it includes provisions such as treating ACM with water prior to transport and placing it in leak-tight containers for haul-truck transport to disposal sites. The project will be required by COAs to comply with all applicable BAAQMD regulations. Consequently, regulatory mechanisms exist that would ensure that impacts from ACM, if present during demolition activities within the project area, would be ***less than significant***.

BAAQMD recommends evaluating potential impacts of TAC emissions on sensitive receptors within 1,000 feet of a project.[37] Sensitive receptors are located within 1,000 feet of the project site, including residences, a health care facility, a senior living facility, and an elementary school. However, DPM concentrations and, therefore, health risks, dissipate as a function of distance and would be lower as distance from the project increases.

An HRA was performed to analyze the impact of DPM and $PM_{2.5}$ emissions from heavy-duty vehicles and construction equipment on sensitive receptors. Based on BAAQMD thresholds, a significant impact would occur if risks exceed 10 cancer cases per 1 million people, there is an acute or chronic non-cancer Hazard Index greater than 1.0, or there is an ambient $PM_{2.5}$ concentration greater than an annual average of 0.3 microgram per cubic meter.

In accordance with guidance from BAAQMD and the Office of Environmental Health Hazard Assessment, the HRA evaluates the incremental increase in cancer risk, chronic Hazard Index, and $PM_{2.5}$ concentrations at specific receptor locations. Emissions of $PM_{2.5}$ from diesel-powered construction equipment and vehicles were used as the basis for calculating health risks associated with DPM, consistent with BAAQMD guidance. $PM_{2.5}$ fugitive dust and exhaust emissions from construction activities (e.g., demolition, site preparation), equipment, and vehicles were used as the basis for calculating the increase in total $PM_{2.5}$ concentrations, consistent with BAAQMD. As discussed above, construction emissions were calculated using CalEEMod, version 2020.4.0. The analysis assumes a 27-month construction schedule. The analysis also assumes the use of clean, diesel-powered equipment during construction and compliance with BAAQMD BMPs. The details of this schedule and analysis, including control measures for construction emissions, are further outlined in Appendix D, *Air Quality Technical Report*.

The EPA Air Quality Dispersion Modeling system was used to model DPM and total $PM_{2.5}$ concentrations at nearby sensitive receptors. Onsite emissions were modeled as an area source, whereas offsite vehicle emissions were modeled as a line source. The onsite release height was assumed to be 4.1 meters, which represents the mid-range of the expected plume rise from frequently used construction equipment during daytime atmospheric conditions. The release height for line sources, representing on-road trucks, was 3.4 feet, based on guidance from EPA.[38] Daily emissions from construction equipment were conservatively assumed to occur over an 8-

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[36] Ibid.

[37] Bay Area Air Quality Management District. 2017. *California Environmental Quality Act Air Quality Guidelines.* May. Available: http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en. Accessed: April 26, 2022.

[38] U.S. Environmental Protection Agency. 2012. *Haul Road Workgroup Final Report Submission*. March 2. Available: www.epa.gov/sites/default/files/2020-10/documents/haul_road_workgroup-final_report_package-20120302.pdf. Accessed: April 26, 2022.

hour period between 9:00 a.m. and 5:00 p.m., Monday through Friday. A default receptor height of 1.5 meters was assumed. The EPA Air Quality Dispersion Modeling input parameters included 5 years of meteorological data from the SFO station, approximately 0.5 miles east of the project site.

The cancer risk from onsite DPM emissions was conservatively assessed for children under the age of 2, beginning with exposure at birth. According to the Office of Environmental Health Hazard Assessment's age-sensitivity factors for cancer risk, children under the age of 2 are the most sensitive. It was assumed that child receptors would be exposed continuously to average concentrations of DPM over the entire duration of project construction. Modeling assumptions and outputs are provided in Appendix D, *Air Quality Technical Report*.

The results for the construction HRA are summarized and compared to BAAQMD's thresholds in **Table 3-13**. All risks are well below the thresholds; as such, this impact would be ***less than significant***.

Table 3-13. Summary of Health Risk Assessment for DPM and $PM_{2.5}$ Emissions during Construction[a]

Receptor	Cancer Risk (cases per million)	Non-Cancer Hazard Index	Annual $PM_{2.5}$ Concentration ($\mu g/m^3$)
Maximally Exposed Individual Receptor[b]	0.9	< 0.1	0.2
BAAQMD's Thresholds	*10*	*1*	*0.3*
Exceed Threshold?	*No*	*No*	*No*

Source: Appendix D

[a] The results account for the project applicant's compliance with BAAQMD's fugitive dust BMPs and commitment to using Tier 4 engines for all diesel-fueled off-road equipment.

[b] This receptor is located 125 feet northeast of the project site, at 850 El Camino Real.

BAAQMD = Bay Area Air Quality Management District; BMP = best management practice; DPM = diesel particulate matter; $PM_{2.5}$ = particulate matter no more than 2.5 microns in diameter; $\mu g/m^3$ = micrograms per cubic meter.

Cumulative Health Risk Assessment

According to BAAQMD's guidelines, combined risk levels should be determined from all nearby DPM sources within 1,000 feet of a project site, and these combined risk levels should be compared to BAAQMD's cumulative health risk thresholds.

The project construction activities would generate DPM and $PM_{2.5}$. Existing nearby DPM and $PM_{2.5}$ sources within 1,000 feet of the site, along with the project, could contribute to a cumulative health risk for existing and future sensitive receptors adjacent to and within the project site. The combined risks from construction and ambient sources are summarized in Table 10.

As shown in Table 10**, the combined** $PM_{2.5}$ concentration from project construction and ambient sources would not exceed the BAAQMD cumulative thresholds**.** Therefore, the project's contribution is considered ***less than cumulatively considerable***.

Table 3-14. Cumulative Health Risks from the Project

Source	Cancer Risk (cases per million)	Non-Cancer Hazard Index	Annual $PM_{2.5}$ Concentration (μg/m^3)
Contribution from Existing Sources [a]			
Stationary Sources	63	< 0.1	< 0.1
Roadway Sources	13	0.0	0.3
Rail Sources	5	0.0	< 0.1
Contribution from Project Construction			
Maximally Exposed Individual Receptor	1	< 0.1	< 0.1
Cumulative Total			
Existing Plus Project Construction	81	0.2	0.5
BAAQMD Thresholds	*100*	*10.0*	*0.8*
Exceeds Threshold?	*No*	*No*	*No*

Source: See Appendix D for modeling outputs and calculations.

[a] Contributions from existing sources represent the health risks within 1,000 feet of the maximum exposed receptor, a residence located 125 feet northeast of the project site, at 850 El Camino Real.

BAAQMD = Bay Area Air Quality Management District; μg/m^3 = micrograms per cubic meter; $PM_{2.5}$ = particulate matter no more than 2.5 microns in diameter.

Odors

Potential odor emitters during construction activities include diesel exhaust, asphalt paving, and the use of architectural coatings and solvents. Construction-related activities would be temporary and would not be likely to result in nuisance odors that would violate BAAQMD Regulation 7. Odors during operation could emanate from the reapplication of architectural coatings. These odors would be limited to the immediate vicinity of the site and occur infrequently. Although such brief paint-related odors may be considered adverse, they would not affect a substantial number of people. Given mandatory compliance with BAAQMD rules, no proposed construction or operational activities would create a significant level of objectionable odors. Therefore, odor impacts for the project would be ***less than significant***.

3.1.7 Criterion Section 15332(d): Water Quality

	Yes	No
Approval of the project would not result in any significant effects related to water quality.	☒	☐

3.1.7.1 Existing Conditions

The project site is within the Central Millbrae watershed. Surface water flow follows regional topography, which generally slopes to the northeast, toward San Francisco Bay, approximately 1 mile east of the project site. Local drainage is managed by urban storm sewers around the project site.

The project site is a single parcel fronting El Camino Real with a single-story commercial building that housed a 31,741-square foot Office Depot (closed in 2020). Vegetation is limited to small shrubs and trees within the islands located throughout the parking lot on the project site and along the adjacent sidewalks on El Camino Real, Meadow Glen Avenue, and Broadway. Four borings were drilled at the project site as a part of a geotechnical study conducted in 2020 (see Appendix D, *Air Quality Technical Report*). Groundwater was encountered at approximately 20 feet within two of the borings, and the groundwater level at the site is expected to fluctuate several feet seasonally, with potentially larger fluctuations annually, depending on the amount of rainfall. In addition, historic groundwater data was reviewed; within the groundwater monitoring period from 2003 to 2019, the depth to groundwater fluctuated about 10 feet, with a high groundwater level of about 10 feet below ground surface (bgs). As described in greater detail in Section 4.1.5, *Criterion 15300.2(e): Hazardous Waste Sites*, the potential remains for residual contamination from a petroleum hydrocarbon groundwater plume associated with the Olympian Service Station/Rob Baker's Garage facility.

3.1.7.2 Project Conditions

Stormwater runoff from the project site would ultimately drain into San Francisco Bay. Currently, the project site includes a single-story commercial building and paved parking areas. Approximately 98 percent (78,975 square feet) of the current project site is composed of impervious surfaces. The project would marginally increase the amount of impervious surfaces onsite from 98 percent to 99 percent (80,084 square feet). Therefore, the project would not be expected to substantially increase the rate or amount of surface runoff. In addition, the project would include drought-tolerant landscaping designed to minimize runoff and construction site best management practices (BMPs) to reduce the amount of runoff during construction.

Surface water runoff from the project site would be regulated under the National Pollutant Discharge Elimination System Program, which is enforced locally by the San Francisco Bay Regional Water Quality Control Board (Regional Water Board). Compliance with existing stormwater-control regulations would ensure that the project would result in ***less-than-significant*** impacts related to water quality.

3.1.7.3 Stormwater Runoff

Because construction activities would affect an impervious area greater than 10,000 square feet, the project would be required to comply with the MRP, which is enforced locally by the Regional Water Board. Per the MRP, the project would be required to implement BMPs during construction. The BMPs would include measures pertaining to erosion control, runoff and runoff control, sediment control, active treatment systems, and good site management. Implementation of the BMPs would reduce or eliminate pollutants associated with construction activities in stormwater runoff.

Operation of the project would very slightly increase the amount of impervious surfaces onsite, but this would not be expected to increase the rate or amount of surface runoff substantially, as discussed above. Although the project qualifies for 100-percent LID reduction credit under MRP Provision C.3.e.ii as a "Special Project," the project is using 89 percent of the reduction credit and would protect water quality with the management of stormwater runoff through a media filter. Therefore, the project would be in compliance with MRP Provision C.3. Compliance with existing stormwater regulations would ensure that both construction and operation of the project would result in ***less-than-significant*** impacts on water quality related to stormwater runoff.

3.1.7.4 Groundwater

Groundwater was encountered at approximately 20 feet within two of the borings, and the groundwater level at the site is expected to fluctuate several feet seasonally, with potentially larger fluctuations annually, depending on the amount of rainfall. In addition, historic groundwater data was reviewed; within the groundwater monitoring period from 2003 to 2019, the depth to groundwater fluctuated about 10 feet, with a high groundwater level of about 10 feet bgs. Excavation for the basement level is expected to reach a maximum depth of 17 feet. Therefore, excavations likely would extend below the groundwater table, and temporary dewatering may be required for isolated excavation activities.

Contaminated groundwater could be encountered due to the nearby petroleum hydrocarbon plume, which could be pulled toward the project site by an onsite dewatering system, causing the produced groundwater to require treatment before release to the storm drainage system. Special handling, as well as proper disposal, would be required for the contaminated groundwater. Furthermore, the Regional Water Board would need to be notified if dewatering is required. The contractor may be subject to dewatering requirements, including discharge sampling and reporting.

All residential units would be constructed above the seasonal high-water table. Although the basement level would extend to a maximum depth of 17 feet bgs, all other project facilities would be at or above grade. All subgrade structures would be flood-proofed and anchored, in accordance with floodplain development requirements. Prior to receiving a building permit or other construction-related permit, the Millbrae Public Works Department would approve the final design. Furthermore, permanent dewatering would not be allowed.

Because of potential groundwater concerns onsite, the project would be required to coordinate with the San Mateo County Department of Public Health. Compliance with existing regulations would ensure that the project's potential impact related to groundwater would be reduced to a ***less-than-significant*** level.

3.1.8 Criterion Section 15332(e): Utilities and Public Services

	Yes	No
The site can be adequately served by all required utilities and public services.	☒	☐

The project would be in an urban area that is already served by all necessary municipal utilities (i.e., water, wastewater, stormwater, and solid waste) and public services (i.e., fire, police, and schools). The City currently has a population of approximately 23,216, which is served by existing utilities and public service providers.[39] The project would demolish all existing onsite uses and construct a new, mixed-use, six-story building with 278 multi-family residential units and amenities (302,609 square feet for residential use);[40] 17,210 square feet of ground-floor commercial use, plus an additional 4,364 square feet for residential trash and utility space; 349 vehicle parking spaces within a 105,424-square foot, two-level parking garage (one level below grade and one at grade); and 68 enclosed bicycle parking spaces, for a total building area of 425,959 square feet. Although the

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[39] United States Census Bureau. 2022. *QuickFacts Millbrae City, California*. Available: www.census.gov/quickfacts/millbraecitycalifornia. Accessed: April 12, 2022

[40] Total residential use includes rentable area (278 units), gross area by floor, the leasing office, amenities, and residential mechanical, electrical, and plumbing engineering (MEP)/utilities/bike space. It excludes open space, such as the common courtyard, rooftop deck, and private patios.

parking garage would not induce parking for new residents, the project's residential component could induce 795 new residents, as calculated using the citywide persons-per-household ratio of 2.86.[41] However, the anticipated population at the project site would be consistent with growth anticipated in the City's Housing Element 2015–2023.[42] As discussed below, the project would be adequately served by all required utilities and public services.

Water. The City purchases all of its potable water from the regional water system of the San Francisco Public Utilities Commission (SFPUC). Approximately 85 percent of the water supply originates in the Hetch Hetchy watershed in Yosemite National Park, and then flows down the Tuolumne River to Hetch Hetchy Reservoir. The remaining 15 percent of the water supply originates locally in the Alameda and Peninsula watersheds and is stored in six different reservoirs in Alameda and San Mateo Counties. [43] According to the City's 2020 Urban Water Management Plan (UWMP),[44] Millbrae's average water demand between 2016 and 2020 was a total of 705.5 million gallons, which is equivalent to 1.9 million gallons per day (mgd), or 76 percent of Millbrae's allotted 3.15 mgd.[45,46]

Millbrae's water supply during shortage years is outlined in the Water Shortage Allocation Plan (WASP). The WASP is composed of two plans in the event of a system wide water shortage of less than 20 percent: the Tier One Plan allocates water between SFPUC and the customers of the regional water system; the Tier Two Plan allocates the collective wholesale water share between each wholesale customer according to an allocation factor, or percentage of total available supply. If the Bay–Delta Plan Amendment is implemented, SFPUC would experience water supply shortages of greater than 20 percent during singular or multiple dry years. If a shortage occurs of more than 20 percent, wholesale customers would collaborate and design a different approach. The City has a six-stage Water Shortage Contingency Plan with triggering levels based on supply deficiencies and was updated in 2021 to align with Department of Water Resources standard shortages.[47,48] These stages range in magnitude from less than 5 percent to over 50 percent and include measures to help reduce water use, prohibit nonessential uses, and allocate available supplies to the uses deemed most critical. The City also maintains a comprehensive water conservation program, which includes a host of Demand Management Measures the City implemented to improve water use efficiency. Without implementation of the Bay–Delta Plan Amendment, the City would generally have sufficient water supplies during normal and dry hydrological conditions to meet the City's projected water demand, including the project's estimated water demand, in addition to the City's existing and other planned future uses. With the implementation of the Bay–Delta Plan Amendment, the City would implement

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[41] United States Census Bureau. 2022. *QuickFacts Millbrae City, California.* Available: www.census.gov/quickfacts/millbraecitycalifornia. Accessed: April 12, 2022.

[42] City of Millbrae. 2015. *City of Millbrae Housing Element 2015-2023*. Available: www.ci.millbrae.ca.us/home/showdocument?id=6623. Accessed: April 22, 2022.

[43] Woodard & Curran. 2021. *2020 Urban Water Management Plan*. Prepared for the City of Millbrae. Available: www.ci.millbrae.ca.us/home/showpublisheddocument/25061/637617870075630000. Accessed: March 31, 2022.

[44] Ibid.

[45] Woodard & Curran. 2021. *2020 Urban Water Management Plan*. Prepared for the City of Millbrae. Available: www.ci.millbrae.ca.us/home/showpublisheddocument/25061/637617870075630000. Accessed: March 31, 2022 (See Table 1.1 2016-2020 Potable Water Use (CCF*)).

[46] Ibid (see Section xi, *System Supplies*).

[47] Woodard & Curran. 2021. *2020 Urban Water Management Plan*. Prepared for the City of Millbrae. Available: www.ci.millbrae.ca.us/home/showpublisheddocument/25061/637617870075630000. Accessed: March 31, 2022 (see xii, *Water Shortage Contingency Planning*).

[48] Ibid (see Section xi, *Water System Reliability*).

its Water Shortage Allocation Plan and conservation measures. Therefore, the incremental increase in water consumption from the proposed project would be served by existing and projected future supplies during normal, single dry years, and multiple dry years, and the impact would be ***less-than-significant***.

According to the UWMP, daily residential per capita water use in the city totaled 82 gallons per day (gpd).[49] The confirmed daily per capita water use target for 2020 is 117 gpd.[50] Using 117 gpd as a conservative figure, and assuming a conservative onsite population of 795 persons, daily water demand would total approximately 93,015 gpd. As explained above, the city uses an average of 1.9 mgd of its 3.15 mgd water supply; therefore, adequate water supplies are available to serve the project. In addition, the existing 8-inch water line along Meadow Glen Avenue would be upgraded and replaced with a 12-inch water line as part of the project. Thus, no additional expanded or new potable water facilities would be required, resulting in a ***less-than-significant*** impact.

Wastewater. The City operates a Water Pollution Control Plant (WPCP), located on the eastern edge of the City limits, adjacent to Highway 101 and near the San Francisco Bay, which treats wastewater generated within the service area boundary. The City operates three sanitary sewer pumping stations. WPCP dry-weather capacity is 3 mgd and wet- weather capacity is 9 mgd. [51] In 2020, the wastewater collected within the service area was 529 million gallons (1.45 mgd) and total wastewater discharged had an annual average of 1.50 mgd. [52] The average wastewater treated at WPCP hit 48 percent of its dry-weather capacity and is well under its wet-weather capacity. As discussed above, the project would demand approximately 93,015 gpd of water; therefore, assuming a one-to-one ratio, the project would generate approximately 93,015 gpd of wastewater. Because WPCP treats only a fraction of its permitted wastewater capacity, adequate wastewater treatment capacity is available, and the project would not exceed wastewater treatment requirements. In addition, the existing 8-inch sewer line along Meadow Glen Avenue would be upgraded and replaced with a 12-inch sewer line. Thus, no additional expanded or new wastewater facilities would be required. Impacts would be ***less than significant***.

Stormwater. Stormwater collection within the project vicinity relies on a system of 21 miles of storm drains, three pump stations, and 3 miles of open creeks and ditches that route stormwater runoff into San Francisco Bay.[53] Approximately 98 percent (78,975 square feet) of the current project site is composed of impervious surfaces. The project would marginally increase the amount of impervious surfaces onsite from 98 percent to 99 percent (80,084 square feet). Therefore, the project would not be expected to substantially increase the rate or amount of surface runoff. In addition, the project would include drought-tolerant landscaping designed to minimize runoff and construction site BMPs to reduce the amount of runoff during construction. The project would also remove existing storm drain inlets for stormwater and replace them with new gutters along the sidewalks around the project site.

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[49] Ibid (see Table 5-2 of Appendix A of the UWMP).

[50] Woodard & Curran. 2021. *2020 Urban Water Management Plan*. Prepared for the City of Millbrae. Available: www.ci.millbrae.ca.us/home/showpublisheddocument/25061/637617870075630000. Accessed: March 31, 2022 (see Table 5-4: Baseline year reduction targets summary and Section 5.6, *2020 Compliance Daily Per Capita Water Use*).

[51] Ibid (See Section 3.1.3, *Wastewater System*).

[52] Ibid (See Table 6-2, Wastewater Treatment and Discharge within Service Area in Fiscal Year 2020).

[53] City of Millbrae. 2018. *Storm Drain Master Plan*. Available: www.ci.millbrae.ca.us/home/show publisheddocument/18432/636713267921470000. Accessed: April 12, 2022.

Because the project would not be expected to substantially increase the rate or amount of surface runoff, and existing or proposed stormwater infrastructure has adequate capacity to serve the project, no additional expanded or new offsite drainage facilities would be required. Although the project qualifies for 100-percent LID reduction credit under MRP Provision C.3.e.ii as a "Special Project," the project is using 89 percent of the reduction credit and would protect water quality with the management of stormwater runoff through a media filter. Impacts related to stormwater drainage would be ***less than significant***.

Solid Waste. The City has its own recycling and waste program. The program works to educate and inform its residents, businesses, schools, and City departments on ways they can reuse, reduce, recycle, and buy recycled goods, and informs its inhabitants of nontoxic and less-toxic products.[54] The City also has a municipal zero-waste diversion goal to increase municipal efforts through reusing, reducing, recycling, and composting waste to reduce the amount of waste from municipal buildings that ends up in landfills. The City intends to achieve this goal by 2030.[55] The South San Francisco Scavenger Company provides solid waste, pre- and post-collection, and recycling services for the City.[56,57] Recyclables, yard trimmings, and food scraps are taken once a week to Blue Line Transfer, a public disposal and recycling center with transfer and processing capacity for solid waste and recyclables, at 500 East Jamie Court.[58,59] The facility also processes construction and demolition debris, along with other recyclables, and diverts these materials that were otherwise destined for landfills. San Mateo County also operates a Permanent Household Hazardous Waste Collection Facility.[60] Once processed, waste and recyclables are sent to the appropriate facility.

Construction of the project would result in demolition waste from parking lot pavement and components of the former commercial building and landscaping. The City requires 50 percent of all waste generated from demolition or construction to be recycled, and at least 25 percent must be from sources other than soil, concrete, or asphalt.[61] Therefore, construction of the project is not expected to have an impact on existing landfills.

The project would also generate waste during operation. In 2020, residential uses in the city generated approximately 2.7 pounds per person per day (ppd) of solid waste.[62] Therefore, with a

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[54] City of Millbrae. 2022. Recycling & Waste Prevention Program. Available: www.ci.millbrae.ca.us/departments-services/public-works/recycling-waste-prevention-program. Accessed: April 14, 2022.

[55] City of Millbrae. 2020. *Administrative Standard Procedures: Municipal Zero Waste Policy*. Available: www.ci.millbrae.ca.us/home/showpublisheddocument/25897/637813006214930000. Accessed: April 12, 2022.

[56] City of Millbrae. 2022. Garbage. Available: www.ci.millbrae.ca.us/departments-services/utility-services/garbage. Accessed: April 12, 2022.

[57] South San Francisco Scavenger Company, Inc. 2022. About Us. Available: ssfscavenger.com/about-us/. Accessed: April 12, 2022.

[58] South San Francisco Scavenger Company, Inc. 2022. Transfer Station. Available: ssfscavenger.com/transfer-station/. Accessed: April 12, 2022.

[59] RecycleWorks. 2010*. San Mateo County Countywide Integrated Waste Management Plan*. *Multi-Jurisdictional Non-Disposal Facility Element (NDFE)*. Available: ccag.ca.gov/wp-content/uploads/2019/08/2010-Multi-Jurisdictional-NDFE-Amendment-V2-Final.pdf. Accessed: April 12, 2022.

[60] Ibid.

[61] RecycleWorks. 2015. *Construction, Demolition, and Deconstruction Information: A Guide for Contractors and Home Owners*. Available: www.smcsustainability.org/wp-content/uploads/C_and_D-Guide.pdf. Accessed: April 12, 2022

[62] California Department of Resources Recycling and Recovery. 2020. Jurisdiction Diversion/Disposal Rate Summary (2007–Current). Jurisdiction: Millbrae. Available: www2.calrecycle.ca.gov/LGCentral/DiversionProgram/JurisdictionDiversionPost2006. Accessed: April 12, 2022.

conservative anticipated population of up to 795 residents, the project could generate approximately 2,147 ppd (1.074 tons per day) of solid waste in the form of garbage, as well as recycling and composting material. Although trash receptacles would be provided in the parking garage, this use is not expected to generate a significant amount of waste. The Blue Line Transfer Material Recover Facility and Transfer station is permitted to receive 2,400 tons of refuse per day.[63] Solid waste generated by operation of the project would represent less than 0.1 percent of the permitted capacity of Blue Line Transfer, Inc. As such, Blue Line Transfer, Inc., would have adequate capacity to serve the project, resulting in a ***less-than-significant*** impact.

Fire Protection Services. The Central County Fire Department (CCFD) provides fire protection services within Burlingame, Millbrae, and Hillsborough. In total, the CCFD service area covers almost 15 square miles, with a residential population of approximately 61,344 individuals. CCFD has 88 full-time employees, including 78 uniformed personnel.[64] Six fire stations are in CCFD's jurisdiction, two of which are in Millbrae. The closest CCFD station to the project site is Fire Station 37, at 511 Magnolia Avenue in Millbrae, approximately 0.4 mile southwest of the project site.[65]

In accordance with standard City practices, CCFD would review project plans prior to the issuance of permits to ensure compliance with all applicable fire and building codes. The project would be required to comply with all applicable CCFD codes and regulations and meet CCFD standards related to fire hydrants (e.g., fire-flow requirements, hydrant spacing) and the design of driveways and access points.

Under CEQA, the need for additional equipment and/or personnel to support fire services is not considered a significant impact, unless new facilities would need to be constructed, resulting in physical impacts. The increase in the number of residents at the project site would be minor compared with the CCFD service population. The project will be required to pay the full Citywide Development Impact fee, including the Public Safety Fee. This Fee is used to fund new public safety facilities or improvements to existing public safety facilities (i.e., police and fire) to maintain the City's existing level of service. Therefore, the project would not increase the need for fire services, staffing, and/or equipment to the extent that new fire facilities would need to be constructed, resulting in a ***less-than-significant*** impact.

Police Protection Services. The San Mateo County Sheriff's Office provides emergency police services within the City of Millbrae through the Millbrae Police Bureau (MPB). The MPB serves a 3.3 square-mile area with approximately 23,216 residents. MPB has one police bureau at 581 Magnolia Avenue in Millbrae. MPB employs 19 people, including 15 sworn officers, resulting in a ratio of 0.65 officers per 1,000 residents.[66] The General Plan's Community Safety Element does not designate a standard ratio for police officers to residents or a standard emergency response time.[67] The General

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[63] RecycleWorks. 2010. *San Mateo County Countywide Integrated Waste Management Plan Multi-Jurisdiction Non-Disposal Facility Element (NDFE)*. Available: ccag.ca.gov/wp-content/uploads/2019/08/2010-Multi-Jurisdictional-NDFE-Amendment-V2-Final.pdf, Accessed: April 12, 2022.

[64] Central County Fire Department. 2020. *Fiscal Year 2021–2022 Adopted Budget*. Available: ccfd.org/wp-content/uploads/2021/07/Adopted-Budget-Book-Web-1.pdf. Accessed: April 26, 2022.

[65] Ibid.

[66] City of Millbrae. 2021. *City Council Agenda Report.* Available: portal.laserfiche.com/Portal/DocView.aspx?id=14603&repo=r-c2783ec8. Accessed: May 11, 2022.

[67] City of Millbrae. 1998. *City of Millbrae General Plan*. Available: www.ci.millbrae.ca.us/departments-services/community-development/planning-division/general-plan-adopted-1998. Date Accessed: April 12, 2022.

Plan requires maintaining adequate workforce and resources to respond to emergencies within the City effectively. [68]

The MPB currently serves the project site. The addition of up to a maximum of 795 residents with project implementation can be adequately served by the existing police services in the city. Under CEQA, the need for additional equipment and/or personnel to support police services is not considered a significant impact, unless new facilities would need to be constructed, resulting in physical impacts. The increase in the number of residents would be minor compared with the MPB service ratio. The project will be required to pay the full Citywide Development Impact fee, including the Public Safety Fee. This Fee is used to fund new public safety facilities or improvements to existing public safety facilities (e.g., police and fire) to maintain the City's existing level of service. Therefore, the project would not increase the need for police services or staffing to the extent that new police facilities would need to be constructed, resulting in a ***less-than-significant*** impact.

Schools. The Millbrae Elementary School District (MESD) is a transitional kindergarten through eighth grade (TK-8) district and includes five public schools, with a total enrollment of approximately 2,428 in 2022.69 The project site is served by Green Hills Elementary School.[70] In addition, Mills High School, part of the San Mateo Union High School District (SMUHSD), is located in Millbrae. In total, the SMUHSD serves approximately 9,000 students, and enrollment grows every year.[71]

The project would include 278 residential units. MESD uses a student-generation rate of 0.1005 student per housing unit for elementary schools and a student-generation rate of 0.0245 for middle schools, averaging at a student yield rate of 0.1250 for TK-8 students per household.[72] SMUHSD uses a student-generation rate of 0.120 for high school students per housing unit.[73] Using these student-generation rates, the 278 new residential units could result in up to 28 elementary school students, 7 middle school students, and 34 high school students, which is not anticipated to result in a significant impact on either school district.[74] In addition, the project is subject to SB 50 school impact fees (established by the Leroy F. Greene School Facilities Act of 1998). State Government Code Section 65996 states that the payment of the school impact fees established by SB 50, which may be required by any state or local agency, is deemed to constitute full and complete compensation for school impacts from development. Therefore, impacts related to schools would be ***less than significant***.

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[68] Ibid.

[69] Public School Review. 2022. *Millbrae Elementary School District.* Available: www.publicschoolreview.com/california/millbrae-elementary-school-district/624900-school-district. Accessed: April 12, 2022.

[70] Millbrae School District. 2018. *Millbrae School District Boundaries*. Available: www.millbraeschooldistrict.org/cms/lib/CA50000692/Centricity/Domain/44/msd%20boundary%20listing%20rev%20dec%202018.pdf. Accessed: April 12, 2022.

[71] San Mateo Union High School District. 2022. *Welcome to the San Mateo Union High School District!* Available: www.smuhsd.org/domain/46. Accessed: April 12, 2022.

[72] SchoolWorks Inc. 2020. *2020 Developer Fee Justification Study Millbrae School District.* Available: www.millbraeschooldistrict.org/cms/lib/CA50000692/Centricity/Domain/33/millbrae%20dev%20fee%20study%202020.pdf. Accessed: April 12, 2022. Single-family and multi-family residential units combined.

[73] Jack Schreder & Associates, Inc. *Level I Developer Fee Study for San Mateo Foster City School District*. Available: www.smfcsd.net/en/assets/files/Board%20Meetings/2020%20Developer%20Fee%20Justification%20Study%20082020.pdf. Accessed: April 26, 2022.

[74] Utilizing these student-generation rates multiplied against the project's 278 residential units for TK-8 elementary, middle, and high schools results in additions of 28, 7, and 34 students, respectively (278*0.1005=28, 278*0.0245=7, 278*0.120=34).

Chapter 4
Exceptions to Categorical Exemptions Checklist

In addition to investigating the applicability of CEQA Guidelines Section 15332 (Class 32), this CEQA document also assesses whether any of the exemptions to qualifying for the Class 32 categorical exemption for an infill project are present. The analysis that follows compares the criteria of CEQA Guidelines Section 15300.2 (Exceptions) to the project.

4.1.1 Criterion 15300.2(a): Location

	Yes	No
Is there an exception to the Class 32 exemption for the project due to its location in a particularly sensitive environment such that the project may affect an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law by federal, state, or local agencies?	☐	☒

This possible exception applies only to CEQA exemptions under Classes 3, 4, 5, 6, or 11. Because the project qualifies as a Class 32 urban infill exemption, this criterion is not applicable. The project is within a developed urban area and not within a sensitive environment. However, designated environmental resources of hazardous or critical concern in the vicinity of the project site are evaluated under Criterion 2(e), below.

4.1.2 Criterion 15300.2(b): Cumulative Impact

	Yes	No
Is there an exception to the Class 32 exemption for the project due to significant cumulative impacts of successive projects of the same type and in the same place over time?	☐	☒

Generally, the effects of the project would be beneficial because the project would help the City increase its housing supply. The project would place new residents in an area that is well served by existing transit, thereby reducing residents' VMT. The project would repurpose an underutilized parcel in an already-developed neighborhood with utilities, public services, and transportation access. Any construction effects would be temporary, confined to the project vicinity, and reduced to a less-than-significant level by implementation of Municipal Code ordinances and other applicable regulatory requirements.

The following projects have been approved, are currently under construction, or have been proposed to the City within 1 mile of the project site (the number of units associated with each project is identified in parentheses):

- 1100 El Camino Real – residential development (384 units)
- 480 El Camino Real – mixed-use development (9 units)
- 1301 Broadway – residential development (99 units)
- 230 Broadway – mixed-use development (6 units)
- 97 Broadway – residential development (83 senior living rooms)

- 210 Adrian Road – life sciences building
- 6, 20, and 30 Rollins Road, and 201, 230, and 231 Adrian Road – life sciences campus
- Gateway at Millbrae Station Development – mixed-use development that includes office, commercial, multi-family residential apartments, and hotel uses
- 111 Rollins Road – biotechnology and scientific laboratory and office development

This document evaluates cumulative impacts using the General Plan EIR because the project is consistent with applicable land use plans and policies.[75] The General Plan EIR is incorporated by reference and available for public review at the City 's Planning Department at 621 Magnolia Ave, Millbrae, CA 94030.

The General Plan EIR evaluated future development, as identified in the 1998 General Plan. As noted in the list above, future development is planned within one (1) mile of the project site. The General Plan EIR concluded that implementation of the 1998 General Plan would result in a less-than-significant impact with respect to cumulative impacts on the following resources: land use and planning; population and housing; transportation and circulation; noise; public services, recreation, and utilities; energy; hazards and hazardous materials; geology, soils, and seismicity; hydrology and water quality; biological resources; aesthetics; and cultural resources. Given the conclusions in the General Plan EIR, given that the project would have a less-than-significant impact on the aforementioned resources, and given that future projects would be required to adhere to federal and state regulations, as well as local regulations identified in the 1998 General Plan, the project's contribution to impacts on the aforementioned resources would not be singularly or cumulatively considerable.

The General Plan EIR identified one significant and unavoidable cumulative impact related to increases in criteria air pollutants from cumulative development in the city and regionally. Specifically, the impact is related to short-term construction emissions, localized CO emissions, and regional emissions from other projects in the Bay Area. However, as shown in **Table 3-12**, construction of the project would not generate emissions in excess of Bay Area Air Quality Management District's significance threshold and, therefore, would not be expected to contribute a significant level of air pollution such that air quality within the San Francisco Bay Area Air Basin would be degraded. Therefore, the project would not contribute considerably to this cumulative construction air quality impact. The impact would be ***less than significant***. Thus, the exception under CEQA Guidelines Section 15300.2(b) does not apply to the project.

4.1.3 Criterion 15300.2(c): Significant Effect

	Yes	No
Is there an exception to the Class 32 exemption for the project because there is a reasonable possibility that the project will have a significant effect on the environment due to unusual circumstances?	☐	☒

There are no known unusual circumstances that would be applicable to the project or its site that would result in a significant effect on the environment (see also the further discussion in Section 4.1.5, Criterion 2[e]: *Hazardous Waste Sites*, regarding Hazardous Materials). Impacts would be ***less***

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[75] City of Millbrae. 1998. *Final Environmental Impact Report for the City of Millbrae General Plan Revision*. October.

than significant. Therefore, the exception under CEQA Guidelines Section 15300.2(c) does not apply to the project.

4.1.4 Criterion 15300.2(d): Scenic Highway

	Yes	No
Is there an exception to the Class 32 exemption for the project because it may result in damage to scenic resources, including, but not limited to, trees, historic buildings, rock outcroppings, or similar resources, within a highway officially designated as a state scenic highway?	☐	☒

The project site has no trees, historic buildings, rock outcroppings, or similar visual resources within a highway that has been officially designated as a state scenic highway. The nearest scenic highway, Interstate 280, is approximately 1.3 miles west of the project site[76]; the project site is not visible from this highway. Impacts would be ***less than significant***. Therefore, the exception under CEQA Guidelines Section 15300.2(d) does not apply to the project.

4.1.5 Criterion 15300.2(e): Hazardous Waste Sites

	Yes	No
Is there an exception to the Class 32 exemption for the project because the project is located on a site that is included on any list compiled pursuant to Section 65962.5 of the Government Code?	☐	☒

The provisions of California Government Code Section 65962.5 are commonly referred to as the *Cortese List*. The provisions require the Department of Toxic Substance Control, the State Water Resources Control Board, the California Department of Public Health,[77] and the California Department of Resources Recycling and Recovery to submit information pertaining to sites associated with solid waste disposal, hazardous waste disposal, leaking underground tank sites, and/or hazardous material releases to the Secretary of the California Environmental Protection Agency.

The project site is not on a currently maintained Cortese List site.[78] The project site is not identified on any other lists compiled pursuant to California Government Code Section 65962.5; therefore, an exception to the Class 32 exemption under CEQA Guidelines Section 15300.2(e) does not apply to the project.

In September 2021, a Phase 1 Environmental Site Assessment (see Appendix F, *Phase 1 Environmental Site Assessment*) was prepared for the project site (see Appendix E, *Preliminary Geotechnical Investigation*). The Phase I Environmental Site Assessment was conducted to evaluate site conditions of the project site.[79] The report noted a potential environmental concern in

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[76] Caltrans. 2022. Scenic Highways. Available: dot.ca.gov/programs/design/lap-landscape-architecture-and-community-livability/lap-liv-i-scenic-highways. Accessed: April 12, 2022

[77] Formerly the California Department of Health Services.

[78] California Department of Toxic Substances Control. 2020. *Hazardous Waste and Substances Site List* (Cortese). EnviroStor. Available: www.envirostor.dtsc.ca.gov/public/search?cmd=search&reporttype=CORTESE &site_type=CSITES,FUDS&status=ACT,BKLG,COM&reporttitle=HAZARDOUS+WASTE+AND+SUBSTANCES+SITE +LIST+%28CORTESE%29. Accessed: April 12, 2022.

[79] Haley & Aldrich. 2021. *Report on ASTM Phase I Environmental Site Assessment 959 El Camino Real Millbrae, California.* Prepared for High Street No. Cal. Development Inc.

association with the redevelopment of the project site, a petroleum hydrocarbon groundwater plume, associated with the Olympian Service Station/Rob Baker's Garage Facility, located adjacent to the project site. The Plume does not extend onto the project site; however, it borders the northwestern edge of Meadow Glen Avenue, where the two properties separate. Impacted groundwater from project construction has the potential to be pulled onto the project site by construction dewatering. The report recommended performing a dewatering analysis and permitting evaluation prior to construction so that any dewatering discharge is appropriately permitted and treated. This would occur in compliance with applicable laws and regulations. The report did not identify any recognized environmental conditions, historical recognized environmental conditions, or controlled recognized environmental conditions.

Because the project site is not currently on any list compiled pursuant to California Government Code Section 65962.5, the exception under CEQA Guidelines Section 15300.2(e) does not apply to the project. Impacts would be ***less than significant***.

4.1.6 Criterion 15300.2(f): Historical Resources

	Yes	No
Is there an exception to the Class 32 exemption for the project because the project may cause a substantial adverse change in the significance of a historical resource?	☐	☒

The project site consists of one parcel (Assessor's Parcel Number 021-364-080), which is within Millbrae's downtown area. The setting comprises one- and two-story commercial and residential buildings. The project site contains a former Office Depot with surface parking and limited vegetation. The subject property was constructed in 1952 as a supermarket called Broadway Market until 1998, when it was converted to an Office Depot.

Because the building was constructed in 1952, it is therefore an age-eligible, built-environment resource with respect to listing on the California Register of Historical Resources (CRHR The building was evaluated as part of a development preapplication under SB 330 and determined not eligible for listing in the CRHR because of a lack of significance under the CRHR evaluative criteria (see Appendix G, *Historic Resources Evaluation Report*). The project site has no association with historic events or historic persons, does not have historically significant architecture, and has no historic informational or research potential. The site is not located within or near a designated historic district.[80] As such, the property does not qualify as a historical resource for the purposes of CEQA. The proposed demolition of the existing building on the project site would not cause a substantial adverse change in the significance of historical resources within the project site.

In consideration of the analysis outlined above, the exception under CEQA Guidelines Section 15300.2(f) does not apply to the project. Impacts would be ***less than significant***.

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[80] Brewster Historic Preservation. 2021. *Historic Resources Evaluation Report 959 El Camino Real Millbrae, California*. Prepared for High Street Residential.

Chapter 5

Conclusions

On the basis of the evidence provided above, the project is eligible for a Class 32 categorical exemption, in accordance with CEQA Guidelines Section 15332, Infill Development Projects. Based on City threshold criteria, no additional substantial adverse impacts, beyond those discussed above, are anticipated. Because the proposed project meets the criteria for categorically exempt infill development projects, and because it would not have a significant effect on the environment, this analysis finds that a Notice of Exemption may be prepared for the proposed project. No further review is needed.

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Appendix A

Biological Resources Memorandum

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Appendix A. Biological Resources Memorandum

To:	Nestor Guevara, Associate Planner, City of Millbrae
From:	Jennifer Andersen, ICF
Date:	April 19, 2022
Re:	**959 El Camino Real Mixed-Use Development Project**

Introduction

The site for the 959 El Camino Real Mixed-Use Development Project (proposed project or project) is in the city of Millbrae, on a parcel that covers approximately 1.86 acres (80,843 square feet [sf]). The project site is currently occupied by a vacant single-story retail building, a surface parking lot, and limited landscaping. The project would demolish all existing onsite uses and construct a new, mixed-use, six-story building with 278 multi-family residential units and amenities (302,609 sf for residential use); 17,210 sf of ground-floor retail use, plus 80 sf for retail utility space; 349 vehicle parking spaces within a 105,424-sf, two-level parking garage (one level below grade and one at grade); and 68 enclosed bicycle parking spaces, for a total building area of 425,959 sf.

Survey and Results

On April 12, 2022, ICF biologist Caitlyn Bishop conducted a site survey at the proposed project property in Millbrae, California. The approximate 1.86-acre project site is currently occupied by a vacant, single-story retail building, a surface parking lot, and limited landscaping. The project site is bordered by El Camino Real to the northeast and mixed-use commercial buildings to the east, south, and west. Prior to the site visit, desktop queries of the California Department of Fish and Wildlife's (CDFW) California Natural Diversity Database (CNDDB) and the California Native Plant Society's (CNPS) Inventory of Rare and Endangered Plants of California were conducted to identify known special-status species occurrences within 2 miles of the project site (see Figure 1). CNDDB and CNPS species lists are included in Attachment A.

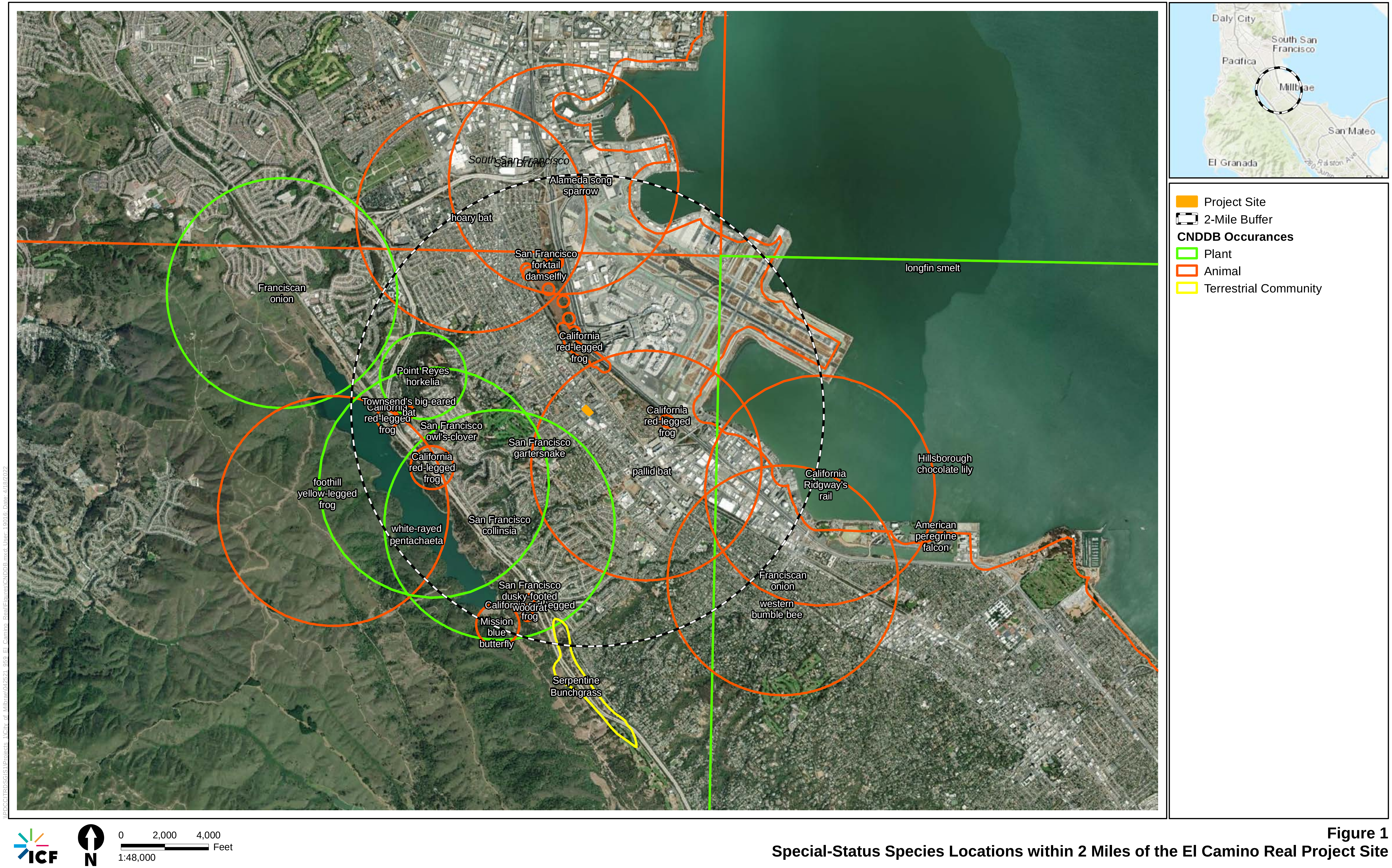

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Figure 1
Special-Status Species Locations within 2 Miles of the El Camino Real Project Site

Ornamental trees and landscaping within the vicinity of the site include eucalyptus (eucalyptus sp.), brush box (*Lophostemon* sp.), magnolia (*Magnolia* sp.), European olive (*Olea europaea*), trumpet vine (*Campsis radicans*), rosemary (*Salvia rosmarinus*), and Mexican fan palm (*Washingotnia robusta*). No rare or endangered plants were observed during this survey.

The ICF biologist arrived on site at 07:15 a.m. and began scanning and searching the nearby landscaped trees and ornamental vegetation for nesting bird behavior and activity, including alarm calling by birds, nest structures, and/or whitewash present within trees or bushes. No nesting bird behavior or activity was observed during this survey. As part of the site visit, the ICF biologist conducted a general bat habitat assessment within and around the existing abandoned structure and within nearby trees. No roosting bats or signs of bats (i.e., guano) were observed within or around the abandoned structure or nearby trees during this survey. Representative photos of the site and vicinity are provided below. The ICF biologist completed the survey and left the site at 08:30 a.m.

Weather conditions during the survey were as follows: Temperatures ranged from 48°–50° Fahrenheit. Wind was 0–5 miles per hour, cloud cover was 0–5 percent, and there was 0 percent precipitation.

Wildlife observed included common raven (*Corvus corax*), American crow (*Corvus brachyrhynchos*), rock pigeon (*Columba livia*), western gull (*Larus occidentalis*), black phoebe (*Sayornis nigricans*), and Anna's hummingbird (*Calypte anna*).

Representative Photographs

Photograph 1: View of the project site facing south.

Photograph 2: View of the project site from El Camino Real facing west.

Photograph 3: View of the project site facing east.

Photograph 4: Example of crevices present on the perimeter of the abandoned building that were searched for bat occupancy and sign.

Photograph 5: Eucalyptus and other ornamental trees in the nearby vicinity of the abandoned building that were observed and searched for presence of sign of nesting birds and roosting bats.

Photograph 6: Dumpster area behind the abandoned building that contained large amounts of refuse.

Attachment A
Species Lists

Table A-1. CNDDB Results for Plant and Wildlife Species in the Project Area and a 2-Mile Radius and Their Potential to Occur in the Project Area

Common Name	Scientific Name	Potential to Occur in the Project Area
Plants		
Franciscan onion	*Allium peninsulare var. franciscanum*	**Low.** No suitable habitat for this species, which includes dry hillsides, is present within the project site.
Hillsborough chocolate lily	*Fritillaria biflora var. ineziana*	**Low.** No suitable habitat for this species, which includes serpentine soils, is present within the project site.
Point Reyes horkelia	*Horkelia marinensis*	**Low.** No suitable habitat for this species, which includes sandy coastal flats, is present within the project site.
San Francisco collinsia	*Collinsia multicolor*	**Low.** No suitable habitat for this species, which includes moist forests and shady scrub, is present within the project site.
San Francisco owl's-clover	*Triphysaria floribunda*	**Low.** No suitable habitat for this species, which includes coastal grasslands and serpentine slopes, is present within the project site.
Serpentine bunchgrass (community)		**Low.** No suitable habitat for this community, which includes serpentine soils, is present within the project site.
White-rayed pentachaeta	*Pentachaeta bellidiflora*	**Low.** No suitable habitat for this species, which includes grassy or rocky areas, is present within the project site.
Wildlife		
Alameda song sparrow	*Melospiza melodia pusillula*	**Low.** No suitable nesting or foraging habitat for this species, which include tidal salt marsh, is present within the project site.
American peregrine falcon	*Falco peregrinus anatum*	**Low.** No suitable nesting or foraging habitat for this species, which includes cliff ledges, bridges, and large trees, is present within the project site.

Common Name	Scientific Name	Potential to Occur in the Project Area
California red-legged frog	*Rana draytonii*	**Low.** No suitable breeding or dispersal habitat for this species, which includes pools, streams, marshes, and ponds, is present within the project site.
California Ridgway's rail	*Rallus obsoletus obsoletus*	**Low.** No suitable nesting or foraging habitat for this species, which includes tidal wetlands, present within the project site.
Foothill yellow-legged frog	*Rana boylii*	**Low.** No suitable habitat for this species, which includes rocky streams and rivers with rocky substrate, is present within the project site.
Hoary bat	*Lasiurus cinereus*	**Low.** No suitable or high-quality roosting habitat for this species, which includes the dense foliage of medium to large trees, is present on the project site. Ornamental trees which do not provide high-quality habitat for this species, are present within the project site,.
Longfin smelt	*Spirinchus thaleichthys*	**Low.** No suitable habitat for this species, which includes bay, estuary, and nearshore coastal environments, is present within the project site.
Mission blue butterfly	*Icaricia icarioides missionensis*	**Low.** No suitable habitat for this species, which includes coastal grassland habitat, is present within the project site. Additionally, larval and nectar host plant species, which include silver lupine (*Lupinus albifrons*), summer lupine (*Lupinus formosus*), and manycolored lupine (*Lupinus variicolor*), were not found within the project site.
San Francisco forktail damselfly	*Ischnura gemina*	**Low.** No suitable habitat for this species, which includes open water with emergent vegetation, is present within the project site.
San Francisco dusky-footed woodrat	*Neotoma fuscipes annectens*	**Low.** No suitable habitat for this species, which includes forest and shrubland communities, is present within the project site.

Common Name	Scientific Name	Potential to Occur in the Project Area
San Francisco gartersnake	*Thamnophis sirtalis tetrataenia*	**Low.** No suitable habitat for this species, which includes grasslands, marshes and sloughs, and wetlands near ponds, is present within the project site.
Townsend's big-eared bat	*Corynorhinus townsendii*	**Low.** Suitable roosting habitat for this species, which includes buildings and other human-made structures, was observed within the project site. However, no sign of occupation by this species was observed during surveys.
Western bumble bee	*Bombus occidentalis*	**Low.** No suitable forging habitat for this species, which includes wild flowering plants and crops, is present within the project site.

Table A-2. CNPS Results for Plant Species in the Montara Mountain, South SF, and San Mateo quadrangles

Common Name	Scientific Name
Adobe sanicle	*Sanicula maratima*
Alkali milk-vetch	*Astragalus tener* var. *tener*
Arcuate bush-mallow	*Malacothamnus arcuatus*
Beach layia	*Layia carnosa*
Bent-flowered fiddleneck	*Amsinckia lunaris*
Blasdale’s bent grass	*Agrostis blasdalei*
Blue coast gilia	*Gilia capitata ssp. chamissonis*
Bristly sedge	*Carex comosa*
Broad-lobed leptosiphon	*Leptosiphon latisectus*
California bottle-brush grass	*Elymus californicus*
California seablite	*Suaeda californica*
Chaparral ragwort	*Senecio aphanactis*
Choris’ popcornflower	*Plagiobothrys chorisianus var. chorisianus*
Clustered lady’s-slipper	*Cypripedium fasciculatum*
Coast iris	*Iris longipetala*
Coast rockcress	*Arabis blepharophylla*
Coast yellow leptosiphon	*Leptosiphon croceus*
Coastal marsh milk-vetch	*Astragalus pycnostachyus var. pycnostachyus*
Coastal triquetrella	*Triquetrella californica*
Compact cobwebby thistle	*Cirsium occidentale var. compactum*
Congested-headed hayfield tarplant	*Hemizonia congesta ssp. congesta*
Crystal Springs lessingia	*Lessingia arachnoidea*
Dark-eyed gilia	*Gilia millefoliata*
Diablo helianthella	*Helianthella castanea*
Fountain thistle	*Cirsium fontinale var. fontinale*
Fragrant fritillary	*Fritillaria liliacea*
Franciscan manzanita	*Arctostaphylos franciscana*
Franciscan onion	*Allium peninsulare var. franciscanum*
Franciscan thistle	*Cirsium andrewsii*
Harlequin lotus	*Hosackia gracilis*
Hickman's cinquefoil	*Potentilla hickmanii*
Hillsborough chocolate lily	*Fritillaria biflora var. ineziana*
Island tube lichen	*Hypogymnia schizidiata*
Johnny-nip	*Castilleja ambigua var. ambigua*
Kellogg's horkelia	*Horkelia cuneata var. sericea*
Kings Mountain manzanita	*Arctostaphylos regismontana*
Large-flowered leptosiphon	*Leptosiphon grandiflorus*
Lobb's aquatic buttercup	*Ranunculus lobbii*
Marin western flax	*Hesperolinon congestum*
Montara manzanita	*Arctostaphylos montaraensis*
Northern curly-leaved monardella	*Monardella sinuata ssp. nigrescens*

Common Name	Scientific Name
Oakland star-tulip	*Calochortus umbellatus*
Ocean bluff milk-vetch	*Astragalus nuttallii var. nuttallii*
Oregon polemonium	*Polemonium carneum*
Ornduff's meadowfoam	*Limnanthes douglasii ssp. ornduffii*
Pacific manzanita	*Arctostaphylos pacifica*
Pappose tarplant	*Centromadia parryi ssp. parryi*
Perennial goldfields	*Lasthenia californica ssp. macrantha*
Pink star-tulip	*Calochortus uniflorus*
Point Reyes horkelia	*Horkelia marinensis*
Point Reyes salty bird's-beak	*Chloropyron maritimum ssp. palustre*
Presidio manzanita	*Arctostaphylos montana ssp. ravenii*
Robust spineflower	*Chorizanthe robusta var. robusta*
Rose leptosiphon	*Leptosiphon rosaceus*
Round-headed Chinese-houses	*Collinsia corymbosa*
Saline clover	*Trifolium hydrophilum*
San Bruno Mountain manzanita	*Arctostaphylos imbricata*
San Francisco Bay spineflower	*Chorizanthe cuspidata var. cuspidata*
San Francisco campion	*Silene verecunda ssp. verecunda*
San Francisco collinsia	*Collinsia multicolor*
San Francisco gumplant	*Grindelia hirsutula var. maritima*
San Francisco lessingia	*Lessingia germanorum*
San Francisco owl's-clover	*Triphysaria floribunda*
San Francisco wallflower	*Erysimum franciscanum*
San Mateo thorn-mint	*Acanthomintha duttonii*
San Mateo tree lupine	*Lupinus arboreus var. eximius*
San Mateo woolly sunflower	*Eriophyllum latilobum*
Scouler's catchfly	*Silene scouleri ssp. scouleri*
Serpentine leptosiphon	*Leptosiphon ambiguus*
Short-leaved evax	*Hesperevax sparsiflora var. brevifolia*
Two-fork clover	*Trifolium amoenum*
Water star-grass	*Heteranthera dubia*
Western leatherwood	*Dirca occidentalis*
White-rayed pentachaeta	*Pentachaeta bellidiflora*
Woodland woollythreads	*Monolopia gracilens*
Woolly-headed lessingia	*Lessingia hololeuca*

Appendix B
Transportation Impact Analysis Report

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959 El Camino Real Mixed-Use Development

Transportation Impact Analysis Report

Prepared for:
ICF
City of Millbrae

May 23, 2022

SF21-1181

FEHR PEERS

Table of Contents

Appendices

Appendix A: Supplemental non-CEQA Analysis

List of Figures

1. Introduction

This transportation impact analysis (TIA) evaluates the potential impacts associated with the 959 El Camino Real mixed-use development project (herein referred to as “proposed project” or “project”) in downtown Millbrae, California. The project site is bounded by El Camino Real, Meadow Glen Avenue, Broadway, and a surface parking lot at the Millbrae Square Shopping Center. The project proposes to demolish an existing Office Depot building and construct a new mixed-use building. The building would include a six-story residential building of 278 units, about 17,210 square feet of ground floor commercial, and two levels of parking. The residential portion of the project would include below-market-rate affordable housing units. The project site location and vicinity are shown on **Figure 1** and the project site plan is shown on **Figure 2**.

This TIA documents the transportation analysis and vehicle-miles travelled (VMT) assessment conducted following the California Environmental Quality Act (CEQA) and City of Millbrae (herein referred to as “City” or “Millbrae”) guidelines to identify effects of the project on the surrounding transportation network. Supplemental non-CEQA analysis such as project trip generation, intersection analysis, site plan review, and recommended improvement measures are provided in **Appendix A**.

The report organization is as follows:

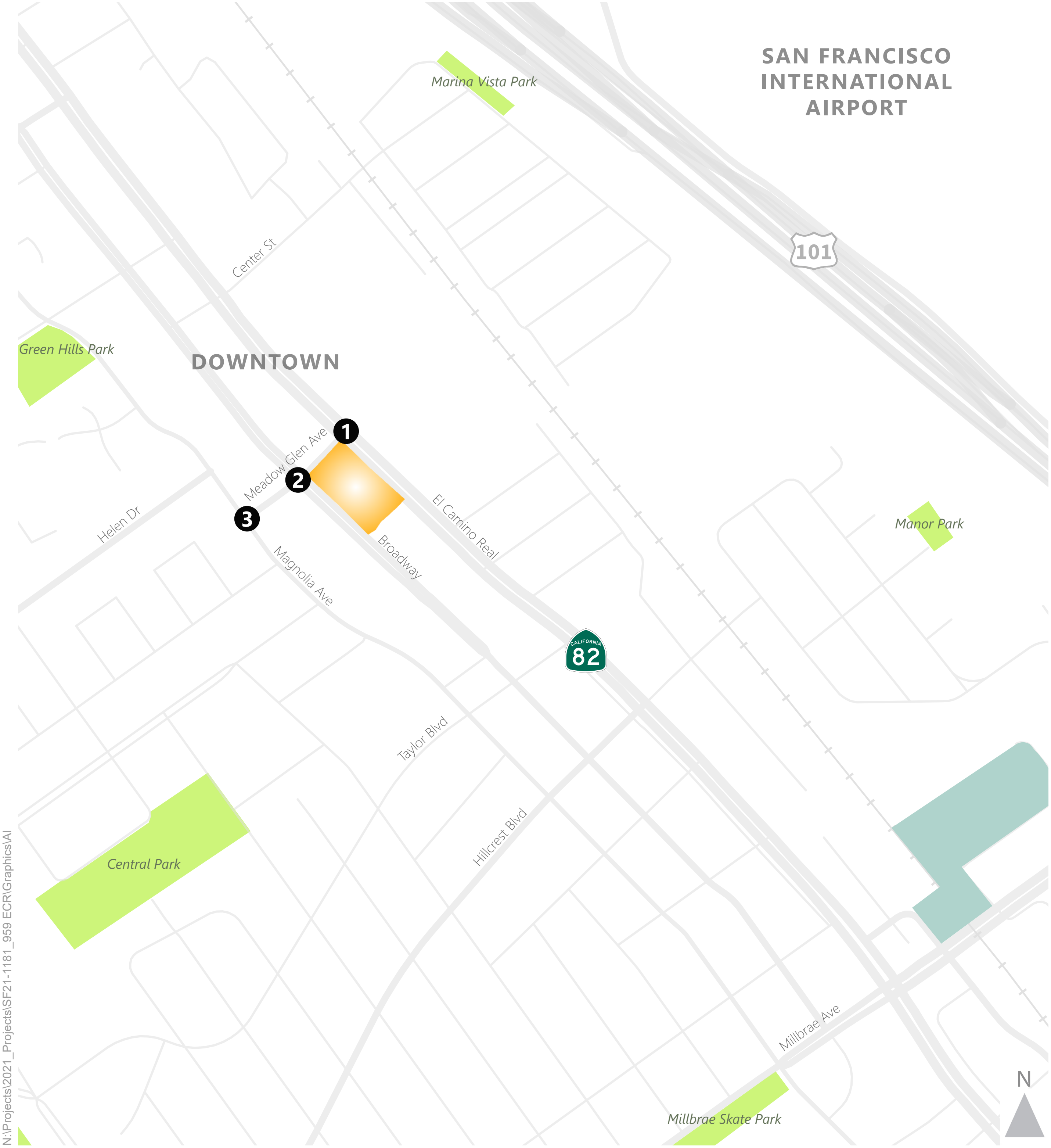
Chapter 1: Introduction – describes purpose and content of this report.

Chapter 2: Regulatory Setting – describes the regulatory agencies and respective policies applicable to the project.

Chapter 3: Analysis Methodology – describes the policies, significance thresholds, and assumptions used to evaluate the project’s potential impacts on the transportation system.

Chapter 4: Existing Conditions – describes the existing transportation and circulation setting in the vicinity of the project site.

Chapter 5: CEQA Analysis – discusses the CEQA-required analysis and potential impacts.



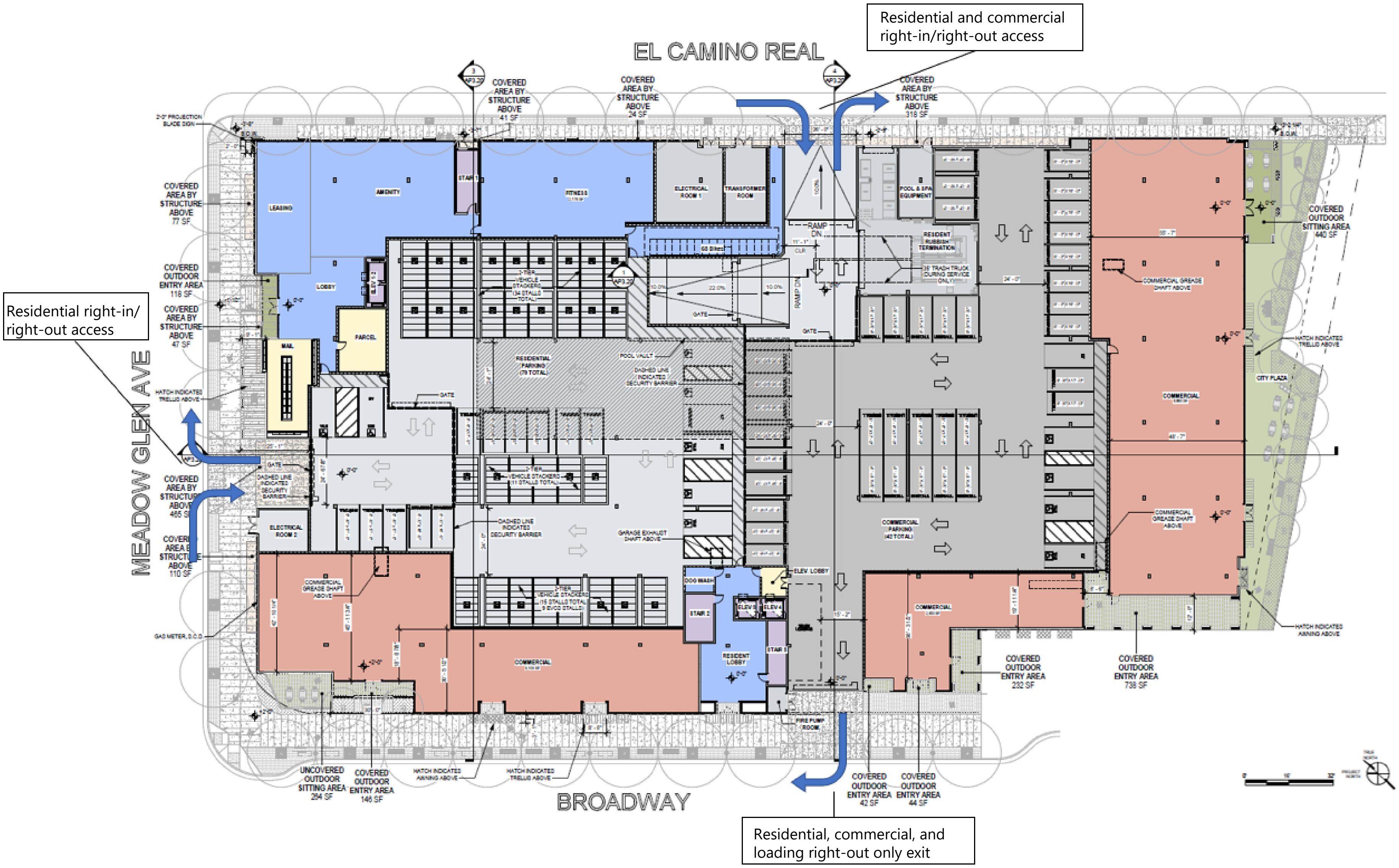
🟧 Project Site

🟦 Millbrae Intermodal Station

● Study Intersection

Figure 1

Project Location and Vicinity



Residential and commercial right-in/right-out access

Residential right-in/ right-out access

Residential, commercial, and loading right-out only exit

Source: BDE Architecture Inc

Figure 2

Project Site Plan

2. Regulatory Setting

This section describes the regulatory agencies and policies which the project is subject to.

2.1 State Regulations

2.1.1 Senate Bill 743

On September 27, 2013, Senate Bill (SB) 743 was signed into law. The legislature found that with the adoption of the Sustainable Communities and Climate Protection Act of 2008 (SB 375), the State had signaled its commitment to encourage land use and transportation planning decisions and investments that reduce vehicle miles traveled and thereby contribute to the reduction of greenhouse gas emissions, as required by the California Global Warming Solutions Act of 2006 (Assembly Bill 32). In December 2018, the Governor's Office of Planning and Research (OPR) finalized new CEQA guidelines (CEQA Guidelines section 15064.3), that identify vehicle miles traveled (VMT) as the most appropriate criteria to evaluate a project's transportation impacts.

The implementation of SB 743 eliminated the use of criteria such as auto delay, level of service, and similar measures of vehicle capacity of traffic congestion as the basis for determining significant impacts as part of CEQA compliance. The SB 743 VMT criteria promotes the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses. Land use projects with one of more of the following characteristics would have lesser VMT impacts:

- Higher land use densities
- Mix of project uses
- Support of a citywide jobs-housing balance (i.e., provide housing in a job-rich area, or vice-versa)
- Proximity to high-quality transit service
- Location in highly walkable or bikeable areas

Although congestion-based metrics cannot be used for determining significant impacts, local jurisdictions can request a study to evaluate project effects on the local transportation network using congestion-based metrics. The City of Millbrae requested a local transportation study using congestion-based metrics for informational purposes and is further discussed in the sections below.

2.1.2 Complete Streets (Assembly Bill 1358)

AB 1358, also known as the California Complete Streets Act of 2008, requires cities and counties to include "complete street" policies in their general plans. These policies address the safe accommodation of all users, including bicyclists, pedestrians, motorists, public transit vehicles and riders, children, the elderly, and persons with disabilities. These policies can apply to new streets, as well as the redesign of corridors.

2.2 Regional Regulations

2.2.1 Metropolitan Transportation Commission

The Metropolitan Transportation Commission (MTC) is the transportation planning, coordinating, and financing agency for the nine-county Bay Area, including San Mateo County. It also functions as the federally mandated metropolitan planning organization (MPO) for the region. Plan Bay Area 2050 is the Bay Area's Regional Transportation Plan (RTP)/Sustainable Community Strategy (SCS). Plan Bay Area 2050, adopted jointly by Association of Bay Area Governments (ABAG) and MTC October 21, 2021, lays out three future development scenarios for the region toward the adopted vision of a Bay Area that is affordable, connected, diverse, healthy, and vibrant for all residents, with a strong focus on measuring equity outcomes. When integrated with the transportation network and other transportation measures and policies, it would also reduce GHG emissions from transportation (excluding goods movement) beyond the per capita reduction targets identified by California Air Resources Board, improve the existing and future multimodal transportation system in terms of accessibility, safety, and connectedness, and develop a more mindful approach to land use-transportation decisions. Plan Bay Area 2050 strategies applicable to the project include:

- H5. Integrate affordable housing into all major housing projects.
- T1. Restore, operate, and maintain the existing system.
- T8. Build a Complete Streets network.
- T9. Advance regional Vision Zero policy through street design and reduced speeds.
- EN9. Expand transportation demand management initiatives.

2.2.2 City/County Association of Governments of San Mateo County

The City/County Association of Governments of San Mateo County (C/CAG) is the Congestion Management Agency (CMA) for San Mateo County and adopted the Congestion Management Program (CMP) to identify strategies to respond to future transportation needs, develop procedures to alleviate and control congestion, and promote countywide solutions. The CMP is consistent with the MTC's regional goals, policies, and projects. The C/CAG transportation-related policy and goal applicable to the project includes the maintenance of LOS E at all CMP intersections, with the exception that intersections already operating at LOS F can remain at LOS F. The project study intersections are not considered CMP intersections. The closest CMP intersection is at the El Camino Real/Millbrae Avenue intersection, about 0.7 mile southeast of the project site.

2.3 Local Regulations

2.3.1 City of Millbrae General Plan

The City of Millbrae General Plan (adopted 1998) serves as a guiding policy document for the development of the City. The General Plan includes separate chapters for the following elements: Land

Use; Circulation; Housing; Parks, Open Space, and Conservation; Noise; and Safety. The Circulation Element was adopted in November 1998 and updated the bicycle and pedestrian sections in August 2009. The General Plan is currently going through an update process. The General Plan policy updates are built into the more recent planning documents in the next sections.

The goals of the Circulation Element include maintenance of the LOS D, reduction of automobile dependence, reduction of single passenger trips within the City, provision of effective links to regional transit, and improvements to the City's bicycle and pedestrian system. Specific goals and policies applicable to the project include:

Goal C1: Provide a circulation system design that is safe and efficient

- Policy C1.1: Maintain and improve traffic safety to minimize traffic accident potential, provide safe walking. Enforce speeding and other traffic safety laws.
- Policy C1.4: Design new commercial developments so that, wherever possible, the minimum number of needed entrance or exit points shall be allowed to ensure safe and efficient internal traffic flow and to reduce through traffic delays on public roads serving the project.
- Policy C1.8: Provide appropriate bikeway and pedestrian improvements to promote alternative transportation uses.

Goal C2: Participate in regional transportation planning efforts

Goal C3: Provide appropriate local street improvements

- Policy C3.2: Maintain traffic level of service. Seek to achieve or exceed adopted traffic service level standards during peak traffic hours through Transportation Systems Management (TSM), Transportation Demand Management (TDM), street maintenance, Capital Improvement Programming, coordination with federal, state, county private and district funding programs, for street and other transportation improvements, and developer payment of pro rata fair share of traffic improvements.
- Policy C3.3 New Development Requirements. Require transportation-related mitigation attributable to a specific development when identified through required traffic analyses in order to maintain acceptable level of service standards. Assure that the new projects pay their pro rata share of off-site street improvements that will be needed to serve the project.
- Policy C3.5: Require site-specific traffic studies (including access, circulation, and parking) for development projects where there may be a substantial impact on the local street system.

Goal C4: Support transit, TSM, and bicycle and pedestrian circulation

- Policy C4.1: Encourage the increased regional use of transit to relieve commuter congestion along the US 101, Interstate 280, and State Route 82 corridor and to serve the transportation needs of San Mateo County.

- Policy C4.7: Implement and enforce local and regional TSM and TDM programs.
- Policy C4.9: Develop and maintain a safe and logical bikeways system which is coordinated with the countywide system. This system is intended as a viable alternative mode of travel throughout the City.
- Policy C4.10: Require adequate bike parking facilities at transportation centers, public parks and buildings, recreational facilities, commercial centers, and large multi-family residential projects.
- Policy C4.15: Develop a safe, pleasant pedestrian system that provides direct and convenient pedestrian access, designed to serve all segments of the public including the young, the ages, and the disabled. Pedestrian safety shall be duly considered in the design of intersection and other roadway improvements. The pedestrian circulation system is intended as a viable alternative mode of travel throughout the City by providing pedestrian facilities including trails, paths, and sidewalks that are safe, direct, and convenient.
- Policy C4.16: Continue to require as a condition of development project approval the provision of sidewalks and curb ramps in accordance with American with Disabilities Act (ADA) requirements.

Goal C5: Provide adequate parking

- Policy C5.2: Provide proper site planning and design, including loading and storage areas.

2.3.2 City of Millbrae Active Transportation Plan

The City of Millbrae Draft Active Transportation Plan (ATP) was approved by the City Council on October 12, 2021. The Plan describes the City's existing bicycle and pedestrian conditions, needs, goals, and policies to support a robust and comfortable active transportation network, additional recommendations at key locations, and implementation strategies.[1] The goals of the City of Millbrae ATP applicable to the project include:

- Provide safe and comfortable bicycle and pedestrian connections to downtown Millbrae and El Camino Real.
- Provide bicycle and pedestrian facilities across and along the El Camino Real corridor.
- Expand bicycle and pedestrian facilities to connect to the Millbrae Intermodal Station and bus stops along El Camino Real to bridge the first-mile/last-mile gap between transit facilities and destinations.
- Promote accessibility for all ages and abilities.
- Improve access to local destinations for Millbrae residents, employees, and visitors.

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[1] All improvements along El Camino Real will require coordination with Caltrans and project development consistent with Caltrans' processes.

- Increase transit, bicyclist, and pedestrian mode share in Millbrae.

Specific recommendations for El Camino Real include:

- Provide a buffer between the street and sidewalk, such as a planting strip, parking, or sidewalk dining.
- Construct wider than minimum sidewalks to ensure comfortable side-by-side or bi-directional travel on each side of the street.
- Install high-visibility crossings, bulb-outs to shorten pedestrian crossings, and raised crosswalks/intersections to reinforce the understanding that the circulation network is for all users and all modes.
- Build a separated bike lane to reduce vehicle/bicycle conflict points.

Recommendations for the general study area include:

- Build a bike lane on Meadow Glen Avenue west of Broadway.
- Invest in more bike parking to increase bicyclist mode share.

2.3.3 Draft Downtown and El Camino Real Specific Plan (in progress)

The draft Downtown and El Camino Real Specific Plan (draft Specific Plan) is currently being prepared to provide overarching policy framework and development regulations that are necessary to achieve the vision for the El Camino Real corridor and Downtown district in Millbrae. The vision is to transform the City’s primary areas of business and commerce into vibrant and connected mixed-use centers of cultural and economic activity. The plan emphasizes transit-oriented, mixed-use development to provide a purposeful mix of housing, restaurants, commercial, hotels, offices, and entertainment uses. The draft Specific Plan envisions El Camino Real as a multi-model complete street with modified configurations to accommodate separated bike lanes, as well as improved sidewalks and crossings for pedestrian safety. Broadway is envisioned to have an enhanced streetscape, reconfigured on-street parking, and parklets for outdoor cafes or other recreational uses. As this plan has not been adopted as of the publication date of this report, the plan policies and standards are not applicable to this project.

2.3.4 Preliminary Draft Broadway and El Camino Real Streetscape Plan (in progress)

The Preliminary Draft Broadway and El Camino Real Streetscape Plan (Streetscape Plan) was released in November 2021. It is an appendix to the draft Downtown and El Camino Real Specific Plan. It serves as the framework to aid the implementation of the draft Specific Plan for two specific streets – El Camino Real and Broadway. The goal is to create a lively, pedestrian-oriented downtown for Millbrae residents, employees, and visitors. The Streetscape Plan framework will guide development toward this goal by supporting higher density mixed-use developments, multi-modal transit, and active transportation. As this plan has not been adopted as of the publication date of this report, the plan policies and standards are not applicable to this project.

Draft Recommendations for Broadway include:

- Widened sidewalks and narrowed curb-to-curb width.
- Replacement of angled parking with parallel parking.
- Replacement of sidewalk pavement with enhanced pavement.
- Pedestrian-level pole-mounted light fixtures.
- New street furnishings including benches and bike racks.
- Retain existing street trees and increase tree canopy.

Draft Recommendations for El Camino Real include:

- Parking-protected bike lanes.
- Bus-stop islands with bus shelters.
- Pedestrian refuge islands.
- Widened sidewalks with street trees.

3. Analysis Methodology

This section describes the policies and thresholds of significance used to evaluate the potential impacts of the project on the transportation system. CEQA impacts are identified based on the project's effect on VMT and its effects on the pedestrian, bicycle, and transit modes of travel. For land use projects, intersection operation impacts (as measured by Level of Service [LOS] and similar congestion-based metrics) are specifically excluded from CEQA consideration per CEQA Guidelines §15064.3 and Senate Bill 743 (Steinberg, 2013). However, local jurisdictions may request a congestion-based analysis for informational purposes to better understand the adverse effects on the roadway system. The City of Millbrae requested an intersection operations analysis using LOS, a congestion-based analysis metric. The LOS analysis is provided in **Appendix A**. The detailed CEQA Transportation Section impact criteria are based on Appendix G of the CEQA Guidelines as well as local considerations from adopted policies by the City of Millbrae and San Mateo County.

3.1 CEQA Analysis

3.1.1 CEQA Impact Criteria

The impacts of the project related to transportation would be considered significant if any of the following standards of significance are exceeded, in accordance with CEQA Guidelines Appendix G:

- Conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities;
- Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b) related to VMT;
- Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment); or
- Result in inadequate emergency access.

Thresholds of significance used in this document are based on Appendix G criteria as well as local considerations from adopted policies by the City of Millbrae. The criteria of significance apply to all Project scenarios as measured against the corresponding No Project scenarios.

3.1.1.1 Vehicle Miles Traveled (VMT)

The City of Millbrae currently does not have adopted VMT analysis guidelines and significance thresholds, and therefore the recommended VMT significance criteria from the Office of Planning Research (OPR) Technical Advisory on Evaluating Transportation Impacts on CEQA were applied to this project analysis. Pursuant CEQA Guidelines Section 15064.3, subdivision (b)(1), the following screening criteria applies to land use projects:

> ***Presumption of Less Than Significant Impact Near Transit Stations:*** *CEQA Guideline Section 15064.3, subdivision (b)(1), states that lead agencies generally should presume that certain projects (including residential, commercial, and office projects, as well as projects that are a mix of these uses) proposed within 0.5 mile of an existing major transit stop or an existing stop along a high quality transit corridor*[2] *will have a less-than-significant impact on VMT. This presumption would not apply, however, if project-specific or location-specific information indicates that the project will still generate significant levels of VMT. For example, the presumption might not be appropriate if the project:*
>
> - Has a Floor Area Ratio (FAR) of less than 0.75
> - Includes more parking for use by residents, customers, or employees of the Project than required by the jurisdiction (if the jurisdiction requires the Project to supply parking)
> - Is inconsistent with the applicable Sustainable Communities Strategy (as determined by the lead agency, with input from the Metropolitan Planning Organization)
> - Replaces affordable residential units with a smaller number of moderate- or high-income residential units

If a land use project is not presumed to have a less than significant impact, the following criteria applies:

- A significant impact would occur if development of the project would generate per-capita vehicle miles traveled (VMT) greater than the City's adopted threshold of greater than 15 percent below the regional average.

3.1.1.2 Design Hazards

A significant impact would occur if the project substantially increases hazards to street users due to a design feature or land uses incompatible with the surrounding street network.

3.1.1.3 Bicycle, Pedestrian, and Transit

A significant impact would occur if project traffic would:

- Produce a detrimental impact to the performance or safety of existing bicycle or pedestrian facilities and local transit or shuttle service; or
- Conflict with adopted plans and programs.

3.1.1.4 Emergency Access

A significant impact would occur if the project would result in inadequate emergency access.

---

[2] Pub. Resources Code, § 21155 ("For purposes of this section, a high-quality transit corridor means a corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours.").

4. Existing Conditions

This section describes the existing transportation and circulation setting in the vicinity of the project site, including the existing roadway network, transit network and service, pedestrian conditions, bicycle conditions, and emergency vehicle access.

4.1 Vehicle Network

The project is located at the southwest corner of Meadow Glen Avenue and El Camino Real in downtown Millbrae, California. Regional access to the site is provided via U.S. Highway 101 (US 101) and State Route 82 (SR 82 or El Camino Real). Key local roadways that would most likely be affected by project-generated traffic include Broadway, Meadow Glen Avenue, and Magnolia Avenue.

The key regional and local roadways for project access are described below:

4.1.1 Regional Roadways

US 101 is an eight-lane, principal north-south freeway connection between San Francisco, San Jose, and intermediate San Francisco Peninsula cities. The closest interchange is about 1.2 miles southeast of the project site on Millbrae Avenue.

El Camino Real (SR 82) is a historic roadway that stretches from Sonoma County to San Diego County. In the project vicinity, El Camino Real is a six-lane divided roadway with a northwest-southeast orientation. El Camino Real provides direct access to the project's northeastern driveway. The posted speed limit is 35 miles-per-hour (mph).

4.1.2 Local Roadways

Broadway is a two-lane, northwest-southeast oriented roadway southwest of the project site. It provides access to the downtown Millbrae area and direct access to the project's southern driveway. Broadway north of Taylor Boulevard is divided with a center landscaped median and is not divided south of Taylor Boulevard. Parking is permitted on both sides of the street. The speed limit is not posted.

Meadow Glen Avenue is a four-lane, northeast-southwest oriented roadway between El Camino Real and Magnolia Avenue. It provides direct access to the project's northwestern driveway. Parking is permitted on both sides of the street west of Broadway and prohibited east of Broadway. The speed limit is not posted.

Magnolia Avenue is a two-lane, northwest-southeast oriented roadway southwest of the project site. It provides access to the project site via connection to Meadow Glen Avenue. Parking is permitted on both sides of the street. The posted speed limit is 25 mph.

4.2 Transit Facilities and Service

The project area is served by regional rail services and local fixed-route bus service. The Millbrae Intermodal Transit Station located about 0.8-miles southeast of the project site provides regional rail access to Bay Area Rapid Transit (BART) and Caltrain and local fixed-route bus services provided by the San Mateo County Transit District (SamTrans). The following existing transit services operate within Millbrae and provide regional and local access to the project site and are shown on **Figure 3**.[3]

4.2.1 Transit Service

The following description reflects current transit service during COVID-19.

San Mateo County Transit District (SamTrans) provides fixed-route bus service throughout San Mateo County. The only route within 0.5-mile of the project site is Route ECR that runs along El Camino Real connecting Daly City BART station to the north and the Palo Alto Transit Center to the south. Route ECR connects to other local SamTrans routes and to the Millbrae Intermodal Station for regional travel. The closest southbound stop to the project site is at the El Camino Real project frontage. This bus stop provides a bench on the sidewalk for waiting passengers but does not include a shelter. This bench takes up about half of the approximately eight-foot-wide sidewalk, which reduces already limited space for sidewalk users. The closest northbound stop to the project site is diagonally across the street at the northern corner of the El Camino Real and Meadow Glen Avenue intersection. The northbound bus stop provides a sheltered waiting area with a bench that does not block the eight-foot-wide sidewalk. Route ECR runs regular and late night service every day. Regular weekday service runs between about 4:00 AM to 1:50 AM with 15-minute headways during peak commute times. Regular weekend service runs between about 4:45 AM to 2:30 AM with 20-minute headways during peak times. The late night service has limited stops and runs between about 1:15 AM to 4:45 AM on weekdays, and between 1:15 AM and 5:45 AM on weekends.

Bay Area Rapid Transit (BART) provides regional rail service connecting the East Bay, San Francisco, San Mateo County, and northern Santa Clara County. The closest BART stop is at the Millbrae Intermodal Station about 0.8-mile southeast of the project site. Two BART routes serve the Millbrae Intermodal Station: Red Line and Yellow Line. The Red Line serves stations between Richmond and the San Francisco Airport (SFO). The Yellow Line serves stations between Antioch and SFO. The Red Line serves Millbrae Intermodal Station between about 6:00 AM to 8:30 PM on weekdays with 15-minute peak commute headways on weekdays, and between about 7:10 AM to 7:10 PM with 30-minute headways on Saturdays. The Yellow Line serves the Millbrae Intermodal Station in the morning between about 5:00 AM to 6:10 AM with 15-minute headways and in the evening between 8:30 PM to 1:10 AM with 15- to 30-minute headways on weekdays; in the morning between 6:10 AM to 6:40 with 30-minute headways and in the evening between 7:35 PM to 1:25 AM with 30-minute headways on Saturdays; and between about 7:25

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[3] The descriptions of transit service in this section reflect conditions prior to the COVID-19 pandemic. Due to the atypical travel patterns during the COVID-19 pandemic, transit service has been temporarily reduced. Agencies plan to restore service to comparable levels once the effects of the pandemic begin to subside.

AM to 10:10 PM with 30-minute headways on Sundays. Route ECR connects Millbrae Intermodal Station to the project site.

Caltrain provides passenger rail service on the Peninsula between San Francisco and San Jose, and limited service trains to Morgan Hill and Gilroy during weekday commute periods. Three routes are provided by Caltrain: Local, Limited, and Baby Bullet. All three routes serve the closest Caltrain station to the project site at Millbrae Intermodal Station. The Local, Limited, and Baby Bullet trains serve the Millbrae Intermodal Station between about 5:15 AM to 12:30 AM on the weekdays with 60-minute headways for each route and 8- to 21-minute headways between each route. On weekends, only the Local train serves the Millbrae Intermodal Station between about 8:30 AM to 12:30 AM with 60-minute headways. Route ECR connects the Millbrae Intermodal Station to the project site.

4.2.2 Shuttle Service

Five *Peninsula Traffic Congestion Relief Alliance (Commute.org)* shuttles provide weekday service at the Millbrae Intermodal Station between various cities in San Mateo County. The five shuttle routes, Burlingame Bayside, Millbrae-Broadway, North Burlingame, and North Foster City, offer commute period first- and last-mile connections between the Millbrae Intermodal Station and local employers in those cities. During commute AM and PM peak commute periods, the Burlingame Bayside route has 30-minute headways. The Millbrae-Broadway route has 15-minute headways in the AM and PM peak commute periods. The North Burlingame route has 28- to 32-minute headways in the AM peak commute period and 30-minute headways in the PM peak commute period. The North Foster City route has 60-minute headways in the AM and PM peak commute periods.

4.3 Bicycle Facilities

Based on the City of Millbrae Active Transportation Plan (draft final version published on October 7, 2021), bikeway planning and design in the City of Millbrae can be generally categorized into four facility types, which are described below.

Bike Path or Shared-Use Path (Class I) are a paved right-of-way separate from any street or highway designated for the exclusive use of bicyclists with minimal vehicle and pedestrian cross-flow.

Bike Lanes (Class II) are a portion of roadway designated by striping, signage, and pavement markings for the preferential or exclusive use of bicyclists for one-way travel. Class II facilities could include a buffer between the bike lane and vehicle lane. They are generally at least five feet wide.

Bike Routes (Class III) are streets designated for shared use with motor vehicles by signs or pavement markings. Shared lanes are appropriate for roads with low speeds and traffic volumes. They can also be used for short stretches along Class II bikeways where there is insufficient right of way for a separated bicycle lane.

Separated Bike Lanes (Class VI) are exclusive bikeways that include a vertical physical barrier from vehicular traffic. The separation may include, but is not limited to, grade separation, bollards, planters, or on-street parking.

Within the project vicinity, a Class I shared-use path, the Spur Trail, is provided on Millbrae Avenue between Magnolia Avenue and Richmond Drive. Class II bike lanes are provided on Broadway between Meadow Glen Avenue and Ludeman Lane and on Richmond Drive between Magnolia Avenue and the Spur Trail. Class III bike routes are provided along El Camino Real and Magnolia Avenue marked with "sharrows" in each travel direction. These existing bike facilities are shown on **Figure 4**. Millbrae's temperate climate and flat terrain is conducive for bicycling. However, the lack of continuous bicycle facilities and the heavily trafficked auto-oriented streets, such as El Camino Real and Millbrae Avenue in the project vicinity, make bicycling challenging and uncomfortable, creating significant barriers to bicycling.

4.4 Pedestrian Facilities

Pedestrian facilities include sidewalks, crosswalks, trails, and pedestrian signals. The project is located in downtown Millbrae with a pedestrian-friendly environment. The project frontages on El Camino Real, Meadow Glen Avenue, and Broadway provide about five- to seven-feet paved sidewalks that connect to the existing sidewalks in the project vicinity. All intersections in the project vicinity provide marked crosswalks, and at signalized intersections, pedestrian actuated signals and pushbuttons are provided. The existing pedestrian network connects the commercial uses in the Millbrae downtown area and surrounding residential neighborhoods.

The downtown area, and specifically at the study intersections, has high pedestrian volumes. The draft Specific Plan identified multiple intersections in the downtown area as high conflict zones where many vehicle/pedestrian and vehicle/bicyclist collisions occurred from 2010 to 2014. Two project study intersections, El Camino Real/Meadow Glen Avenue and Broadway/Meadow Glen Avenue, were included in the list of high conflict zone intersections. Although standard pedestrian facilities are provided along the project frontages and project study intersections (sidewalk meeting minimum widths, crosswalks, signalized crossings), there are many opportunities to improve pedestrian safety, experience, and connectivity, as recommended in the ATP. Recommended improvements for these intersections include high visibility crosswalks, bulb-outs, pedestrian-scale lighting, landscape buffers for safety and comfort, and wider sidewalks. Additionally, approximately 50-feet from the project site's southwest corner, an existing marked, uncontrolled mid-block crosswalk of Broadway currently lacks accessible curb ramps on both sides of the street.

4.5 Emergency Vehicle Access

Emergency vehicles typically use major streets through the study area when heading to and from an emergency and/or emergency facility. Arterial roadways allow emergency vehicles to travel at higher speeds and provide enough clearance space to permit other traffic to maneuver out of the path of the emergency vehicle and yield the right-of-way. The project site is located approximately 0.4 miles northeast of City of

Millbrae Fire Station 37 located at 511 Magnolia Avenue. Emergency vehicle access to the project site is primarily from Meadow Glen Avenue and El Camino Real. Meadow Glen Avenue has two travel lanes in each direction and El Camino Real has three travel lanes in each direction. Travel time is approximately two minutes from the Fire Station to the project site.

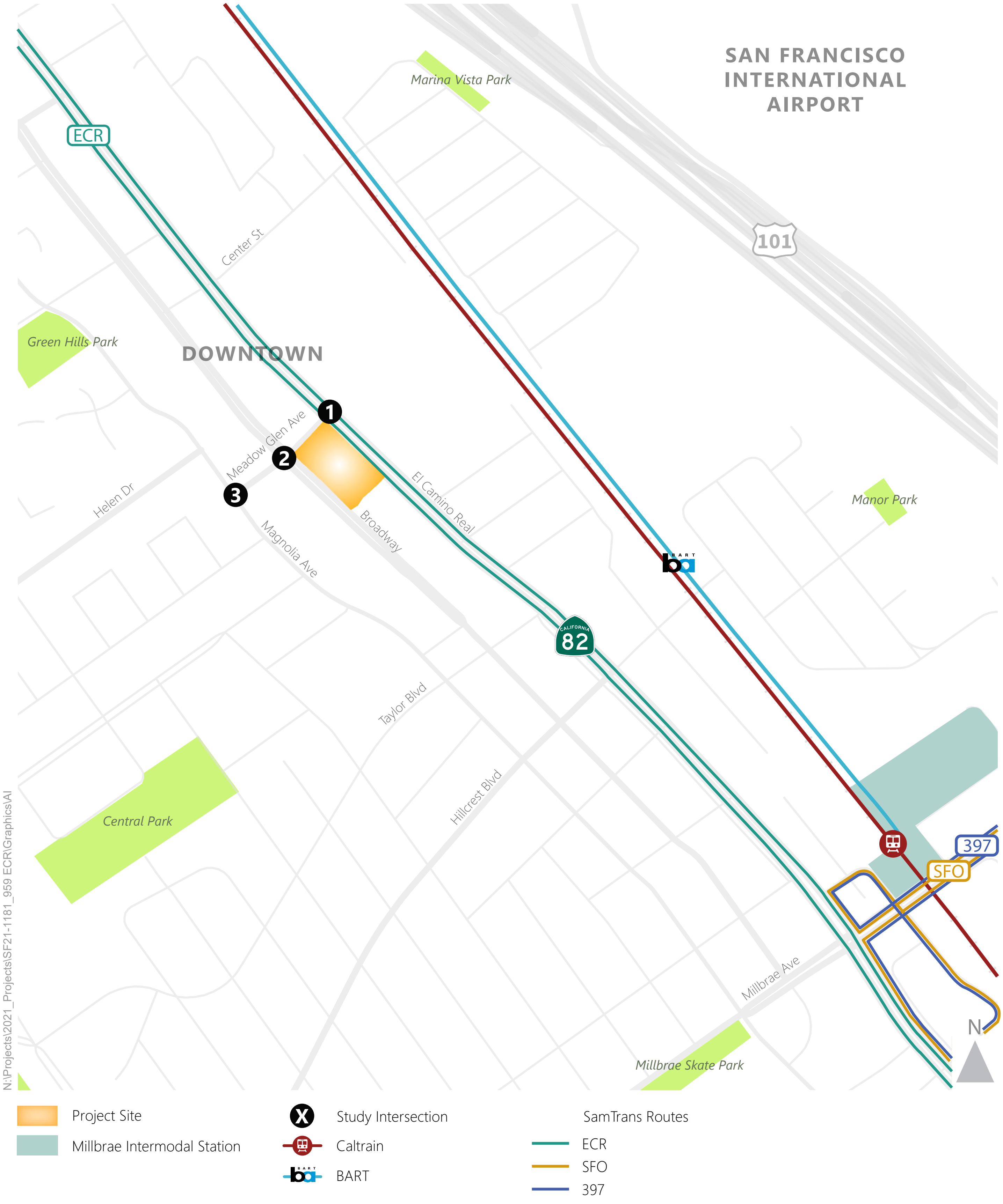

Figure 3

Existing Transit Facilities

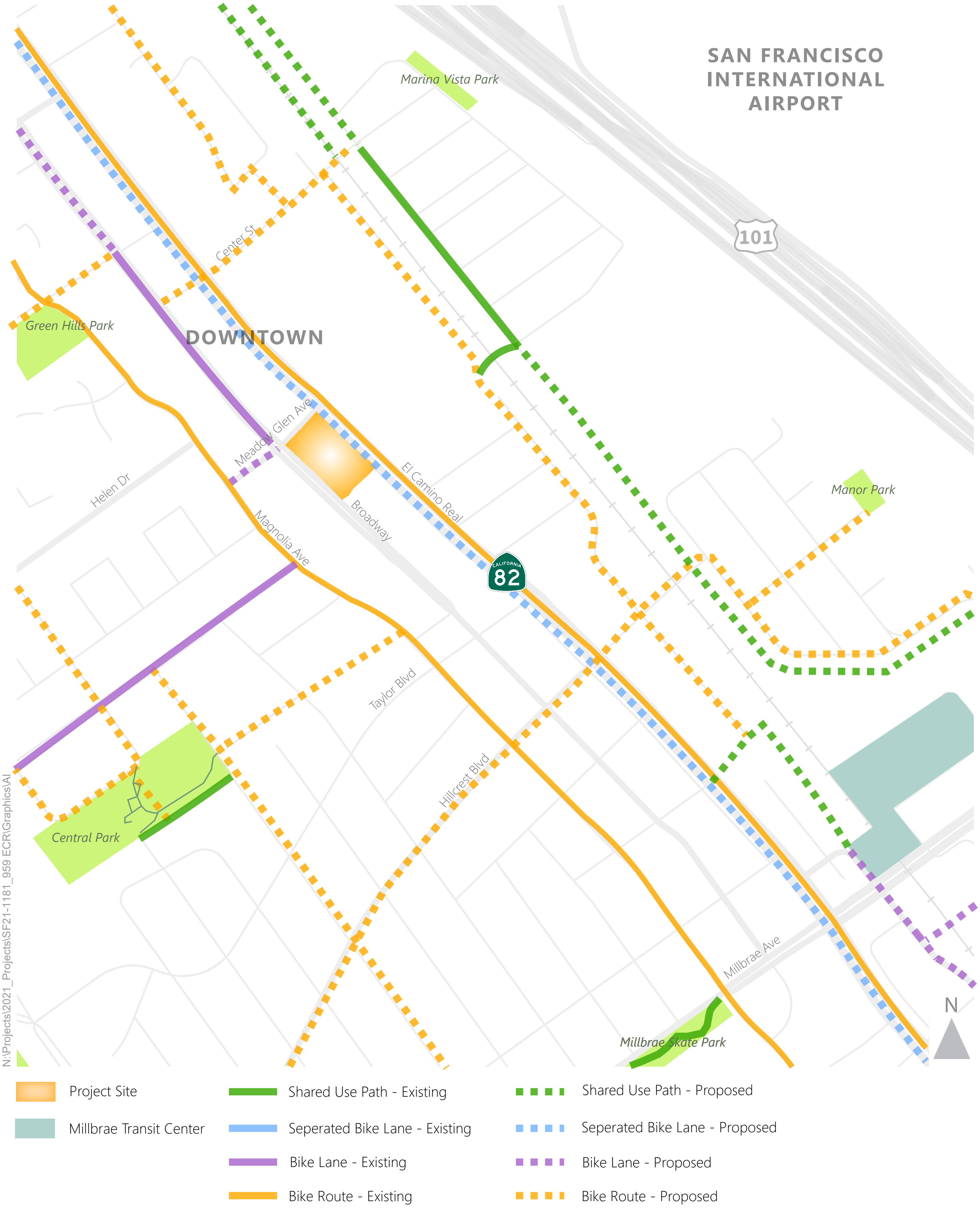

Figure 4

Existing and Planned Bicycle Facilities

5. CEQA Analysis

This chapter evaluates the project's potential impacts on VMT and the multimodal transportation network based on CEQA significance criteria.

5.1 Vehicle Miles Traveled (VMT)

Impact TRANS-1: Based on OPR Technical Advisory guidelines, the project is located within 0.5 mile of a major transit stop or an existing stop along a high-quality transit corridor and is presumed to have no impact on vehicle miles traveled (VMT) under Existing Plus project and Cumulative Plus Project conditions. (*Less-than-significant*)

CEQA Guideline Section 15064.3, subdivision (b)(1), states that lead agencies generally should presume that projects proposed within 0.5 mile of an existing major transit stop or an existing stop along a high-quality transit corridor will have a less-than-significant impact on VMT. The project site is directly served by an existing transit stop for SamTrans Route ECR at the El Camino Real frontage. Route ECR has peak commute headways of 15 minutes, thus qualifying El Camino Real a high-quality transit corridor. The project is located within 0.5 mile of an existing major transit stop or an existing stop along a high-quality transit corridor, and therefore presumed to have a less-than-significant impact on VMT.

The project also does not meet project-specific or location-specific criteria outlined in OPR Guidelines that would indicate that the project will still generate significant levels of VMT:

- Has a Floor Area Ratio (FAR) of less than 0.75
    - The project has a FAR of about 4.5, which is substantially higher than the requirement of 0.75.
- Includes more parking for use by residents, customers, or employees of the project than required by the jurisdiction
    - The project proposes to construct up to 278 residential units and 17,210 square feet of commercial space. The City of Millbrae municipal code would require the project to supply 417 residential parking spaces (1.5 space per unit in C or DIA districts) and 87 commercial parking spaces (1 space per 200 square feet) for a total of 504 spaces. However, since this project is eligible for a density bonus, a lesser amount of parking spaces is required. Per California State Law Title 7, Division 1, Chapter 4.3 Density Bonuses and Other Incentives, Subdivision (p)(1): (A) & (B), the project is required to provide 330 residential spaces and 86 commercial spaces, for a total of 416 spaces. State Density Bonus law allows projects providing at least 13% very low-income units within ½ mile of an accessible major transit stop to reduce their parking requirement from 1.5 spaces per unit to 0.5 spaces per unit. The project provides 307 residential parking spaces (a rate of 1.1 parking spaces per residential unit) and 42 commercial parking spaces (a rate of 2.44 spaces per 1,000 square feet of commercial space) for a total of 349 spaces.

- Is inconsistent with the applicable Plan Bay Area 2050 strategies
    - The project is consistent with the applicable Plan Bay Area 2050 strategies of incorporating affordable housing into major residential projects, building a Complete Streets network, improving the safety and accessibility of the multimodal transportation network, and implementing a VMT-reducing measures in its transportation demand management plan.
- Replaces affordable residential units with a smaller number of moderate- or high-income residential units
    - The project does not replace affordable residential units with a smaller number of moderate- or high-income residential units.

The project meets all criteria to be presumed to have no impact on VMT and therefore impacts to VMT are ***less-than-significant*** under Existing Plus Project and Cumulative Plus Project conditions.

Mitigation: None required.

5.2 Vehicle System

Impact TRANS-2: The project would not produce a detrimental impact to the on- and off-site vehicle system, conflict with adopted plans and programs, or substantially increase hazards to the vehicle system. (*Less-than-significant*)

The project provides three right-turn only driveways at existing curb cuts which would also guide the vehicle circulation flow on and off the site:

- Meadow Glen driveway: This is a gated driveway for residential use only, including courier services. This driveway will only allow right-turns in and out of the site. This right-turn ingress and egress driveway minimizes the number of vehicle conflict points and reduces potential queueing at the driveway and on Meadow Glen such that it does not back up to El Camino Real compared to a full access driveway by removing left-turns across multiple travel lanes.
- El Camino Real driveway: This driveway provides access to the commercial uses, residential uses, and trash and loading area on the project site. Residents and commercial patrons can use this driveway to enter and exit the site. Trash and loading heavy vehicles would also use this driveway to enter the site and must exit at the Broadway driveway.
- Broadway driveway: This is a right-turn, exit-only driveway for vehicles that enter from the El Camino Real driveway. Trash and loading heavy vehicles must use this driveway to exit. Residents and commercial patrons may also use this driveway to exit the site.

The project proposes to construct a bulb-out at the southeast corner of the Meadow Glen Ave/Broadway intersection at the project frontage. This bulb-out is consistent with the recommended improvements in the ATP to create a safer pedestrian environment along the downtown Millbrae Broadway corridor. This bulb-out would reduce the northbound approach lane configuration at the intersection from a left-turn pocket and one shared through-right lane to one shared left-through-right lane on Broadway. The lane reduction would not result in hazardous maneuvers or roadway alignment issues at the intersection.

The project is not expected to conflict with the existing or planned vehicle system, and therefore, impacts to the vehicle system are ***less-than-significant*** under Existing Plus Project conditions. The project is also not expected to conflict with the future vehicle system so the project would also not be a considerable contributor to significant cumulative impacts under Cumulative Plus Project conditions.

Mitigation: Non required.

5.3 Transit System

Impact TRANS-3: The project would not have adverse impacts to the transit system. (*Less-than-significant*)

Fixed-route bus service operates east of the project site with stops located at the project frontage and across the street. The existing bus stop at the El Camino Real frontage only provides a bench for waiting passengers. The bench is located within the eight-foot-wide sidewalk, which is an uncomfortably narrow width to accommodate both waiting passengers and passing sidewalk users adjacent to an arterial with high vehicle travel speeds and traffic volumes. SamTrans is currently evaluating potential bus stop relocations along El Camino Real as part of an ongoing study. While there are no publications on which bus stops would be removed or relocated, it is expected that a bus stop will remain within 0.5 mile of the project along El Camino Real and would not change the conclusion of the VMT screening assessment.

The fixed-route bus service connects to regional rail stations for BART and Caltrain at the Millbrae Intermodal Station about 0.8-miles away. Route ECR currently has ample capacity, and it is unlikely that the project would generate a large amount of new riders that would exceed capacity for the transit services and facilities that serve the area. Furthermore, the OPR Technical Advisory states that lead agencies should not treat the addition of new transit users as an adverse impact. The project is not expected to conflict with existing transit facilities or adopted plans or policies described in **Section 2** and is compatible with future transit plans in the area. Therefore, impacts to transit are ***less-than-significant*** under Existing Plus Project and Cumulative Plus Project conditions.

Mitigation: None required.

5.4 Pedestrian and Bicycle System

Impact TRANS-4: The project would not have adverse impacts to the existing and planned pedestrian and bicycle system. (*Less-than-significant*)

The project's residential and commercial uses are facing the street and can be accessed by pedestrians and bicyclists through existing sidewalks and streets. The project proposes to improve the sidewalks along all the project frontages. Improvements include adding new seating areas, bicycle racks, street trees and vegetation. The proposed sidewalk along the El Camino Real frontage is eight feet wide between the face of curb and the property line with zero setback between the building edge and the property line. Sidewalks along the Meadow Glen Avenue and Broadway project frontages would be widened to up to 15 feet. A bulb-out would be constructed at the southeast corner of the Meadow Glen Ave/Broadway intersection at the project frontage. This bulb-out is consistent with the recommended improvements in the ATP to create a safer pedestrian environment along the downtown Millbrae Broadway corridor. This bulb-out would give pedestrians more space to wait to cross the street and would make them more visible to the drivers.

The project frontage adjacent to the Millbrae Square Shopping Center's surface parking lot would be dedicated to a small pedestrian plaza and walkway to connect El Camino Real to Broadway. This pedestrian plaza would have planters to separate the space from the adjacent parking lot. Seating and lighting would also be added. The project would also provide a secured bike storage room of about 52 spaces for residents. The bike room can be accessed through the resident lobby on Broadway. These improvements are consistent with the ATP's goals of creating more public outdoor, pedestrian-oriented, and bike-friendly spaces in downtown Millbrae.

The streetscape improvements associated with the proposed project would create a more pedestrian- and bicycle-friendly environment by improving the quality of the facilities and providing access to the project site from the existing off-site pedestrian and bicycle network without having adverse impacts to the existing and planned pedestrian and bicycle system. The project is not expected to conflict with a program plan, ordinance, or policy addressing the circulation system related to bicycle and pedestrian facilities in the near-term or future. Therefore, impacts to the pedestrian and bicycle system are ***less-than-significant*** under Existing Plus Project and Cumulative Plus Project conditions. Additional improvements that could further enhance the project's surrounding pedestrian and bicycle environment are identified in **Appendix A**.

Mitigation: None required.

5.5 Emergency Access

Impact TRANS-5: The project would not pose potential hazards to emergency vehicles accessing the project site through existing streets with the existing transportation infrastructure. (*Less-than-significant*)

There are red curbs along the project frontage at Meadow Glen Avenue and on El Camino Real from the intersection to the project commercial driveway. These red curb areas can be used by emergency vehicles to access the project site. The residential portion of the project provides vehicle aisles between 24 feet and 26 feet wide and a 24-foot-wide driveway on Meadow Glen. The commercial portion of the project provides 24 feet wide vehicle aisles and driveway widths on El Camino Real and Broadway. These widths meet the Millbrae Municipal Code requirement of at least 20-foot-wide aisles and driveways for emergency access.

The closest fire station is Fire Station 37, about 0.4-miles, or two minutes, away from the project site. The route for the Fire Station 37 vehicles would be on Magnolia Avenue to Meadow Glen Avenue and El Camino Real. Other emergency vehicles would also use the Meadow Glen and El Camino Real access points. The project off-site transportation system modifications would not disrupt these emergency routes.

The project provides sufficient facilities for emergency vehicle access and would not make off-site transportation system changes that would disrupt the emergency access routes or pose potential hazards to emergency vehicles. Therefore, impacts to emergency access are ***less-than-significant*** under Existing Plus Project conditions. The project would also not be a considerable contributor to significant cumulative impacts under Cumulative Plus Project conditions because there are no planned future changes to the fire department location or on-site and off-site emergency vehicle access facilities.

Mitigation: None required.

Appendix A: Supplemental non-CEQA Analysis

This appendix documents the supplemental non-CEQA intersection operations analysis, site plan review with recommendations, and a discussion of Transportation Demand Management (TDM) strategies.

Intersection Operations Analysis

Analysis Locations

Based on discussion with City staff, the following three intersections were selected for analysis:

1. Meadow Glen Avenue/El Camino Real (signalized)
2. Meadow Glen Avenue/Broadway (all way stop controlled)
3. Meadow Glen Avenue/Magnolia Avenue (all way stop controlled)

Intersection Volumes

Existing Baseline Volumes

Due to suppressed vehicle travel during the COVID-19 pandemic shelter-in-place order, traditional field intersection counts were deemed not representative of typical travel volumes, and therefore intersection turning movement counts were not collected. As an alternative, a combination of pre-pandemic intersection counts and Streetlight mobile device “big data”[4] were used to develop baseline intersection volumes reflective of pre-pandemic travel patterns.

Pre-pandemic intersection counts in 2014 and 2019 were obtained for the Meadow Glen Avenue/El Camino Real intersection. The 2019 counts were used for the Meadow Glen Avenue/El Camino Real intersection baseline volumes. The Meadow Glen Avenue/Broadway intersection only had 2014 count data. Annual growth factors were developed from the 2014 and 2019 count data at the Meadow Glen Avenue/El Camino Real intersection and applied to 2014 Meadow Glen Avenue/Broadway intersection counts to establish baseline volumes. The Meadow Glen Avenue/Magnolia Avenue intersection did not have any historical count data, so we used 2019 Streetlight counts for baseline volumes.

Cumulative Baseline Volumes

The annual growth factors for AM and PM peak hours described above were applied to the existing baseline volumes to develop cumulative (year 2040) volumes. The cumulative volumes were compared to forecasts from the 2014 City of Millbrae General Plan Circulation Element Update and the California High Speed Rail Draft Environmental Impact Report/Environmental Impact Statement for consistency.

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[4] For more about the performance of StreetLight Data’s intersection turning movement count product, please review Fehr & Peers’ whitepaper detailing our independent review of the data source: https://www.fehrandpeers.com/transformative-data-collection-solution/

Analysis Scenarios

The impacts of the project to the surrounding transportation system were evaluated for the four scenarios listed below:

Scenario 1: Existing conditions – existing baseline intersection volumes reflective of year 2019 pre-pandemic conditions.

Scenario 2: Existing Plus Project conditions – Scenario 1 volumes plus traffic generated by the proposed project.

Scenario 3: Cumulative conditions – cumulative baseline intersection volumes reflective of year 2040 conditions.

Scenario 4: Cumulative Plus Project conditions – Scenario 3 volumes plus traffic generated by the proposed project.

Analysis Methodology

The operations of roadway facilities are described with the term level of service ("LOS", a qualitative description of traffic flow based on such factors as speed, travel time, delay, and freedom to maneuver). Six levels are defined from LOS A, as the best operating conditions, to LOS F, or the worst operating conditions. LOS E represents "at-capacity" operations. When traffic volumes exceed intersection capacity, stop-and-go conditions result, and operations are designated as LOS F.

Operations of signalized intersections were evaluated using the method from Transportation Research Board's *Highway Capacity Manual, 6th Edition,* which uses various intersection characteristics (such as traffic volumes, lane geometry, and signal phasing) to estimate the average control delay experienced by motorists traveling through an intersection. Control delay incorporates delay associated with deceleration, acceleration, stopping, and moving up in the queue. **Table 1** summarizes the relationship between average delay per vehicle and LOS for signalized intersections. **Table 2** summarizes the relationship between average delay per vehicle and LOS for unsignalized intersections.

Table 1: Signalized Intersection LOS Definitions

Level of Service	Description	Delay in Seconds
A	Progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.	< 10.0
B	Progression is good, cycle lengths are short, or both. More vehicles stop than with LOS A, causing higher levels of average delay.	> 10.0 to 20.0

Table 1: Signalized Intersection LOS Definitions

Level of Service	Description	Delay in Seconds
C	Higher congestion may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level, though many still pass through the intersection without stopping.	> 20.0 to 35.0
D	The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume to capacity (V/C) ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	> 35.0 to 55.0
E	This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences.	> 55.0 to 80.0
F	This level is considered unacceptable with oversaturation, which is when arrival flow rates exceed the capacity of the intersection. This level may also occur at high V/C ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be contributing factors to such delay levels.	> 80.0

Source: *Highway Capacity Manual 6th Edition*, Transportation Research Board of the National Academies of Science, 2017.

Table 2: Unsignalized Intersection LOS Definitions

Level of Service	Delay in Seconds
A	< 10.0
B	> 10.0 to 15.0
C	> 15.0 to 25.0
D	> 25.0 to 35.0
E	> 35.0 to 50.0
F	> 50.0

Source: *Highway Capacity Manual 6th Edition*, Transportation Research Board of the National Academies of Science, 2017.

The intersection operations analysis adverse effect criteria are based on the City's adopted policies. The City of Millbrae General Plan policies establish LOS D as the minimum acceptable threshold for signalized and unsignalized intersections. The minimum LOS D operating standard is also consistent with other jurisdictions in San Mateo County. Based on this policy, the project's effect on intersection operations would be in conflict with the General Plan policy if the project would:

1. Cause an intersection operating at LOS D or better without the project to operate at LOS E or F;

2. Increase the average delay at a signalized intersection operating at LOS E or F by five or more seconds.

Existing Intersection Operations

Existing intersection operations were evaluated using the methodology described above. The Existing conditions analysis volumes are shown on **Figure A-1**. The intersection operations results are summarized in **Table 3**. Detailed intersection LOS calculation worksheets are provided in **Attachment A**. As shown in **Table 3**, all study intersections operate acceptably based on the City's LOS standards under Existing conditions.

Table 3: Existing Conditions Intersection Operations

Intersection	Control[1]	Peak Hour	Delay[2]	LOS
1. Meadow Glen Ave/ El Camino Real	Signalized	AM	26.6	C
		PM	31.4	C
2. Meadow Glen Ave/ Broadway	AWSC	AM	14.9	B
		PM	19.2	C
3. Meadow Glen Ave/ Magnolia Ave	AWSC	AM	11.5	B
		PM	17.1	C

3. AWSC=all-way stop-controlled
4. Average delay calculated per HCM 6th Edition methodologies.

Source: Fehr & Peers, December 2021.

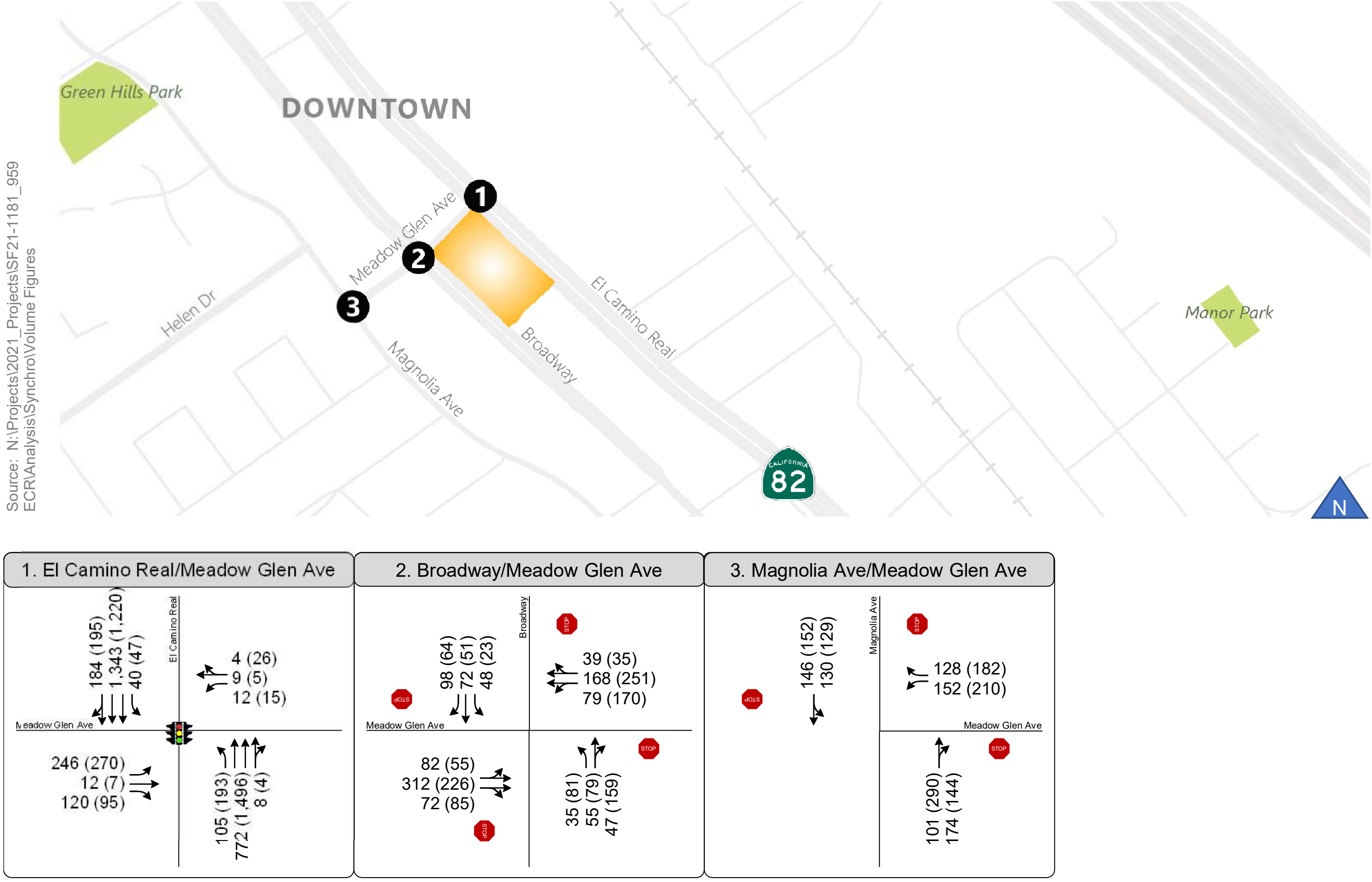

Figure A-1

Existing Peak Hour
Intersection Control, Volumes and, Lane Configuration

Project Characteristics

This chapter provides a review of the project description and trip generation, distribution, and assignment analysis completed for the project. The proposed project trip generation, trip distribution, and trip assignment allow for an evaluation of project effects on the surrounding roadway network. The amount of project traffic estimated to be added to the transportation system after completion of the Project was estimated using a three-step process:

1. **Trip Generation** – The amount of vehicle traffic entering/exiting the site was estimated.
2. **Trip Distribution** – The directions of trips to compatible land uses and their general routes of approach/departure to the Project site were identified.
3. **Trip Assignment** – Trips were then assigned to specific roadway segments and intersection turning movements based on likely paths of travel.

Project Trip Generation

Trip generation refers to the process of estimating the amount of vehicular traffic a project would add to the surrounding roadway system. Project trip generation forecasts are prepared for the one-hour peak period during the weekday morning and evening commute when traffic volumes on the adjacent streets are typically the highest.

The trip generation forecasts for the project were prepared using data from the Institute of Transportation Engineers' *Trip Generation Manual, 11th Edition*. Based on the assumed residential and commercial land use types, data from Land Use Code 221 (Multi Family, Mid-Rise) and Land Use Code 822 (Strip Retail Plaza, retail <40,000 square feet) were used. Standard ITE trip generation practice is blind to the effect that development density, scale, design, accessibility, transit proximity, demographics and mix of uses all have on site traffic generation. The ITE Trip Generation Manual and Handbook overestimate peak traffic generation for mixed-use development (MXD) by an average of 35%. To reflect the proposed project more accurately, the MXD+ analysis tool was used to calculate the project's raw trip generation and internal capture and shift to transit, bike, or walk trips reductions.[5] The trips associated with the Office Depot were also applied as a trip credit to the proposed project trip generation because the existing counts were conducted in 2019 when the Office Depot was still in operation. Since the Office Depot closed in 2020 before this analysis began and site-specific data was not available, the Office Depot trip generation was

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[5] For more information on the research related to ITE overestimation and MXD corrections, please refer to the American Planning Association planning advisory, "Getting Trip Generation Right: Eliminating the Bias Against Mixed-Use Development."

estimated using ITE Land Use Code 867 (Office Supply Superstore). A summary of the vehicle trip generation estimates is presented in **Table 4**.

Table 4: Project Trip Generation Estimates

Land Use	Quantity[1]	Daily Trips	Weekday AM Peak Hour Trips			Weekday PM Peak Hour Trips		
			In	Out	Total	In	Out	Total
Proposed Project								
Multifamily Housing[2]	278 DUs	1,280	26	85	111	66	43	109
Commercial[3]	17.21 KSF	930	24	16	40	57	56	113
Subtotal		2,210	50	101	151	123	99	222
Reductions								
Office Depot[4]	31.741 KSF	(728)	(16)	(16)	(32)	(45)	(43)	(88)
Internal Capture[5]		(50)	(2)	(4)	(6)	(12)	(9)	(21)
Walk, Bike, Transit[5]		(561)	(14)	(23)	(37)	(29)	(23)	(52)
Subtotal		(1,339)	(32)	(43)	(75)	(86)	(75)	(161)
NET NEW PROJECT TRIPS		**871**	**18**	**58**	**76**	**37**	**24**	**61**

Notes:

1. DUs=dwelling units; KSF=1,000 square feet.
2. Land Use Code 221 – Multi Family Mid-Rise (not close to rail transit, >0.5 mile)
   Daily: T=4.77(X)-46.46; 50% in, 50% out
   AM: T=0.44(X)-11.61; 23% in, 77% out
   PM: T=0.39(X)+0.34; 61% in, 39% out
3. Land Use Code 822 – Shopping Center (Strip Retail Plaza, <40 KSF)
   Daily: 54.45 average rate; 50% in, 50% out
   AM: 2.36 average rate; 60% in, 40% out
   PM: 6.59 average rate; 50% in, 50% out
4. Land Use Code 867 – Office Supply Superstore
   PM: 2.77 average rate; 51% in, 49% out
   ITE did not provide Daily and AM rates for this land use. A conversion factor of about 0.42 was developed by dividing the PM trip generation estimate using Land Use Code by the PM trip generation estimate using 822Land Use Code 867. The conversion factor was applied to the daily and AM trip generation estimates using Land Use Code 822 for the 31.741 KSF Office Depot. The resulting trips estimates are shown in the table.
5. Internal capture and walk/bike/transit trips were calculated using MXD+.

Sources: Institute of Transportation Engineers' *Trip Generation Manual, 11th Edition* and MXD+ analysis tool.
Fehr & Peers, November 2021.

The project is anticipated to add approximately 871 net new weekday daily trips, including about 76 net new AM peak hour trips and 61 net new PM peak hour vehicle trips to the roadway network.

Project Trip Distribution & Assignment

Project trip distribution refers to the directions of approach and departure that vehicles would take to access and leave the site. The project trip distribution was estimated based on project site access, existing traffic count data, existing travel patterns, the trip making characteristics of the proposed project, and the location of complementary land uses. The project's residential and commercial users have different travel patterns, so two sets of trip distribution are shown on **Figure A-2**. Project trip assignment refers to project trip loading on specific roadway segments and intersections in the study area. Access to the residential parking is provided on the El Camino Real and Meadow Glen driveways, both of which only allow right-turns in or out of the site. The El Camino Real driveway is the only entrance to commercial parking. Residents and commercial patrons can also exit the commercial parking lot at the Broadway right-turn out only driveway. Driveway access is shown in Figure 2 of the TIA. The net new project trips assignment is shown on **Figure A-3**.

Existing Plus Project Conditions

Peak hour net new project trips were added to the Existing conditions volumes to develop Existing Plus Project conditions analysis volumes shown on **Figure A-4**. The intersection operations results are summarized in **Table 5**. The addition of project traffic does not result in intersection operations policy exceedance at the study intersections.

Table 5: Existing and Existing Plus Project Conditions Intersection Operations

Intersection	Control[1]	Peak Hour	Existing No Project		Existing Plus Project	
			Delay[2]	LOS	Delay[2]	LOS
1. Meadow Glen Ave/ El Camino Real	Signalized	AM	26.6	C	27.3	C
		PM	31.4	C	31.1	C
2. Meadow Glen Ave/ Broadway	AWSC	AM	14.9	B	15.3	C
		PM	19.2	C	32.6	D
3. Meadow Glen Ave/ Magnolia Ave	AWSC	AM	11.5	B	11.5	B
		PM	17.1	C	17.2	C

Notes:
1. AWSC=all-way stop-controlled
2. Average delay calculated per HCM 6th Edition methodologies.
Source: Fehr & Peers, December 2021.

Under the Existing and Existing Plus Project PM peak hour conditions, the eastbound left-turn movement storage at the Meadow Glen Avenue/El Camino Real intersection is exceeded by about 50 feet, or two vehicle lengths, as shown in **Table 6**. However, the addition of project traffic does not increase the 95th percentile queue length.[6] All other movements at the study intersections do not exceed available storage under Existing and Existing Plus Project conditions. A detailed queue length summary for all intersection movements is provided in **Attachment B**.

Table 6: Existing and Existing Plus Project Conditions 95th Percentile Queue Summary

Intersection	Movement	Storage (ft)[1]	Existing No Project (ft)[1]		Existing Plus Project (ft)[1]	
			AM	PM	AM	PM
1. Meadow Glen Ave/ El Camino Real	EBL	200	200	**250**	200	**250**

Notes:

Bolded text indicates storage is exceeded.

1. Storage and queue lengths are rounded to 25 with the assumption that one vehicle in queue takes up about 25 feet.

Source: Fehr & Peers, December 2021.

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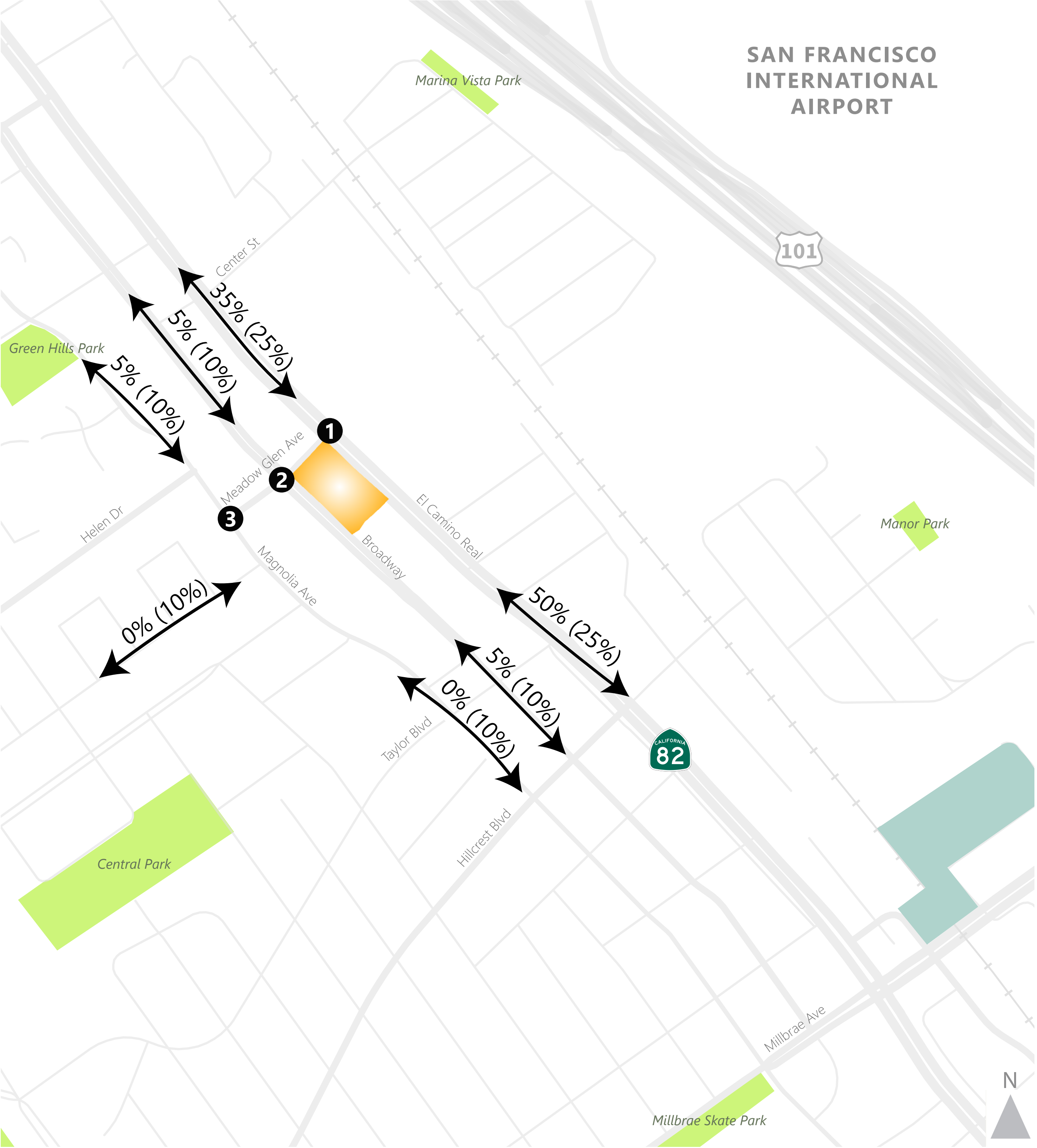
[6] The queue lengths presented in this report are the 95th percentile queue lengths. The 95th percentile queue length has only a 5-percent probability of being exceeded during the analysis time period. It is typically used for determining the appropriate length of turn pockets, but it is not typical of what an average driver would experience.



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🟧 Project Site

🟦 Millbrae Intermodal Station

Ⓧ Study Intersection

Residential (Commercial) ↔

Figure A-2

Project Trips Distribution

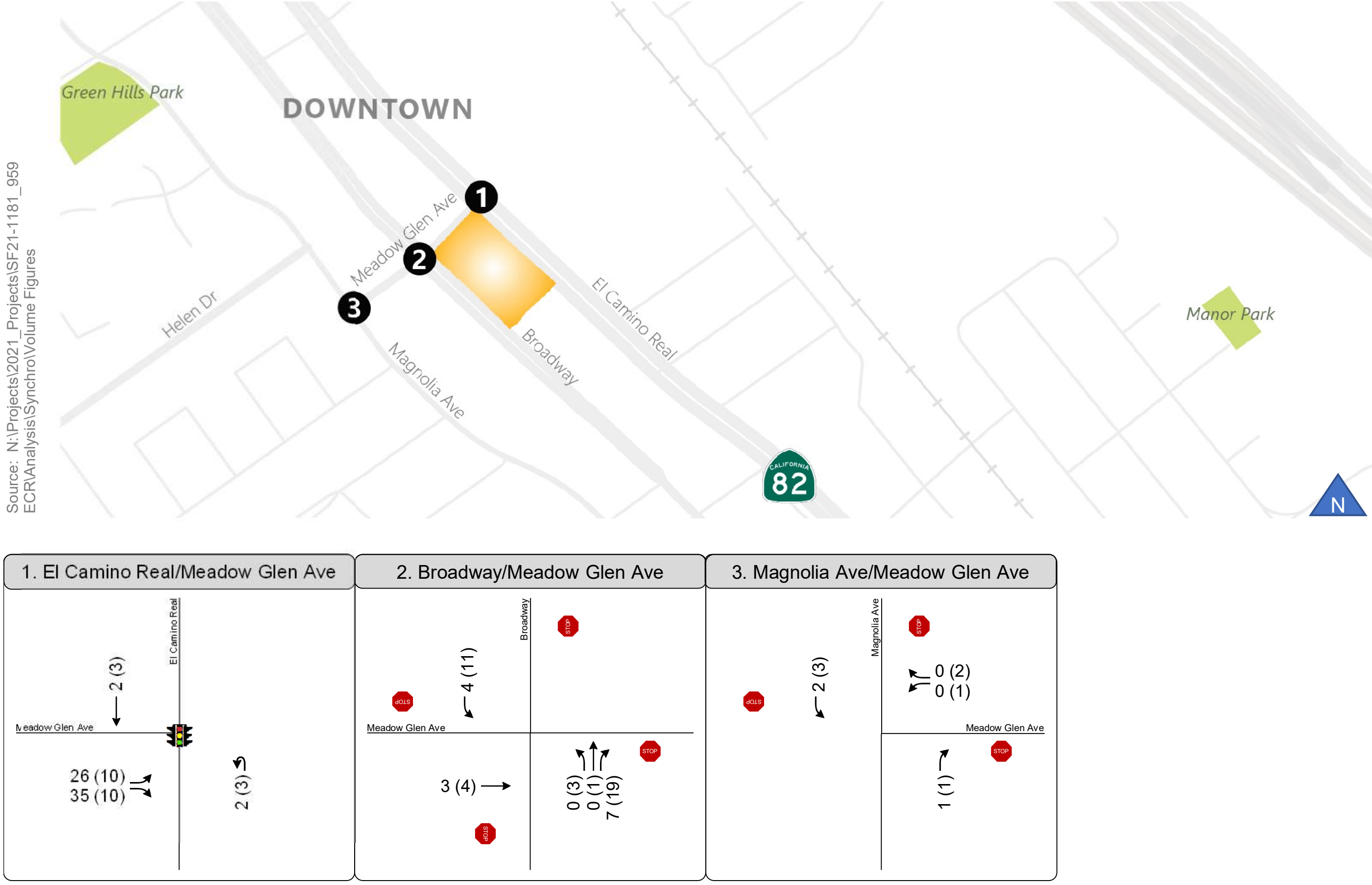

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Figure A-3

Net New Peak Hour Project Trip Assignment

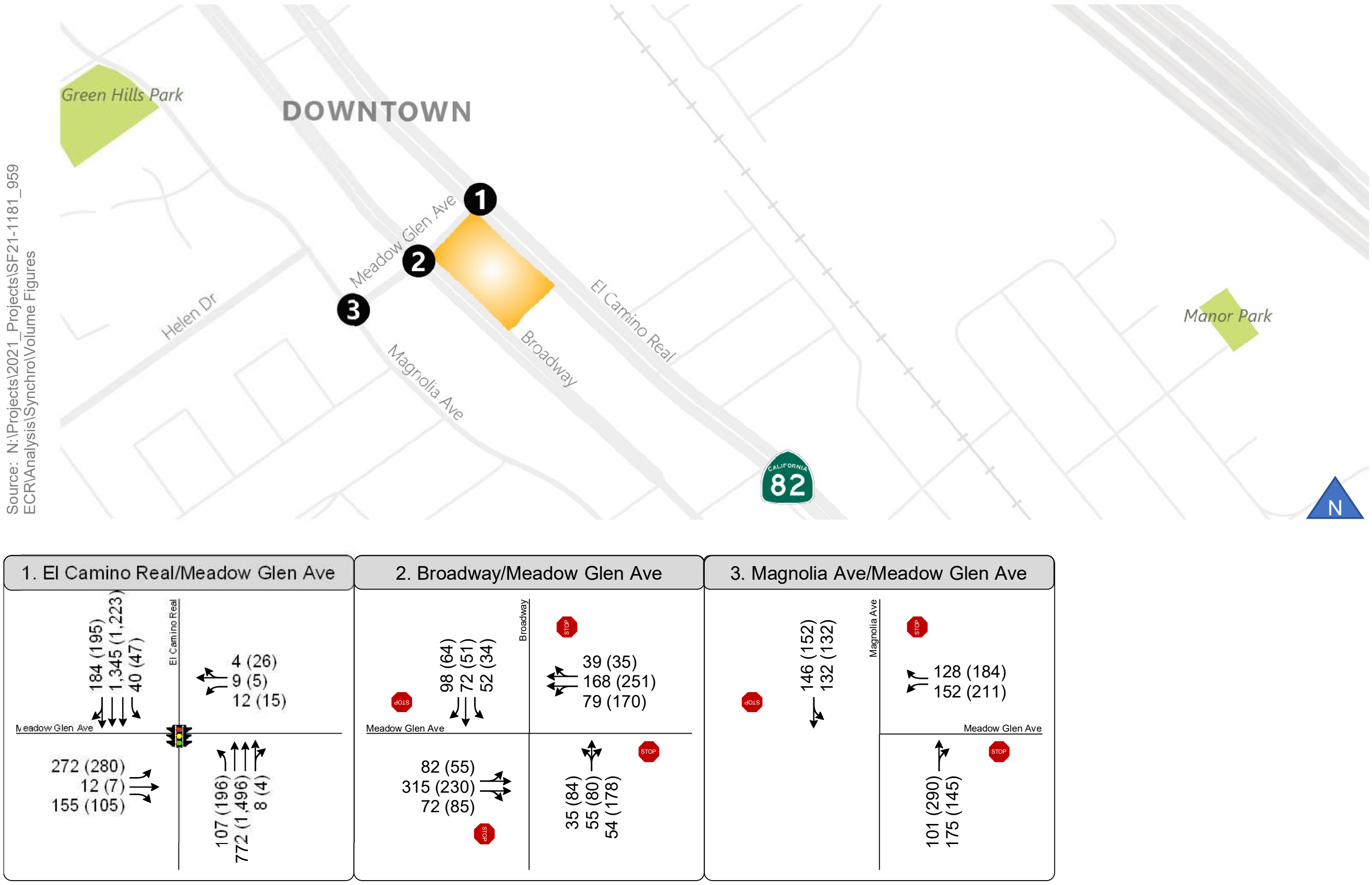

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Figure A-4

Existing Plus Project Peak Hour
Intersection Control, Volumes and, Lane Configuration

Cumulative and Cumulative Plus Project Conditions

Cumulative conditions volumes are shown on **Figure A-5**. Project trips were added to get the Cumulative Plus Project conditions volumes, as shown on **Figure A-6**. The intersection operations results are summarized in **Table 7** and vehicle queues are presented in **Table 8**.

Table 7: Cumulative and Cumulative Plus Project Conditions Intersection Operations

			Cumulative No Project		Cumulative Plus Project	
Intersection	**Control[1]**	**Peak Hour**	**Delay[2]**	**LOS**	**Delay[2]**	**LOS**
1. Meadow Glen Ave/ El Camino Real	Signalized	AM	47.1	D	52.7	D
		PM	49.4	D	43.4	D
2. Meadow Glen Ave/ Broadway	AWSC	AM	33.9	D	**35.6**	**E**
		PM	**43.1**	**E**	**83.6**	**F**
3. Meadow Glen Ave/ Magnolia Ave	AWSC	AM	17.7	C	17.8	C
		PM	**41.2**	**E**	**41.7**	**E**

Notes:
Bolded text indicates unacceptable intersection operations (worse than LOS D).
Underlined text indicates the addition of project traffic would result in a policy exceedance.
1. AWSC=all-way stop-controlled
2. Average delay calculated per HCM 6th Edition methodologies.
Source: Fehr & Peers, December 2021.

Based on the City's intersection operations policy, the addition of project traffic would result in a policy exceedance at the Meadow Glen Ave/Broadway intersection in the AM and PM peak hours. The project is expected to deteriorate the AM operations from LOS D to LOS E and add more than five seconds of delay to already unacceptable operations without the project in the PM peak hour.

Table 8: Cumulative and Cumulative Plus Project Conditions 95th Percentile Queue Summary

			Cumulative No Project (ft)[1]		Cumulative Plus Project (ft)[1]	
Intersection	**Movement**	**Storage[1]**	**AM**	**PM**	**AM**	**PM**
1. Meadow Glen Ave/ El Camino Real	EBL	200	**275**	**375**	**350**	**350**
	NBL	250	200	**300**	200	**275**
2. Meadow Glen Ave/ Broadway	NBTR	1,375	N/A	N/A	100	525
	EBTL	200	**250**	100	**250**	100
	WBTL	250	125	**350**	125	**375**

Table 8: Cumulative and Cumulative Plus Project Conditions 95th Percentile Queue Summary

Intersection	Movement	Storage[1]	Cumulative No Project (ft)[1]		Cumulative Plus Project (ft)[1]	
			AM	PM	AM	PM
3. Meadow Glen Ave/ Magnolia Ave	NBTR	175	125	**400**	125	**400**

Notes:
Bolded text indicates storage is exceeded.
Underlined text indicates the addition of project traffic increases queues compared to no project conditions.
1. Storage and queue lengths are rounded to 25 with the assumption that one vehicle in queue takes up about 25 feet.
Source: Fehr & Peers, December 2021.

The addition of project traffic increases vehicles queues exceeding available storage at these locations:

- Intersection 1: Meadow Glen Ave/El Camino Real
    - Eastbound left queue increases from 275 feet to 350 feet (about three vehicle lengths) in the AM peak hour
- Intersection 2: Meadow Glen Ave/Broadway
    - Westbound shared through-left queue increases from 350 feet to 375 feet (about one vehicle length) in the PM peak hour

All other movements at the study intersections do not exceed available storage or are not increased with the addition of project traffic.

Cumulative Plus Project Conditions Future Intersection Improvement Recommendations

Recommendation 1: Modify Meadow Glen Ave/El Camino Real lane geometry and signal phasing

The City may work with Caltrans to modify the eastbound lane geometry and the Meadow Glen approaches signal phasing. There are two recommended options. One option is to modify the eastbound through lane to an eastbound shared through-left lane and update the Meadow Glen approaches from permitted left-turn phasing to split phasing. The other option is to modify the eastbound through lane to an eastbound left-turn lane and the eastbound right lane to an eastbound shared through-right lane and update the Meadow Glen approaches from permitted left-turn phasing to protected left-turn phasing. These modifications would provide more storage for eastbound left-turning vehicles to prevent queues from spilling back into the Meadow Glen Ave/Broadway intersection. The estimated cost for either option is between $500,000 and $1,000,000.[7] Since this improvement is focused on the eastbound approach, the fair share percentage was calculated by dividing the project's eastbound approach trips by the

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[7] Estimates include an estimate of construction costs with a reasonable assumption for contingency. Additional analysis and engineering are required to refine project scope and estimate more detailed construction costs.

intersection's eastbound approach trips under cumulative plus project conditions. The resulting project fair share contribution is about 7% of the median estimate of $750,000, or $50,000.

Implementation of this recommendation requires participation by agencies over which Millbrae has no authority, and it is not within the City's power to impose such requirement on the development project. This is a recommendation only.

Recommendation 2: Modify the Intersection Control at Meadow Glen Ave/Broadway as Part of a Future Intersection Improvement

The addition of project traffic is expected to result in a policy exceedance at the Meadow Glen Ave/Broadway intersection. A signal is warranted at the Meadow Glen Avenue/Broadway intersection under Cumulative no project conditions. Detailed signal warrant analysis worksheets are provided in **Attachment C**. Cumulative Plus Project operations would improve to LOS A in the AM and LOS B in the PM peak hour with signalization, as shown in **Table 9**. The vehicle queues would also decrease to fit into the available storage, as shown in **Table 10**. A roundabout would also be a suitable intersection control and would result in acceptable operations. The estimated cost of a signal installation or roundabout at this intersection would be about $1,000,000.[7] The project fair share percentage of 2% was calculated by dividing the project's added trips at the intersection by the total intersection volume under cumulative plus project conditions. The project's fair share contribution would be $20,000.

Table 9: Cumulative Plus Project with Improvements Intersection Operations

Intersection	Peak Hour	No Project (AWSC[1])		Plus Project (AWSC[1])		With Improvement (Signal[1])	
		Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS
2. Meadow Glen Ave/ Broadway	AM	33.9	D	<u>**35.6**</u>	<u>**E**</u>	6.8	A
	PM	**43.1**	**E**	<u>**83.6**</u>	<u>**F**</u>	12.8	B

Notes:
Bolded text indicates unacceptable intersection operations (worse than LOS D).
<u>Underlined</u> text indicates the addition of project traffic would result in a policy exceedance.
1. Intersection control type under specific scenario: AWSC=all-way stop-controlled; Signal=signalized.
2. Average delay calculated per HCM 6th Edition methodologies.
Source: Fehr & Peers, December 2021.

Table 10: Cumulative and Cumulative Plus Project Conditions 95th Percentile Queue Summary

Intersection	Move-ment	Storage[1]	No Project		Plus Project		With Improvement	
			AM	PM	AM	PM	AM	PM
2. Meadow Glen Ave/ Broadway	EBTL	200	**250**	100	**250**	100	125	100
	WBTL	250	125	**350**	125	**<u>375</u>**	75	150

Notes:
Bolded text indicates storage is exceeded.
<u>Underlined</u> text indicates the addition of project traffic increases queues compared to no project conditions.
1. Storage and queue lengths are rounded to 25 with the assumption that one vehicle in queue takes up about 25 feet.
Source: Fehr & Peers, December 2021.

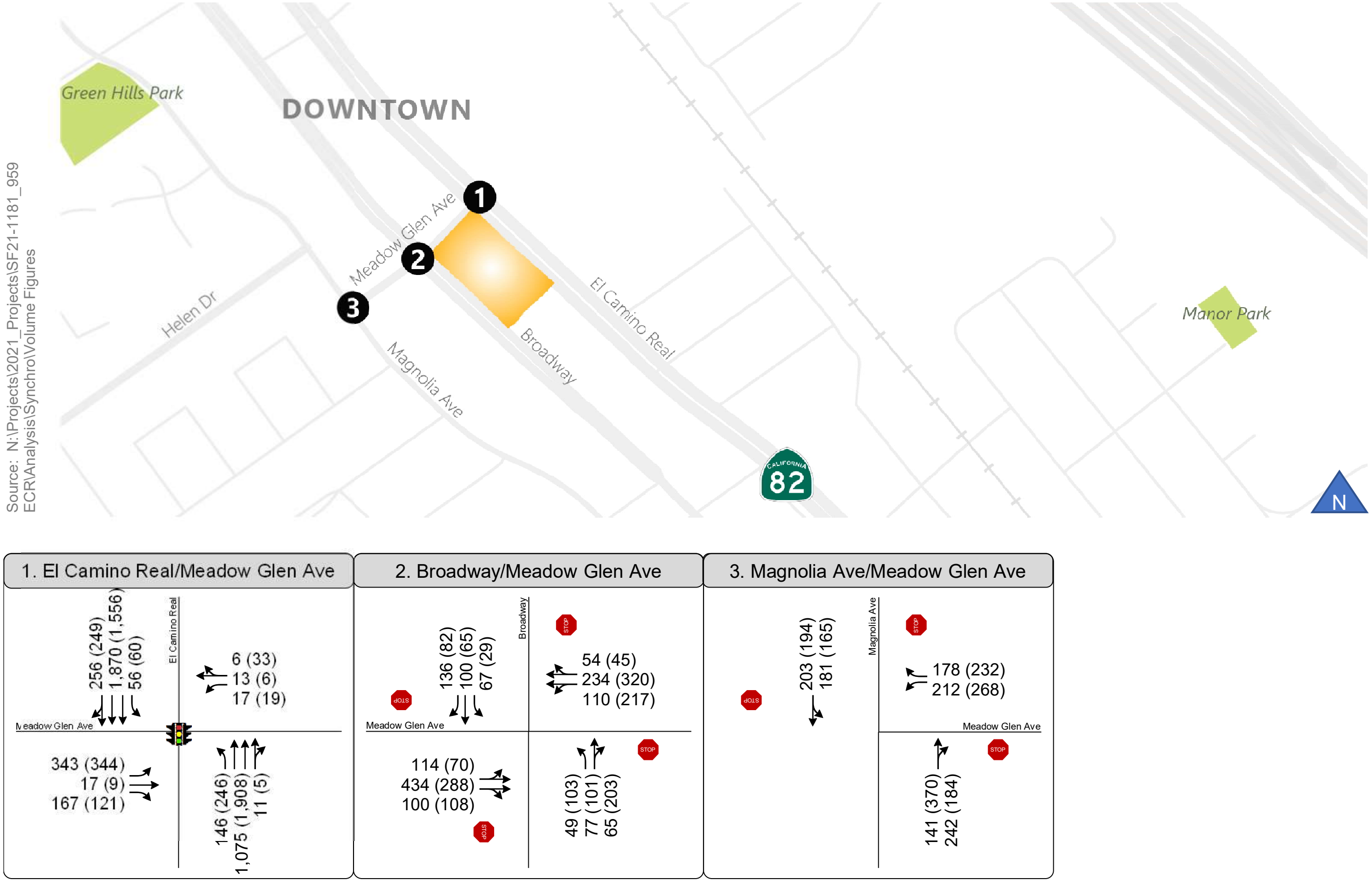

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Figure A-5

Cumulative Peak Hour Intersection Control, Volumes and, Lane Configuration

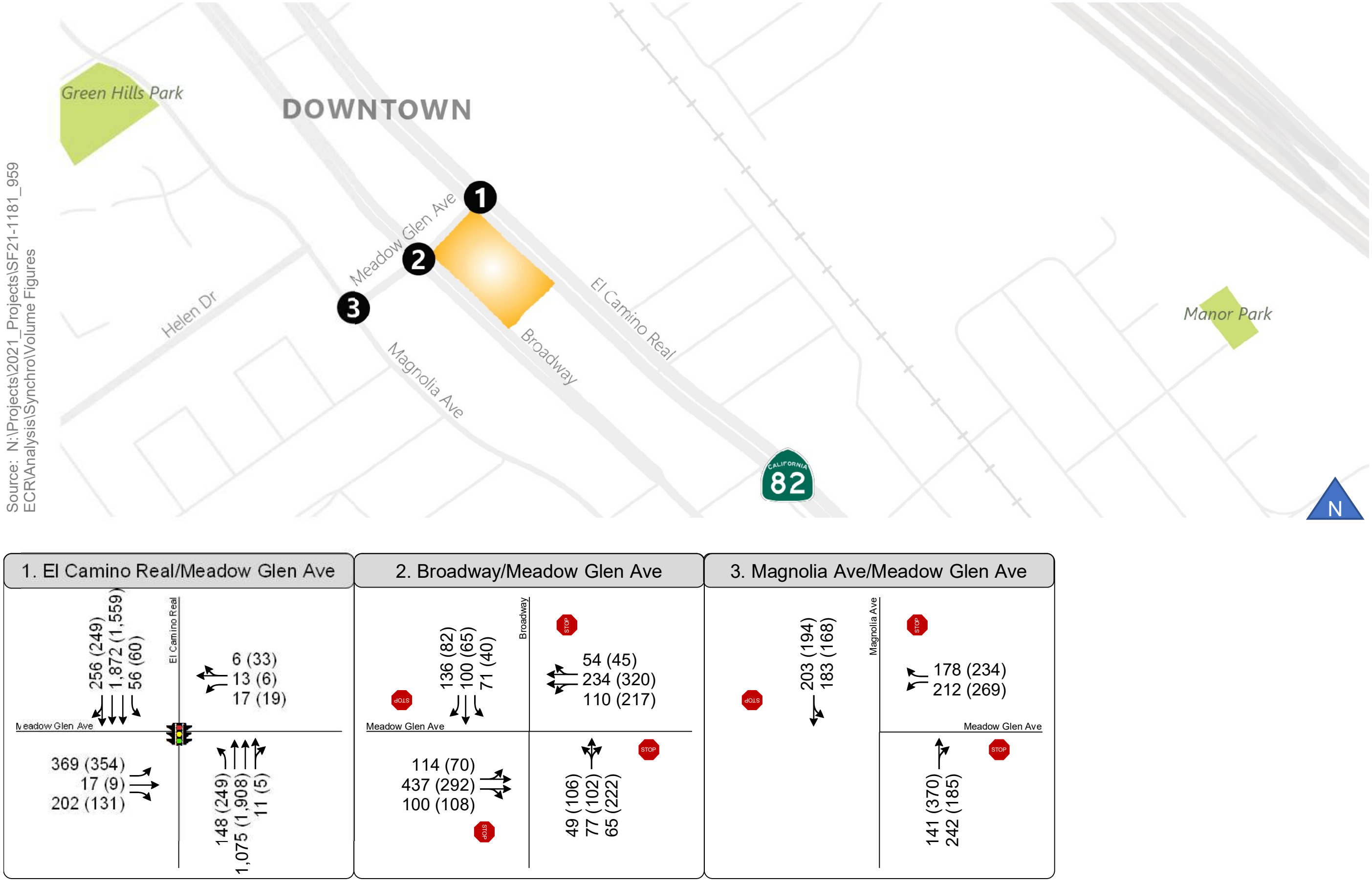

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Figure A-6

Cumulative Plus Project Peak Hour Intersection Control, Volumes and, Lane Configuration

Site Plan Review and Recommendations

This section is provided to evaluate the project site plan and provide suggested improvements for the City and project applicant to consider that could be incorporated into the project as a negotiated voluntary improvement as a condition of approval. It is for informational purposes only. Fehr and Peers reviewed project site plans dated March 17, 2022 to evaluate the project's access and circulation for all modes. The following are a summary of findings and one recommended off-site improvement.

Bicycle and Pedestrian

The project's proposed bicycle and pedestrian features are described in Section 5.4 of the TIA which include sidewalk widening along the project's Meadow Glen and Broadway frontages, a new bulb-out at the Broadway/Meadow Glen Avenue intersection, and expanded pedestrian amenities. These improvements represent a substantial improvement to the public realm and Downtown Millbrae pedestrian circulation network. One potential pedestrian improvement opportunity is suggested below. There are no suggested bicycle enhancements.

The project plans show that the El Camino Real/Meadow Glen intersection curb ramp will remain diagonal. The Meadow Glen Avenue/Broadway intersection improvement includes directional curb ramps. Diagonal curb ramps are less desirable because turning vehicles may not see the pedestrians and users on wheels may roll into the intersection instead of the crosswalk. Directional curb ramps are in line with the sidewalk and crosswalk for a safer environment.

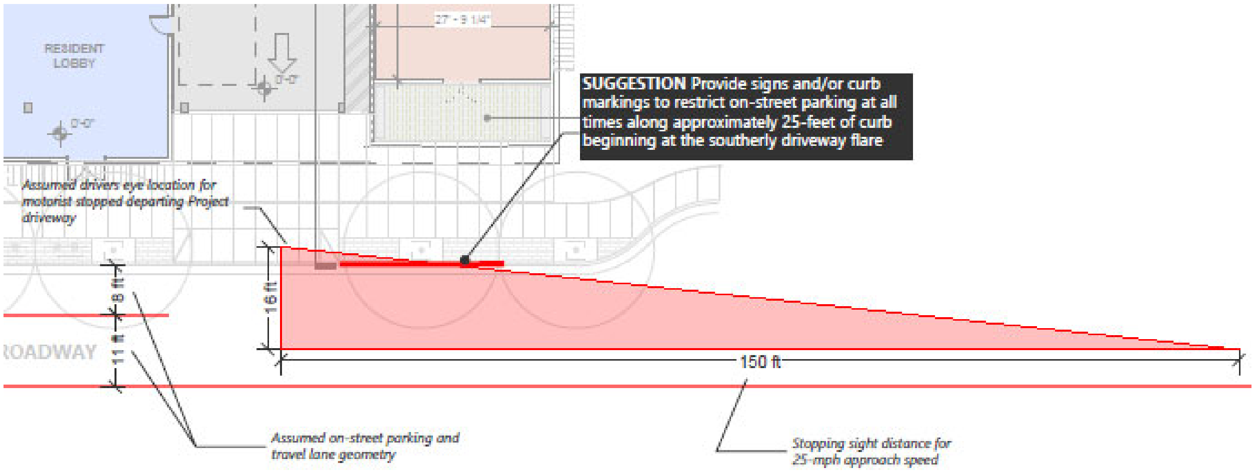
Suggestion BP-1: Consider installing two additional off-site directional curb ramps at the El Camino Real/Meadow Glen intersection on the northwest and southeast corners (which connect to the project site via crosswalks), similar to the Meadow Glen Avenue/Broadway intersection curb ramps. Directional curb ramps will improve pedestrian safety at the intersection.

Motor Vehicle

The Project's proposed motor vehicle access and circulation characteristics are described in Section 5.2 of the TIA. The following suggestions are related to stopping sight distance at the Broadway driveway, commercial vehicle access, and two considerations for the project's final design phases.

The El Camino Real and Meadow Glen Avenue driveways do not require stopping sight distance studies since on-street parking is prohibited along both frontages which would otherwise potentially obscure sight lines. In contrast, on-street parking along the Broadway frontage could potentially impede sight lines between vehicles departing the project site and northbound through vehicles on Broadway.

Suggestion MV-1: Provide signs and/or curb markings to restrict on-street parking at all times along approximately 25-feet of curb beginning at the south edge of the Broadway project access driveway. This will provide clear stopping sight distance as shown in the diagram below.



SUGGESTION Provide signs and/or curb markings to restrict on-street parking at all times along approximately 25-feet of curb beginning at the southerly driveway flare

Assumed drivers eye location for motorist stopped departing Project driveway

Assumed on-street parking and travel lane geometry

Stopping sight distance for 25-mph approach speed

Transit

As described in Section 4.2, the project site is near the Millbrae Intermodal Station and is adjacent to northbound and southbound SamTrans Route ECR stops at the Meadow Glen Avenue/El Camino Real intersection. The existing Meadow Glen Avenue/El Camino Real intersection features crosswalks on all street legs which provide direct pedestrian connections between these transit facilities. The existing southbound Route ECR bus stop and seating bench is within the project's El Camino Real eight-foot-wide sidewalk frontage. This width is uncomfortably narrow to be shared with sidewalk users and transit passengers using the bus stop. The bus stop is also lacking key amenities such as shelter, pedestrian-scaled lighting, and adequate sidewalk width for waiting passengers.

Suggestion TR-1: Site plans appear to show no major conflicts between the proposed El Camino Real sidewalk design and typical on-street bus stop standards, but there is a benefit to future residents, workers, and visitors of this development with the installation of an improved bus stop. The project sponsor should improve the bus stop by installing a bus shelter and seating for waiting passengers. This bus stop should not interrupt the flow of travel along the sidewalk. The project sponsor should verify final designs with SamTrans prior to construction.

Transportation Demand Management (TDM) Strategies

Transportation Demand Management (TDM) strategies help reduce travel demand or redistribute the demand by mode choice or time of day. The main goal is to provide sustainable transportation alternatives to make the best use of and reduce stress on the transportation network. There is a strong focus on shifting people out of single-occupancy vehicles and into more efficient modes of travel. TDM strategies include information sharing, incentives, support resources, and urban design features to encourage travel mode shifts.

The project is in a pedestrian- and bike-oriented downtown area in Millbrae that already has features to encourage active transportation modes. The project site plan and project description also include features of effective TDM strategies to complement the existing infrastructure, such as:

- Widened sidewalks with tree canopy and lighting
- Bulbout for pedestrian visibility
- Directional curb ramps at intersections
- Secure bike parking
- Reduced off-street vehicle parking
- Proximity to high-quality transit

After the project is constructed, future occupants may also voluntarily implement TDM strategies to further reduce single-occupancy vehicles and encourage more sustainable modes of travel. Some strategies include:

- Coordination with Commute.org for ride-matching assistance in carpool or vanpool programs, resource and information sharing, and TDM implementation support
- Transit or ridesharing passes and/or subsidies
- Paid parking strategies
- Incentives for mode switch
- Showers, lockers, and bike repair stations for bikers

Attachment A: LOS Worksheets

Existing Conditions

HCM 6th Signalized Intersection Summary
1: El Camino Real & Meadow Glen Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↱		↰	↑↑↱		↰	↑↑↱	
Traffic Volume (veh/h)	246	12	120	12	9	4	105	772	8	40	1343	184
Future Volume (veh/h)	246	12	120	12	9	4	105	772	8	40	1343	184
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.99	0.99		0.97	1.00		0.95	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	259	13	32	13	9	1	111	813	7	42	1414	177
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	433	489	410	425	431	48	140	1216	10	591	2282	285
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.08	0.23	0.23	0.33	0.50	0.50
Sat Flow, veh/h	1360	1856	1553	1335	1636	182	1767	5177	45	1767	4549	569
Grp Volume(v), veh/h	259	13	32	13	0	10	111	530	290	42	1050	541
Grp Sat Flow(s),veh/h/ln	1360	1856	1553	1335	0	1817	1767	1689	1845	1767	1689	1741
Q Serve(g_s), s	15.7	0.5	1.4	0.7	0.0	0.4	5.6	12.8	12.8	1.5	20.2	20.2
Cycle Q Clear(g_c), s	16.0	0.5	1.4	1.1	0.0	0.4	5.6	12.8	12.8	1.5	20.2	20.2
Prop In Lane	1.00		1.00	1.00		0.10	1.00		0.02	1.00		0.33
Lane Grp Cap(c), veh/h	433	489	410	425	0	479	140	793	433	591	1694	873
V/C Ratio(X)	0.60	0.03	0.08	0.03	0.00	0.02	0.79	0.67	0.67	0.07	0.62	0.62
Avail Cap(c_a), veh/h	573	680	569	562	0	666	177	1388	758	591	1694	873
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.5	24.6	24.9	25.0	0.0	24.5	40.7	31.2	31.3	20.4	16.2	16.2
Incr Delay (d2), s/veh	1.3	0.0	0.1	0.0	0.0	0.0	17.5	4.4	8.0	0.1	1.7	3.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.2	0.2	0.5	0.2	0.0	0.2	3.0	5.5	6.5	0.6	7.5	8.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.8	24.6	25.0	25.0	0.0	24.5	58.2	35.7	39.2	20.5	17.9	19.5
LnGrp LOS	C	C	C	C	A	C	E	D	D	C	B	B
Approach Vol, veh/h		304			23			931			1633	
Approach Delay, s/veh		30.8			24.8			39.5			18.5	
Approach LOS		C			C			D			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.1	50.1		28.7	35.1	26.1		28.7				
Change Period (Y+Rc), s	4.0	5.0		5.0	5.0	* 5		5.0				
Max Green Setting (Gmax), s	9.0	34.0		33.0	6.0	* 37		33.0				
Max Q Clear Time (g_c+I1), s	7.6	22.2		3.1	3.5	14.8		18.0				
Green Ext Time (p_c), s	0.0	7.7		0.1	0.0	5.3		0.9				

Intersection Summary			
HCM 6th Ctrl Delay			26.6
HCM 6th LOS			C

Notes

User approved ignoring U-Turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	14.9
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↱		↰	↑↱		↰	↑	↱
Traffic Vol, veh/h	82	312	72	79	168	39	35	55	47	48	72	98
Future Vol, veh/h	82	312	72	79	168	39	35	55	47	48	72	98
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	92	351	81	89	189	44	39	62	53	54	81	110
Number of Lanes	0	2	0	0	2	0	1	1	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	2	2
HCM Control Delay	17.1	14.3	13	12.2
HCM LOS	C	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	34%	0%	48%	0%	100%	0%	0%
Vol Thru, %	0%	54%	66%	68%	52%	68%	0%	100%	0%
Vol Right, %	0%	46%	0%	32%	0%	32%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	35	102	238	228	163	123	48	72	98
LT Vol	35	0	82	0	79	0	48	0	0
Through Vol	0	55	156	156	84	84	0	72	0
RT Vol	0	47	0	72	0	39	0	0	98
Lane Flow Rate	39	115	267	256	183	138	54	81	110
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.095	0.25	0.538	0.487	0.394	0.279	0.126	0.178	0.221
Departure Headway (Hd)	8.713	7.865	7.245	6.846	7.751	7.278	8.442	7.93	7.212
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	411	456	497	525	463	493	424	452	497
Service Time	6.472	5.624	4.99	4.592	5.503	5.031	6.197	5.684	4.966
HCM Lane V/C Ratio	0.095	0.252	0.537	0.488	0.395	0.28	0.127	0.179	0.221
HCM Control Delay	12.4	13.2	18.2	16	15.5	12.8	12.4	12.4	12
HCM Lane LOS	B	B	C	C	C	B	B	B	B
HCM 95th-tile Q	0.3	1	3.1	2.6	1.9	1.1	0.4	0.6	0.8

Intersection	
Intersection Delay, s/veh	11.5
Intersection LOS	B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↱			↰↑
Traffic Vol, veh/h	152	128	101	174	130	146
Future Vol, veh/h	152	128	101	174	130	146
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	165	139	110	189	141	159
Number of Lanes	1	1	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	2
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	2	0
HCM Control Delay	10.9	11.1	12.5
HCM LOS	B	B	B

Lane	NBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	100%	0%	47%
Vol Thru, %	37%	0%	0%	53%
Vol Right, %	63%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	275	152	128	276
LT Vol	0	152	0	130
Through Vol	101	0	0	146
RT Vol	174	0	128	0
Lane Flow Rate	299	165	139	300
Geometry Grp	2	7	7	2
Degree of Util (X)	0.404	0.301	0.206	0.442
Departure Headway (Hd)	4.865	6.549	5.333	5.305
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	744	550	673	681
Service Time	2.874	4.279	3.063	3.314
HCM Lane V/C Ratio	0.402	0.3	0.207	0.441
HCM Control Delay	11.1	12.1	9.4	12.5
HCM Lane LOS	B	B	A	B
HCM 95th-tile Q	2	1.3	0.8	2.3

HCM 6th Signalized Intersection Summary
1: El Camino Real & Meadow Glen Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↱		↰	↑↑↱		↰	↑↑↱	
Traffic Volume (veh/h)	270	7	95	15	5	26	193	1496	4	47	1220	195
Future Volume (veh/h)	270	7	95	15	5	26	193	1496	4	47	1220	195
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.98		0.98	1.00		0.99	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	300	8	25	17	6	7	214	1662	4	52	1356	198
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	447	522	433	444	217	253	249	2071	5	335	2023	295
Arrive On Green	0.28	0.28	0.28	0.28	0.28	0.28	0.14	0.39	0.39	0.19	0.45	0.45
Sat Flow, veh/h	1381	1885	1565	1360	783	913	1795	5301	13	1795	4513	659
Grp Volume(v), veh/h	300	8	25	17	0	13	214	1076	590	52	1031	523
Grp Sat Flow(s),veh/h/ln	1381	1885	1565	1360	0	1696	1795	1716	1883	1795	1716	1741
Q Serve(g_s), s	20.2	0.3	1.2	0.9	0.0	0.6	11.7	27.8	27.8	2.4	23.7	23.7
Cycle Q Clear(g_c), s	20.8	0.3	1.2	1.2	0.0	0.6	11.7	27.8	27.8	2.4	23.7	23.7
Prop In Lane	1.00		1.00	1.00		0.54	1.00		0.01	1.00		0.38
Lane Grp Cap(c), veh/h	447	522	433	444	0	470	249	1341	736	335	1538	780
V/C Ratio(X)	0.67	0.02	0.06	0.04	0.00	0.03	0.86	0.80	0.80	0.16	0.67	0.67
Avail Cap(c_a), veh/h	550	664	551	546	0	597	341	1517	832	335	1538	780
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.9	26.3	26.6	26.7	0.0	26.3	42.1	27.0	27.0	34.1	21.8	21.8
Incr Delay (d2), s/veh	2.3	0.0	0.1	0.0	0.0	0.0	14.8	5.2	9.0	0.2	2.3	4.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.0	0.1	0.4	0.3	0.0	0.2	6.1	11.8	13.7	1.1	9.5	10.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.2	26.3	26.6	26.7	0.0	26.4	56.9	32.2	36.1	34.3	24.1	26.3
LnGrp LOS	D	C	C	C	A	C	E	C	D	C	C	C
Approach Vol, veh/h		333			30			1880			1606	
Approach Delay, s/veh		35.3			26.6			36.2			25.2	
Approach LOS		D			C			D			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	17.9	49.8		32.3	23.6	44.1		32.3				
Change Period (Y+Rc), s	4.0	5.0		4.6	5.0	* 5		4.6				
Max Green Setting (Gmax), s	19.0	32.2		35.2	7.0	* 44		35.2				
Max Q Clear Time (g_c+I1), s	13.7	25.7		3.2	4.4	29.8		22.8				
Green Ext Time (p_c), s	0.3	4.7		0.1	0.0	9.2		0.9				

Intersection Summary	
HCM 6th Ctrl Delay	31.4
HCM 6th LOS	C

Notes

User approved ignoring U-Turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th AWSC
2: Broadway /Broadway & Meadow Glen Ave

Intersection	
Intersection Delay, s/veh	19.2
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↱		↰	↑↱		↰	↑	↱
Traffic Vol, veh/h	55	226	85	170	251	35	81	79	159	23	51	64
Future Vol, veh/h	55	226	85	170	251	35	81	79	159	23	51	64
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	59	243	91	183	270	38	87	85	171	25	55	69
Number of Lanes	0	2	0	0	2	0	1	1	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	2	2
HCM Control Delay	16.8	23.5	18.5	12.9
HCM LOS	C	C	C	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	33%	0%	58%	0%	100%	0%	0%
Vol Thru, %	0%	33%	67%	57%	42%	78%	0%	100%	0%
Vol Right, %	0%	67%	0%	43%	0%	22%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	81	238	168	198	296	161	23	51	64
LT Vol	81	0	55	0	170	0	23	0	0
Through Vol	0	79	113	113	126	126	0	51	0
RT Vol	0	159	0	85	0	35	0	0	64
Lane Flow Rate	87	256	181	213	318	173	25	55	69
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.213	0.554	0.411	0.456	0.709	0.364	0.066	0.138	0.159
Departure Headway (Hd)	8.793	7.795	8.181	7.707	8.032	7.583	9.576	9.058	8.332
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	406	461	437	464	448	471	376	398	433
Service Time	6.59	5.591	5.978	5.503	5.824	5.375	7.276	6.758	6.032
HCM Lane V/C Ratio	0.214	0.555	0.414	0.459	0.71	0.367	0.066	0.138	0.159
HCM Control Delay	14	20	16.6	16.9	28.3	14.7	13	13.2	12.6
HCM Lane LOS	B	C	C	C	D	B	B	B	B
HCM 95th-tile Q	0.8	3.3	2	2.3	5.5	1.6	0.2	0.5	0.6

Intersection	
Intersection Delay, s/veh	17.1
Intersection LOS	C

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↱			↰↑
Traffic Vol, veh/h	210	182	290	144	129	152
Future Vol, veh/h	210	182	290	144	129	152
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	228	198	315	157	140	165
Number of Lanes	1	1	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	2
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	2	0
HCM Control Delay	13.7	21.3	15.2
HCM LOS	B	C	C

Lane	NBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	100%	0%	46%
Vol Thru, %	67%	0%	0%	54%
Vol Right, %	33%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	434	210	182	281
LT Vol	0	210	0	129
Through Vol	290	0	0	152
RT Vol	144	0	182	0
Lane Flow Rate	472	228	198	305
Geometry Grp	2	7	7	2
Degree of Util (X)	0.717	0.453	0.325	0.509
Departure Headway (Hd)	5.475	7.141	5.919	5.997
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	656	504	605	599
Service Time	3.53	4.901	3.678	4.059
HCM Lane V/C Ratio	0.72	0.452	0.327	0.509
HCM Control Delay	21.3	15.7	11.5	15.2
HCM Lane LOS	C	C	B	C
HCM 95th-tile Q	6	2.3	1.4	2.9

Existing Plus Project Conditions

1: El Camino Real & Meadow Glen Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↱		↰	↑↑↱		↰	↑↑↱	
Traffic Volume (veh/h)	272	12	155	12	9	4	107	772	8	40	1345	184
Future Volume (veh/h)	272	12	155	12	9	4	107	772	8	40	1345	184
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.99	0.99		0.98	1.00		0.95	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	286	13	44	13	9	1	113	813	7	42	1416	177
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	452	514	430	439	453	50	142	1216	10	568	2216	277
Arrive On Green	0.28	0.28	0.28	0.28	0.28	0.28	0.08	0.23	0.23	0.32	0.49	0.49
Sat Flow, veh/h	1361	1856	1554	1321	1636	182	1767	5177	45	1767	4549	568
Grp Volume(v), veh/h	286	13	44	13	0	10	113	530	290	42	1051	542
Grp Sat Flow(s),veh/h/ln	1361	1856	1554	1321	0	1818	1767	1689	1845	1767	1689	1741
Q Serve(g_s), s	17.4	0.5	1.9	0.7	0.0	0.4	5.7	12.8	12.8	1.5	20.9	20.9
Cycle Q Clear(g_c), s	17.8	0.5	1.9	1.1	0.0	0.4	5.7	12.8	12.8	1.5	20.9	20.9
Prop In Lane	1.00		1.00	1.00		0.10	1.00		0.02	1.00		0.33
Lane Grp Cap(c), veh/h	452	514	430	439	0	503	142	793	433	568	1645	848
V/C Ratio(X)	0.63	0.03	0.10	0.03	0.00	0.02	0.80	0.67	0.67	0.07	0.64	0.64
Avail Cap(c_a), veh/h	574	680	570	558	0	666	177	1388	758	568	1645	848
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.1	23.7	24.2	24.1	0.0	23.7	40.7	31.2	31.3	21.2	17.2	17.2
Incr Delay (d2), s/veh	1.5	0.0	0.1	0.0	0.0	0.0	18.0	4.4	8.0	0.1	1.9	3.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.8	0.2	0.7	0.2	0.0	0.2	3.1	5.5	6.5	0.6	7.9	8.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.6	23.7	24.3	24.1	0.0	23.7	58.7	35.7	39.2	21.3	19.1	20.9
LnGrp LOS	C	C	C	C	A	C	E	D	D	C	B	C
Approach Vol, veh/h		343			23			933			1635	
Approach Delay, s/veh		30.4			23.9			39.6			19.7	
Approach LOS		C			C			D			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.2	48.8		29.9	33.9	26.1		29.9				
Change Period (Y+Rc), s	4.0	5.0		5.0	5.0	* 5		5.0				
Max Green Setting (Gmax), s	9.0	34.0		33.0	6.0	* 37		33.0				
Max Q Clear Time (g_c+I1), s	7.7	22.9		3.1	3.5	14.8		19.8				
Green Ext Time (p_c), s	0.0	7.4		0.1	0.0	5.3		0.9				

Intersection Summary	
HCM 6th Ctrl Delay	27.3
HCM 6th LOS	C

Notes

User approved ignoring U-Turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	15.3
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↱			↰↑↱		↰	↑	↱
Traffic Vol, veh/h	82	315	72	79	168	39	35	55	54	52	72	98
Future Vol, veh/h	82	315	72	79	168	39	35	55	54	52	72	98
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	92	354	81	89	189	44	39	62	61	58	81	110
Number of Lanes	0	2	0	0	2	0	0	1	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	3	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	3	2	2
HCM Control Delay	17.5	14.6	15.4	11.6
HCM LOS	C	B	C	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	24%	34%	0%	48%	0%	100%	0%	0%
Vol Thru, %	38%	66%	69%	52%	68%	0%	100%	0%
Vol Right, %	38%	0%	31%	0%	32%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	144	240	230	163	123	52	72	98
LT Vol	35	82	0	79	0	52	0	0
Through Vol	55	158	158	84	84	0	72	0
RT Vol	54	0	72	0	39	0	0	98
Lane Flow Rate	162	269	258	183	138	58	81	110
Geometry Grp	8	8	8	8	8	7	7	7
Degree of Util (X)	0.362	0.548	0.496	0.399	0.283	0.13	0.169	0.208
Departure Headway (Hd)	8.06	7.326	6.928	7.849	7.375	8.028	7.516	6.799
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	445	492	521	458	486	446	477	527
Service Time	5.822	5.074	4.676	5.605	5.13	5.779	5.267	4.549
HCM Lane V/C Ratio	0.364	0.547	0.495	0.4	0.284	0.13	0.17	0.209
HCM Control Delay	15.4	18.7	16.3	15.8	13	12	11.8	11.3
HCM Lane LOS	C	C	C	C	B	B	B	B
HCM 95th-tile Q	1.6	3.3	2.7	1.9	1.2	0.4	0.6	0.8

Intersection	
Intersection Delay, s/veh	11.5
Intersection LOS	B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↱			↰↑
Traffic Vol, veh/h	152	128	101	175	132	146
Future Vol, veh/h	152	128	101	175	132	146
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	165	139	110	190	143	159
Number of Lanes	1	1	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	2
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	2	0
HCM Control Delay	10.9	11.2	12.5
HCM LOS	B	B	B

Lane	NBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	100%	0%	47%
Vol Thru, %	37%	0%	0%	53%
Vol Right, %	63%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	276	152	128	278
LT Vol	0	152	0	132
Through Vol	101	0	0	146
RT Vol	175	0	128	0
Lane Flow Rate	300	165	139	302
Geometry Grp	2	7	7	2
Degree of Util (X)	0.406	0.301	0.206	0.446
Departure Headway (Hd)	4.867	6.557	5.342	5.308
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	744	549	672	683
Service Time	2.877	4.289	3.073	3.317
HCM Lane V/C Ratio	0.403	0.301	0.207	0.442
HCM Control Delay	11.2	12.1	9.5	12.5
HCM Lane LOS	B	B	A	B
HCM 95th-tile Q	2	1.3	0.8	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↱		↰	↑↑↱		↰	↑↑↱	
Traffic Volume (veh/h)	280	7	105	15	5	26	196	1496	4	47	1223	195
Future Volume (veh/h)	280	7	105	15	5	26	196	1496	4	47	1223	195
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.99	0.99		0.98	1.00		0.97	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	295	7	30	16	5	7	206	1575	4	49	1287	187
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	434	505	423	434	187	262	241	1984	5	356	2030	295
Arrive On Green	0.27	0.27	0.27	0.27	0.27	0.27	0.14	0.38	0.38	0.20	0.46	0.46
Sat Flow, veh/h	1358	1856	1553	1344	689	965	1767	5217	13	1767	4454	647
Grp Volume(v), veh/h	295	7	30	16	0	12	206	1020	559	49	976	498
Grp Sat Flow(s),veh/h/ln	1358	1856	1553	1344	0	1654	1767	1689	1853	1767	1689	1724
Q Serve(g_s), s	20.3	0.3	1.4	0.9	0.0	0.5	11.4	26.8	26.8	2.3	22.1	22.1
Cycle Q Clear(g_c), s	20.9	0.3	1.4	1.2	0.0	0.5	11.4	26.8	26.8	2.3	22.1	22.1
Prop In Lane	1.00		1.00	1.00		0.58	1.00		0.01	1.00		0.38
Lane Grp Cap(c), veh/h	434	505	423	434	0	450	241	1285	705	356	1539	786
V/C Ratio(X)	0.68	0.01	0.07	0.04	0.00	0.03	0.86	0.79	0.79	0.14	0.63	0.63
Avail Cap(c_a), veh/h	543	653	547	542	0	582	336	1493	819	356	1539	786
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.3	26.6	27.0	27.0	0.0	26.7	42.2	27.5	27.5	32.8	20.8	20.8
Incr Delay (d2), s/veh	2.5	0.0	0.1	0.0	0.0	0.0	14.3	5.1	9.0	0.2	2.0	3.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.0	0.1	0.5	0.3	0.0	0.2	5.8	11.2	13.1	1.0	8.7	9.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.8	26.6	27.1	27.1	0.0	26.7	56.6	32.6	36.5	33.0	22.8	24.7
LnGrp LOS	D	C	C	C	A	C	E	C	D	C	C	C
Approach Vol, veh/h		332			28			1785			1523	
Approach Delay, s/veh		35.7			26.9			36.6			23.8	
Approach LOS		D			C			D			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	17.6	50.6		31.8	25.2	43.0		31.8
Change Period (Y+Rc), s	4.0	5.0		4.6	5.0	* 5		4.6
Max Green Setting (Gmax), s	19.0	32.2		35.2	7.0	* 44		35.2
Max Q Clear Time (g_c+I1), s	13.4	24.1		3.2	4.3	28.8		22.9
Green Ext Time (p_c), s	0.3	5.5		0.1	0.0	9.2		0.9

Intersection Summary	
HCM 6th Ctrl Delay	31.1
HCM 6th LOS	C

Notes

User approved ignoring U-Turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	32.6
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↑↱			↰↑↑↱			↰↑↱		↰	↑	↱
Traffic Vol, veh/h	55	230	85	170	251	35	84	80	178	34	51	64
Future Vol, veh/h	55	230	85	170	251	35	84	80	178	34	51	64
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	62	258	96	191	282	39	94	90	200	38	57	72
Number of Lanes	0	2	0	0	2	0	0	1	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	3	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	3	2	2
HCM Control Delay	20.4	32.6	54.3	13.1
HCM LOS	C	D	F	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	25%	32%	0%	58%	0%	100%	0%	0%
Vol Thru, %	23%	68%	57%	42%	78%	0%	100%	0%
Vol Right, %	52%	0%	42%	0%	22%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	342	170	200	296	161	34	51	64
LT Vol	84	55	0	170	0	34	0	0
Through Vol	80	115	115	126	126	0	51	0
RT Vol	178	0	85	0	35	0	0	64
Lane Flow Rate	384	191	225	332	180	38	57	72
Geometry Grp	8	8	8	8	8	7	7	7
Degree of Util (X)	0.913	0.479	0.534	0.817	0.421	0.101	0.144	0.166
Departure Headway (Hd)	8.549	9.031	8.556	8.855	8.4	9.552	9.032	8.302
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	423	399	420	408	427	375	397	431
Service Time	6.305	6.797	6.321	6.617	6.161	7.317	6.796	6.066
HCM Lane V/C Ratio	0.908	0.479	0.536	0.814	0.422	0.101	0.144	0.167
HCM Control Delay	54.3	19.9	20.8	41	17.2	13.4	13.3	12.7
HCM Lane LOS	F	C	C	E	C	B	B	B
HCM 95th-tile Q	9.9	2.5	3.1	7.4	2	0.3	0.5	0.6

Intersection	
Intersection Delay, s/veh	17.2
Intersection LOS	C

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↱			↰↑
Traffic Vol, veh/h	211	184	290	145	132	152
Future Vol, veh/h	211	184	290	145	132	152
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	229	200	315	158	143	165
Number of Lanes	1	1	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	2
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	2	0
HCM Control Delay	13.8	21.5	15.4
HCM LOS	B	C	C

Lane	NBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	100%	0%	46%
Vol Thru, %	67%	0%	0%	54%
Vol Right, %	33%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	435	211	184	284
LT Vol	0	211	0	132
Through Vol	290	0	0	152
RT Vol	145	0	184	0
Lane Flow Rate	473	229	200	309
Geometry Grp	2	7	7	2
Degree of Util (X)	0.721	0.456	0.33	0.516
Departure Headway (Hd)	5.491	7.158	5.936	6.013
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	657	502	604	596
Service Time	3.547	4.917	3.694	4.076
HCM Lane V/C Ratio	0.72	0.456	0.331	0.518
HCM Control Delay	21.5	15.8	11.6	15.4
HCM Lane LOS	C	C	B	C
HCM 95th-tile Q	6.1	2.4	1.4	3

Cumulative Conditions

HCM 6th Signalized Intersection Summary

1: El Camino Real & Meadow Glen Ave

959 El Camino Real Millbrae
2040 AM

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↱		↰	↑↑↱		↰	↑↑↱	
Traffic Volume (veh/h)	343	17	167	17	13	6	146	1075	11	56	1870	256
Future Volume (veh/h)	343	17	167	17	13	6	146	1075	11	56	1870	256
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.99	0.99		0.98	1.00		0.96	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	361	18	55	18	14	2	154	1132	11	59	1968	251
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	501	586	491	483	500	71	177	1538	15	389	1948	245
Arrive On Green	0.32	0.32	0.32	0.32	0.32	0.32	0.10	0.30	0.30	0.22	0.43	0.43
Sat Flow, veh/h	1358	1856	1556	1304	1583	226	1767	5171	50	1767	4544	572
Grp Volume(v), veh/h	361	18	55	18	0	16	154	739	404	59	1456	763
Grp Sat Flow(s),veh/h/ln	1358	1856	1556	1304	0	1809	1767	1689	1844	1767	1689	1739
Q Serve(g_s), s	22.5	0.6	2.3	0.9	0.0	0.5	7.7	17.7	17.7	2.4	38.6	38.6
Cycle Q Clear(g_c), s	23.0	0.6	2.3	1.5	0.0	0.5	7.7	17.7	17.7	2.4	38.6	38.6
Prop In Lane	1.00		1.00	1.00		0.13	1.00		0.03	1.00		0.33
Lane Grp Cap(c), veh/h	501	586	491	483	0	571	177	1005	549	389	1448	745
V/C Ratio(X)	0.72	0.03	0.11	0.04	0.00	0.03	0.87	0.74	0.74	0.15	1.01	1.02
Avail Cap(c_a), veh/h	570	680	571	549	0	663	177	1388	758	389	1448	745
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.2	21.3	21.8	21.8	0.0	21.3	39.9	28.4	28.4	28.3	25.7	25.7
Incr Delay (d2), s/veh	3.8	0.0	0.1	0.0	0.0	0.0	34.5	4.8	8.5	0.2	25.1	39.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.7	0.3	0.8	0.3	0.0	0.2	5.0	7.5	8.8	1.0	19.2	22.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.0	21.3	21.9	21.8	0.0	21.3	74.5	33.2	37.0	28.5	50.8	64.7
LnGrp LOS	C	C	C	C	A	C	E	C	D	C	F	F
Approach Vol, veh/h		434			34			1297			2278	
Approach Delay, s/veh		31.2			21.6			39.3			54.9	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	13.0	43.6		33.4	24.8	31.8		33.4
Change Period (Y+Rc), s	4.0	5.0		5.0	5.0	* 5		5.0
Max Green Setting (Gmax), s	9.0	34.0		33.0	6.0	* 37		33.0
Max Q Clear Time (g_c+I1), s	9.7	40.6		3.5	4.4	19.7		25.0
Green Ext Time (p_c), s	0.0	0.0		0.1	0.0	7.0		1.0

Intersection Summary	
HCM 6th Ctrl Delay	47.1
HCM 6th LOS	D

Notes

User approved ignoring U-Turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	33.9
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↑↱			↰↑↑↱		↰	↑↱		↰	↑	↱
Traffic Vol, veh/h	114	434	100	110	234	54	49	77	65	67	100	136
Future Vol, veh/h	114	434	100	110	234	54	49	77	65	67	100	136
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	128	488	112	124	263	61	55	87	73	75	112	153
Number of Lanes	0	2	0	0	2	0	1	1	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	2	2
Conflicting Approach Righ	NB	SB	WB	EB
Conflicting Lanes Right	2	3	2	2
HCM Control Delay	50.8	26.3	19.3	17
HCM LOS	F	D	C	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	34%	0%	48%	0%	100%	0%	0%
Vol Thru, %	0%	54%	66%	68%	52%	68%	0%	100%	0%
Vol Right, %	0%	46%	0%	32%	0%	32%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	49	142	331	317	227	171	67	100	136
LT Vol	49	0	114	0	110	0	67	0	0
Through Vol	0	77	217	217	117	117	0	100	0
RT Vol	0	65	0	100	0	54	0	0	136
Lane Flow Rate	55	160	372	356	255	192	75	112	153
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.166	0.443	0.923	0.844	0.682	0.488	0.217	0.308	0.388
Departure Headway (Hd)	10.847	9.987	8.934	8.53	9.624	9.146	10.398	9.878	9.15
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	330	361	405	424	375	394	345	364	393
Service Time	8.625	7.765	6.7	6.296	7.395	6.917	8.171	7.65	6.922
HCM Lane V/C Ratio	0.167	0.443	0.919	0.84	0.68	0.487	0.217	0.308	0.389
HCM Control Delay	15.8	20.5	57.9	43.3	30.8	20.4	16	17	17.6
HCM Lane LOS	C	C	F	E	D	C	C	C	C
HCM 95th-tile Q	0.6	2.2	10	8.1	4.8	2.6	0.8	1.3	1.8

Intersection	
Intersection Delay, s/veh	17.7
Intersection LOS	C

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↱			↰
Traffic Vol, veh/h	212	178	141	242	181	203
Future Vol, veh/h	212	178	141	242	181	203
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	230	193	153	263	197	221
Number of Lanes	1	1	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	2
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	2	0
HCM Control Delay	14.2	17.8	21.1
HCM LOS	B	C	C

Lane	NBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	100%	0%	47%
Vol Thru, %	37%	0%	0%	53%
Vol Right, %	63%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	383	212	178	384
LT Vol	0	212	0	181
Through Vol	141	0	0	203
RT Vol	242	0	178	0
Lane Flow Rate	416	230	193	417
Geometry Grp	2	7	7	2
Degree of Util (X)	0.636	0.466	0.325	0.687
Departure Headway (Hd)	5.499	7.274	6.05	5.926
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	654	493	592	605
Service Time	3.565	5.043	3.818	3.99
HCM Lane V/C Ratio	0.636	0.467	0.326	0.689
HCM Control Delay	17.8	16.3	11.7	21.1
HCM Lane LOS	C	C	B	C
HCM 95th-tile Q	4.5	2.4	1.4	5.4

HCM 6th Signalized Intersection Summary
1: El Camino Real & Meadow Glen Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↱		↰	↑↑↱		↰	↑↑↱	
Traffic Volume (veh/h)	344	9	121	19	6	33	246	1908	5	60	1556	249
Future Volume (veh/h)	344	9	121	19	6	33	246	1908	5	60	1556	249
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.98		0.98	1.00		0.99	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	382	10	37	21	7	10	273	2120	5	67	1729	256
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	495	591	491	489	217	310	306	2315	5	187	1714	252
Arrive On Green	0.31	0.31	0.31	0.31	0.31	0.31	0.17	0.44	0.44	0.10	0.38	0.38
Sat Flow, veh/h	1380	1885	1569	1346	693	990	1795	5301	13	1795	4506	662
Grp Volume(v), veh/h	382	10	37	21	0	17	273	1372	753	67	1313	672
Grp Sat Flow(s),veh/h/ln	1380	1885	1569	1346	0	1683	1795	1716	1883	1795	1716	1737
Q Serve(g_s), s	26.6	0.4	1.7	1.1	0.0	0.7	14.9	37.5	37.6	3.5	38.0	38.0
Cycle Q Clear(g_c), s	27.3	0.4	1.7	1.5	0.0	0.7	14.9	37.5	37.6	3.5	38.0	38.0
Prop In Lane	1.00		1.00	1.00		0.59	1.00		0.01	1.00		0.38
Lane Grp Cap(c), veh/h	495	591	491	489	0	527	306	1498	822	187	1305	661
V/C Ratio(X)	0.77	0.02	0.08	0.04	0.00	0.03	0.89	0.92	0.92	0.36	1.01	1.02
Avail Cap(c_a), veh/h	548	664	552	541	0	592	341	1517	832	187	1305	661
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.3	23.7	24.1	24.2	0.0	23.8	40.6	26.4	26.4	41.7	31.0	31.0
Incr Delay (d2), s/veh	6.1	0.0	0.1	0.0	0.0	0.0	22.7	10.3	16.6	1.2	26.5	39.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.6	0.2	0.6	0.4	0.0	0.3	8.3	16.5	19.5	1.6	19.6	22.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.4	23.7	24.2	24.2	0.0	23.8	63.3	36.7	43.0	42.8	57.5	70.3
LnGrp LOS	D	C	C	C	A	C	E	D	D	D	F	F
Approach Vol, veh/h		429			38			2398			2052	
Approach Delay, s/veh		37.7			24.1			41.7			61.2	
Approach LOS		D			C			D			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	21.0	43.0		35.9	15.4	48.7		35.9				
Change Period (Y+Rc), s	4.0	5.0		4.6	5.0	* 5		4.6				
Max Green Setting (Gmax), s	19.0	32.2		35.2	7.0	* 44		35.2				
Max Q Clear Time (g_c+I1), s	16.9	40.0		3.5	5.5	39.6		29.3				
Green Ext Time (p_c), s	0.2	0.0		0.1	0.0	4.1		0.8				

Intersection Summary	
HCM 6th Ctrl Delay	49.4
HCM 6th LOS	D

Notes

User approved ignoring U-Turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

2: Broadway /Broadway & Meadow Glen Ave

Intersection	
Intersection Delay, s/veh	43.1
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↱		↰	↑↱		↰	↑	↱
Traffic Vol, veh/h	70	288	108	217	320	45	103	101	203	29	65	82
Future Vol, veh/h	70	288	108	217	320	45	103	101	203	29	65	82
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	75	310	116	233	344	48	111	109	218	31	70	88
Number of Lanes	0	2	0	0	2	0	1	1	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	2	2
HCM Control Delay	28	68.5	35.9	16
HCM LOS	D	F	E	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	33%	0%	58%	0%	100%	0%	0%
Vol Thru, %	0%	33%	67%	57%	42%	78%	0%	100%	0%
Vol Right, %	0%	67%	0%	43%	0%	22%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	103	304	214	252	377	205	29	65	82
LT Vol	103	0	70	0	217	0	29	0	0
Through Vol	0	101	144	144	160	160	0	65	0
RT Vol	0	203	0	108	0	45	0	0	82
Lane Flow Rate	111	327	230	271	405	220	31	70	88
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.305	0.814	0.605	0.678	1.058	0.547	0.095	0.203	0.239
Departure Headway (Hd)	10.352	9.342	9.769	9.289	9.396	8.941	11.413	10.888	10.153
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	349	389	373	393	385	401	316	332	356
Service Time	8.052	7.042	7.469	6.989	7.191	6.735	9.113	8.588	7.853
HCM Lane V/C Ratio	0.318	0.841	0.617	0.69	1.052	0.549	0.098	0.211	0.247
HCM Control Delay	17.5	42.1	26.3	29.4	93.7	22.1	15.3	16.3	16
HCM Lane LOS	C	E	D	D	F	C	C	C	C
HCM 95th-tile Q	1.3	7.3	3.8	4.8	13.7	3.2	0.3	0.7	0.9

3: Magnolia Ave & Meadow Glen Ave

Intersection	
Intersection Delay, s/veh	41.2
Intersection LOS	E

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↱			↰↑
Traffic Vol, veh/h	268	232	370	184	165	194
Future Vol, veh/h	268	232	370	184	165	194
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	291	252	402	200	179	211
Number of Lanes	1	1	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	2
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	2	0
HCM Control Delay	19.7	70.4	25.9
HCM LOS	C	F	D

Lane	NBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	100%	0%	46%
Vol Thru, %	67%	0%	0%	54%
Vol Right, %	33%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	554	268	232	359
LT Vol	0	268	0	165
Through Vol	370	0	0	194
RT Vol	184	0	232	0
Lane Flow Rate	602	291	252	390
Geometry Grp	2	7	7	2
Degree of Util (X)	1.032	0.635	0.464	0.726
Departure Headway (Hd)	6.167	7.986	6.753	6.832
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	590	454	537	535
Service Time	4.167	5.686	4.453	4.832
HCM Lane V/C Ratio	1.02	0.641	0.469	0.729
HCM Control Delay	70.4	23.6	15.2	25.9
HCM Lane LOS	F	C	C	D
HCM 95th-tile Q	16.2	4.3	2.4	6

Cumulative Plus Project Conditions

1: El Camino Real & Meadow Glen Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↱		↰	↑↑↱		↰	↑↑↱	
Traffic Volume (veh/h)	369	17	202	17	13	6	148	1075	11	56	1872	256
Future Volume (veh/h)	369	17	202	17	13	6	148	1075	11	56	1872	256
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.99	0.99		0.98	1.00		0.96	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	388	18	70	18	14	2	156	1132	11	59	1971	250
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	519	610	512	495	521	74	177	1538	15	366	1890	237
Arrive On Green	0.33	0.33	0.33	0.33	0.33	0.33	0.10	0.30	0.30	0.21	0.42	0.42
Sat Flow, veh/h	1359	1856	1557	1287	1583	226	1767	5171	50	1767	4547	569
Grp Volume(v), veh/h	388	18	70	18	0	16	156	739	404	59	1457	764
Grp Sat Flow(s),veh/h/ln	1359	1856	1557	1287	0	1809	1767	1689	1844	1767	1689	1740
Q Serve(g_s), s	24.3	0.6	2.8	0.9	0.0	0.5	7.8	17.7	17.7	2.5	37.4	37.4
Cycle Q Clear(g_c), s	24.9	0.6	2.8	1.5	0.0	0.5	7.8	17.7	17.7	2.5	37.4	37.4
Prop In Lane	1.00		1.00	1.00		0.13	1.00		0.03	1.00		0.33
Lane Grp Cap(c), veh/h	519	610	512	495	0	595	177	1005	549	366	1403	723
V/C Ratio(X)	0.75	0.03	0.14	0.04	0.00	0.03	0.88	0.74	0.74	0.16	1.04	1.06
Avail Cap(c_a), veh/h	570	680	571	544	0	663	177	1388	758	366	1403	723
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.9	20.5	21.2	21.0	0.0	20.4	40.0	28.4	28.4	29.3	26.3	26.3
Incr Delay (d2), s/veh	4.9	0.0	0.1	0.0	0.0	0.0	36.9	4.8	8.5	0.2	34.6	49.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.5	0.3	1.0	0.3	0.0	0.2	5.1	7.5	8.8	1.0	20.5	24.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.8	20.5	21.3	21.0	0.0	20.5	76.8	33.2	37.0	29.5	60.9	75.7
LnGrp LOS	C	C	C	C	A	C	E	C	D	C	F	F
Approach Vol, veh/h		476			34			1299			2280	
Approach Delay, s/veh		31.5			20.7			39.6			65.0	
Approach LOS		C			C			D			E	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	13.0	42.4		34.6	23.6	31.8		34.6
Change Period (Y+Rc), s	4.0	5.0		5.0	5.0	* 5		5.0
Max Green Setting (Gmax), s	9.0	34.0		33.0	6.0	* 37		33.0
Max Q Clear Time (g_c+I1), s	9.8	39.4		3.5	4.5	19.7		26.9
Green Ext Time (p_c), s	0.0	0.0		0.1	0.0	7.0		0.9

Intersection Summary	
HCM 6th Ctrl Delay	52.7
HCM 6th LOS	D

Notes

User approved ignoring U-Turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	35.6
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↑↱			↰↑↑↱			↰↑↱		↰	↑	↱
Traffic Vol, veh/h	114	437	100	110	234	54	49	77	65	71	100	136
Future Vol, veh/h	114	437	100	110	234	54	49	77	65	71	100	136
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	128	491	112	124	263	61	55	87	73	80	112	153
Number of Lanes	0	2	0	0	2	0	0	1	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	3	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	3	2	2
HCM Control Delay	53	26.9	27.4	15.3
HCM LOS	F	D	D	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	26%	34%	0%	48%	0%	100%	0%	0%
Vol Thru, %	40%	66%	69%	52%	68%	0%	100%	0%
Vol Right, %	34%	0%	31%	0%	32%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	191	333	319	227	171	71	100	136
LT Vol	49	114	0	110	0	71	0	0
Through Vol	77	219	219	117	117	0	100	0
RT Vol	65	0	100	0	54	0	0	136
Lane Flow Rate	215	374	358	255	192	80	112	153
Geometry Grp	8	8	8	8	8	7	7	7
Degree of Util (X)	0.605	0.935	0.855	0.688	0.493	0.212	0.282	0.353
Departure Headway (Hd)	10.145	9.006	8.601	9.71	9.229	9.553	9.033	8.306
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	356	403	422	372	390	376	398	432
Service Time	7.917	6.77	6.365	7.478	6.997	7.303	6.784	6.056
HCM Lane V/C Ratio	0.604	0.928	0.848	0.685	0.492	0.213	0.281	0.354
HCM Control Delay	27.4	60.6	45.1	31.5	20.7	14.9	15.3	15.5
HCM Lane LOS	D	F	E	D	C	B	C	C
HCM 95th-tile Q	3.8	10.3	8.4	4.9	2.6	0.8	1.1	1.6

Intersection	
Intersection Delay, s/veh	17.8
Intersection LOS	C

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↱			↰↑
Traffic Vol, veh/h	212	178	141	242	183	203
Future Vol, veh/h	212	178	141	242	183	203
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	230	193	153	263	199	221
Number of Lanes	1	1	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	2
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	2	0
HCM Control Delay	14.2	17.8	21.3
HCM LOS	B	C	C

Lane	NBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	100%	0%	47%
Vol Thru, %	37%	0%	0%	53%
Vol Right, %	63%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	383	212	178	386
LT Vol	0	212	0	183
Through Vol	141	0	0	203
RT Vol	242	0	178	0
Lane Flow Rate	416	230	193	420
Geometry Grp	2	7	7	2
Degree of Util (X)	0.636	0.466	0.325	0.691
Departure Headway (Hd)	5.503	7.28	6.056	5.926
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	654	493	590	608
Service Time	3.569	5.049	3.824	3.991
HCM Lane V/C Ratio	0.636	0.467	0.327	0.691
HCM Control Delay	17.8	16.3	11.7	21.3
HCM Lane LOS	C	C	B	C
HCM 95th-tile Q	4.5	2.4	1.4	5.4

1: El Camino Real & Meadow Glen Ave

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↱		↰	↑↑↱		↰	↑↑↱	
Traffic Volume (veh/h)	354	9	131	19	6	33	249	1908	5	60	1559	249
Future Volume (veh/h)	354	9	131	19	6	33	249	1908	5	60	1559	249
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.99	0.99		0.98	1.00		0.97	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	373	9	43	20	6	11	262	2008	5	63	1641	242
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	484	577	484	480	180	329	295	2251	6	197	1718	252
Arrive On Green	0.31	0.31	0.31	0.31	0.31	0.31	0.17	0.43	0.43	0.11	0.39	0.39
Sat Flow, veh/h	1356	1856	1556	1329	578	1060	1767	5217	13	1767	4447	653
Grp Volume(v), veh/h	373	9	43	20	0	17	262	1300	713	63	1244	639
Grp Sat Flow(s),veh/h/ln	1356	1856	1556	1329	0	1638	1767	1689	1853	1767	1689	1722
Q Serve(g_s), s	26.4	0.3	2.0	1.1	0.0	0.7	14.5	35.6	35.6	3.3	35.8	36.2
Cycle Q Clear(g_c), s	27.1	0.3	2.0	1.4	0.0	0.7	14.5	35.6	35.6	3.3	35.8	36.2
Prop In Lane	1.00		1.00	1.00		0.65	1.00		0.01	1.00		0.38
Lane Grp Cap(c), veh/h	484	577	484	480	0	509	295	1457	799	197	1305	665
V/C Ratio(X)	0.77	0.02	0.09	0.04	0.00	0.03	0.89	0.89	0.89	0.32	0.95	0.96
Avail Cap(c_a), veh/h	540	653	548	535	0	576	336	1493	819	197	1305	665
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.4	23.9	24.4	24.3	0.0	24.0	40.7	26.3	26.3	40.9	29.8	29.9
Incr Delay (d2), s/veh	6.1	0.0	0.1	0.0	0.0	0.0	22.1	8.7	14.4	0.9	16.1	26.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.4	0.2	0.7	0.3	0.0	0.3	8.0	15.1	17.9	1.5	16.6	19.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.5	23.9	24.5	24.4	0.0	24.0	62.9	34.9	40.6	41.8	45.9	56.2
LnGrp LOS	D	C	C	C	A	C	E	C	D	D	D	E
Approach Vol, veh/h		425			37			2275			1946	
Approach Delay, s/veh		37.7			24.2			39.9			49.2	
Approach LOS		D			C			D			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	20.7	43.6		35.7	16.2	48.1		35.7				
Change Period (Y+Rc), s	4.0	5.0		4.6	5.0	* 5		4.6				
Max Green Setting (Gmax), s	19.0	32.2		35.2	7.0	* 44		35.2				
Max Q Clear Time (g_c+I1), s	16.5	38.2		3.4	5.3	37.6		29.1				
Green Ext Time (p_c), s	0.2	0.0		0.1	0.0	5.6		0.8				

Intersection Summary			
HCM 6th Ctrl Delay			43.4
HCM 6th LOS			D

Notes

User approved ignoring U-Turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	83.6
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↑↱			↰↑↑↱			↰↑↱		↰	↑	↱
Traffic Vol, veh/h	70	292	108	217	320	45	106	102	222	40	65	82
Future Vol, veh/h	70	292	108	217	320	45	106	102	222	40	65	82
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	79	328	121	244	360	51	119	115	249	45	73	92
Number of Lanes	0	2	0	0	2	0	0	1	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	3	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	3	2	2
HCM Control Delay	33.4	85	166.1	15.3
HCM LOS	D	F	F	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	25%	32%	0%	58%	0%	100%	0%	0%
Vol Thru, %	24%	68%	57%	42%	78%	0%	100%	0%
Vol Right, %	52%	0%	43%	0%	22%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	430	216	254	377	205	40	65	82
LT Vol	106	70	0	217	0	40	0	0
Through Vol	102	146	146	160	160	0	65	0
RT Vol	222	0	108	0	45	0	0	82
Lane Flow Rate	483	243	285	424	230	45	73	92
Geometry Grp	8	8	8	8	8	7	7	7
Degree of Util (X)	1.261	0.652	0.723	1.121	0.582	0.125	0.193	0.226
Departure Headway (Hd)	9.795	10.633	10.148	10.338	9.875	10.953	10.425	9.686
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	377	342	360	356	369	329	346	373
Service Time	7.495	8.333	7.848	8.038	7.575	8.653	8.125	7.386
HCM Lane V/C Ratio	1.281	0.711	0.792	1.191	0.623	0.137	0.211	0.247
HCM Control Delay	166.1	31.2	35.3	117.4	25.4	15.2	15.6	15.2
HCM Lane LOS	F	D	E	F	D	C	C	C
HCM 95th-tile Q	20.5	4.3	5.4	15	3.5	0.4	0.7	0.9

Intersection	
Intersection Delay, s/veh	41.7
Intersection LOS	E

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↱			↰↑
Traffic Vol, veh/h	269	234	370	185	168	194
Future Vol, veh/h	269	234	370	185	168	194
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	292	254	402	201	183	211
Number of Lanes	1	1	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	2
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	2	0
HCM Control Delay	19.8	71.6	26.4
HCM LOS	C	F	D

Lane	NBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	100%	0%	46%
Vol Thru, %	67%	0%	0%	54%
Vol Right, %	33%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	555	269	234	362
LT Vol	0	269	0	168
Through Vol	370	0	0	194
RT Vol	185	0	234	0
Lane Flow Rate	603	292	254	393
Geometry Grp	2	7	7	2
Degree of Util (X)	1.036	0.639	0.469	0.733
Departure Headway (Hd)	6.183	8.001	6.768	6.848
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	591	453	537	531
Service Time	4.183	5.701	4.468	4.848
HCM Lane V/C Ratio	1.02	0.645	0.473	0.74
HCM Control Delay	71.6	23.8	15.3	26.4
HCM Lane LOS	F	C	C	D
HCM 95th-tile Q	16.4	4.4	2.5	6.1

Cumulative Plus Project Conditions w/ Improvements

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↱			↰↑↱		↰	↑	↱
Traffic Volume (veh/h)	114	437	100	110	234	54	49	77	65	71	100	136
Future Volume (veh/h)	114	437	100	110	234	54	49	77	65	71	100	136
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	0.99		0.99	0.99		0.98	0.99		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	128	491	90	124	263	42	55	87	73	80	112	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	342	1120	199	400	835	141	214	224	152	618	514	
Arrive On Green	0.47	0.47	0.47	0.47	0.47	0.47	0.27	0.27	0.27	0.27	0.27	0.00
Sat Flow, veh/h	398	2368	421	456	1766	299	260	816	553	1218	1870	1585
Grp Volume(v), veh/h	363	0	346	198	0	231	215	0	0	80	112	0
Grp Sat Flow(s),veh/h/ln	1569	0	1618	878	0	1643	1630	0	0	1218	1870	1585
Q Serve(g_s), s	0.7	0.0	4.5	2.3	0.0	2.7	0.2	0.0	0.0	0.0	1.5	0.0
Cycle Q Clear(g_c), s	4.2	0.0	4.5	6.9	0.0	2.7	3.3	0.0	0.0	1.1	1.5	0.0
Prop In Lane	0.35		0.26	0.63		0.18	0.26		0.34	1.00		1.00
Lane Grp Cap(c), veh/h	896	0	765	600	0	777	590	0	0	618	514	
V/C Ratio(X)	0.41	0.00	0.45	0.33	0.00	0.30	0.36	0.00	0.00	0.13	0.22	
Avail Cap(c_a), veh/h	1828	0	1786	1260	0	1814	1495	0	0	1321	1593	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	5.5	0.0	5.6	6.1	0.0	5.1	9.5	0.0	0.0	8.7	8.9	0.0
Incr Delay (d2), s/veh	0.3	0.0	0.4	0.3	0.0	0.2	0.4	0.0	0.0	0.1	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	1.0	0.5	0.0	0.6	1.0	0.0	0.0	0.3	0.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.8	0.0	6.0	6.4	0.0	5.3	9.9	0.0	0.0	8.8	9.1	0.0
LnGrp LOS	A	A	A	A	A	A	A	A	A	A	A	
Approach Vol, veh/h		709			429			215			192	A
Approach Delay, s/veh		5.9			5.8			9.9			9.0	
Approach LOS		A			A			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		12.7		19.0		12.7		19.0				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		27.0		35.0		27.0		35.0				
Max Q Clear Time (g_c+I1), s		5.3		6.5		3.5		8.9				
Green Ext Time (p_c), s		1.3		5.5		0.9		3.4				

Intersection Summary	
HCM 6th Ctrl Delay	6.8
HCM 6th LOS	A

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
2: Broadway /Broadway & Meadow Glen Ave

959 El Camino Real Millbrae
2040 PP Improvement PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↑↱			↰↑↑↱			↰↑↱		↰	↑	↱
Traffic Volume (veh/h)	70	292	108	217	320	45	106	102	222	40	65	82
Future Volume (veh/h)	70	292	108	217	320	45	106	102	222	40	65	82
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	0.99		0.99	0.99		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	79	328	121	244	360	51	119	115	249	45	73	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	227	899	344	445	748	109	197	170	305	413	704	
Arrive On Green	0.48	0.48	0.48	0.48	0.48	0.48	0.38	0.38	0.38	0.38	0.38	0.00
Sat Flow, veh/h	299	1872	717	676	1558	227	309	453	811	1015	1870	1585
Grp Volume(v), veh/h	265	0	263	282	0	373	483	0	0	45	73	0
Grp Sat Flow(s),veh/h/ln	1330	0	1559	803	0	1657	1573	0	0	1015	1870	1585
Q Serve(g_s), s	1.0	0.0	5.9	12.9	0.0	8.4	11.3	0.0	0.0	0.0	1.4	0.0
Cycle Q Clear(g_c), s	9.4	0.0	5.9	18.7	0.0	8.4	15.3	0.0	0.0	2.6	1.4	0.0
Prop In Lane	0.30		0.46	0.87		0.14	0.25		0.52	1.00		1.00
Lane Grp Cap(c), veh/h	722	0	748	506	0	796	672	0	0	413	704	
V/C Ratio(X)	0.37	0.00	0.35	0.56	0.00	0.47	0.72	0.00	0.00	0.11	0.10	
Avail Cap(c_a), veh/h	912	0	951	636	0	1011	867	0	0	541	939	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	9.0	0.0	9.1	14.5	0.0	9.7	15.5	0.0	0.0	11.6	11.3	0.0
Incr Delay (d2), s/veh	0.3	0.0	0.3	1.0	0.0	0.4	2.1	0.0	0.0	0.1	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	1.8	2.8	0.0	2.7	5.2	0.0	0.0	0.4	0.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.3	0.0	9.3	15.4	0.0	10.1	17.5	0.0	0.0	11.8	11.3	0.0
LnGrp LOS	A	A	A	B	A	B	B	A	A	B	B	
Approach Vol, veh/h		528			655			483			118	A
Approach Delay, s/veh		9.3			12.4			17.5			11.5	
Approach LOS		A			B			B			B	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	25.0	30.8	25.0	30.8
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	28.0	34.0	28.0	34.0
Max Q Clear Time (g_c+I1), s	17.3	11.4	4.6	20.7
Green Ext Time (p_c), s	2.6	3.7	0.5	4.1

Intersection Summary	
HCM 6th Ctrl Delay	12.8
HCM 6th LOS	B

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Attachment B: Queueing Summary

Existing and Existing Plus Project Conditions 95th Percentile Queue Summary

Intersection	Movement	Storage[1]	Existing No Project[1]		Existing Plus Project[1]	
			AM	PM	AM	PM
1. Meadow Glen Ave/ El Camino Real	EBL	200	200	**250**	200	**250**
	EBT	200	25	25	25	0
	EBR	200	25	25	50	25
	WBL	100	25	25	25	25
	WBT	175	25	25	25	25
	NBL	250	125	200	125	200
	NBT	900	175	375	175	350
	SBL	100	50	75	50	75
	SBT	825	350	450	350	425
2. Meadow Glen Ave/ Broadway	NBTR	1,375	25	75	N/A	N/A
	NBL	200	0	25	N/A	N/A
	NBTLR	1,375	N/A	N/A	50	250
	EBTL	200	75	50	75	75
	EBTR	200	75	50	75	75
	WBTL	250	50	150	50	175
	WBTR	250	25	50	25	50
	SBL	75	0	0	0	0
	SBT	900	25	25	25	25
	SBR	75	25	25	25	25
3. Meadow Glen Ave/ Magnolia Ave	NBTR	175	50	150	50	150
	WBL	200	25	50	25	50
	WBR	200	25	25	25	25
	SBTL	200	50	75	50	75

Notes:

Bolded text indicates storage is exceeded.

1. Storage and queue lengths are rounded to 25 with the assumption that one vehicle in queue takes up about 25 feet.

Source: Fehr & Peers, December 2021.

Cumulative and Cumulative Plus Project Conditions 95th Percentile Queue Summary

Intersection	Movement	Storage (ft)[1]	Cumulative No Project (ft)[1]		Cumulative Plus Project (ft)[1]	
			AM	PM	AM	PM
1. Meadow Glen Ave/ El Camino Real	EBL	200	**275**	**375**	**350**	**350**
	EBT	200	25	25	25	25
	EBR	200	50	50	50	50
	WBL	100	25	25	25	25
	WBT	175	25	25	25	25
	NBL	250	200	**300**	200	**275**
	NBT	900	225	575	225	500
	SBL	100	75	100	75	100
	SBT	825	675	675	675	625
2. Meadow Glen Ave/ Broadway	NBTR	1,375	N/A	N/A	100	525
	NBL	200	25	25	N/A	N/A
	NBTLR	1,375	50	175	N/A	N/A
	EBTL	200	**250**	100	**250**	100
	EBTR	200	200	125	200	125
	WBTL	250	125	**350**	125	**375**
	WBTR	250	75	75	75	100
	SBL	75	25	0	25	0
	SBT	900	25	25	25	25
	SBR	75	50	25	50	25
3. Meadow Glen Ave/ Magnolia Ave	NBTR	175	125	**400**	125	**400**
	WBL	200	50	100	50	100
	WBR	200	25	50	25	75
	SBTL	200	125	150	125	150

Notes:
Bolded text indicates storage is exceeded.
Underlined text indicates the addition of project traffic increases queues compared to no project conditions.
1. Storage and queue lengths are rounded to 25 with the assumption that one vehicle in queue takes up about 25 feet.
Source: Fehr & Peers, December 2021.

Attachment C: Signal Warrant Analysis Worksheets

Project	959 ECR Millbrae
Scenario	Cumulative No Project
Peak Hour	AM

Major Street	Meadow Glen Ave
Minor Street	Broadway /Broadway

Turn Movement Volumes

	NB	SB	EB	WB
Left	49	67	114	110
Through	77	100	434	234
Right	65	136	100	54
Total	191	303	648	398

Major Street Direction

	North/South
X	East/West

Intersection Geometry

Number of Approach Lanes for Minor Street	1
Total Approaches	4

Worst Case Delay for Minor Street

Stopped Delay (seconds per vehicle)	19.3
Approach with Worst Case Delay	NB
Total Vehicles on Approach	191

Warrant 3A, Peak Hour

	Peak Hour Delay on Minor Approach (vehicle-hours)	**Peak Hour Volume on Minor Approach (vph)**	**Peak Hour Entering Volume Serviced (vph)**
Cumulative No Project	**1**	**303**	**1,540**
Limiting Value	**4**	**100**	**800**
Condition Satisfied?	**Not Met**	**Met**	**Met**
Warrant Met	**NO**		

FEHR & PEERS

			Project	959 ECR Millbrae
Major Street	Meadow Glen Ave		Scenario	Cumulative No Project
Minor Street	Broadway /Broadway		Peak Hour	AM

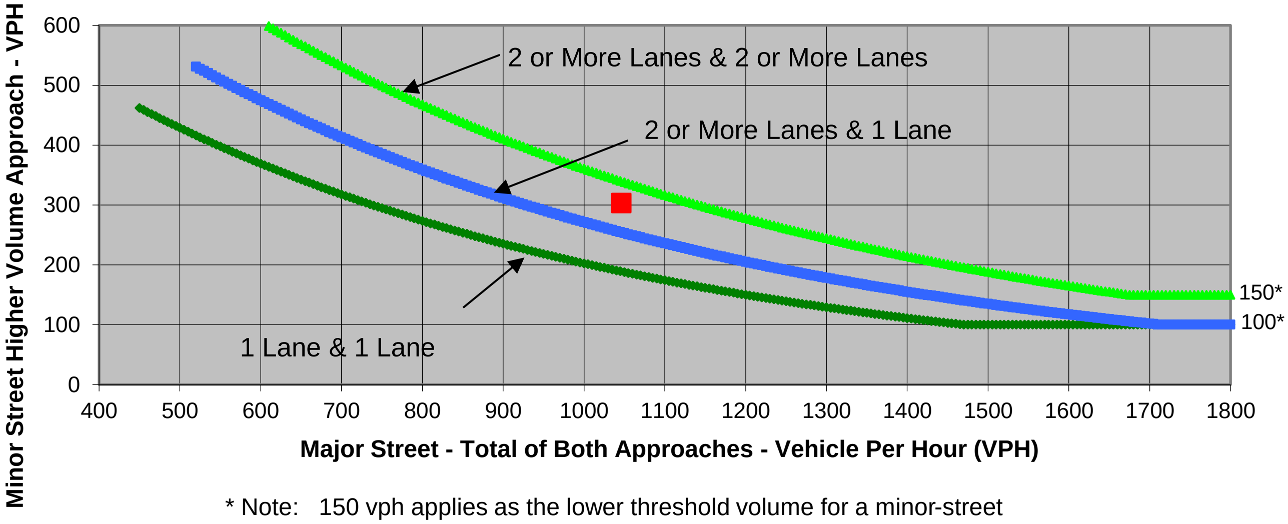
Turn Movement Volumes

	NB	SB	EB	WB
Left	49	67	114	110
Through	77	100	434	234
Right	65	136	100	54
Total	191	303	648	398

Major Street Direction

	North/South
X	East/West

Warrant 3B, Peak Hour



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street Meadow Glen Ave	**Minor Street** Broadway /Broadway	**Warrant Met**
Number of Approach Lanes	**2**	**1**	**YES**
Traffic Volume (VPH) *	**1,046**	**303**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR & PEERS

Project	959 ECR Millbrae
Scenario	Cumulative No Project
Peak Hour	PM

Major Street	Meadow Glen Ave
Minor Street	Broadway /Broadway

Turn Movement Volumes

	NB	SB	EB	WB
Left	103	29	70	217
Through	101	65	288	320
Right	203	82	108	45
Total	407	176	466	582

Major Street Direction

	North/South
X	East/West

Intersection Geometry

Number of Approach Lanes for Minor Street	1
Total Approaches	4

Worst Case Delay for Minor Street

Stopped Delay (seconds per vehicle)	35.9
Approach with Worst Case Delay	NB
Total Vehicles on Approach	407

Warrant 3A, Peak Hour

	Peak Hour Delay on Minor Approach (vehicle-hours)	**Peak Hour Volume on Minor Approach (vph)**	**Peak Hour Entering Volume Serviced (vph)**
Cumulative No Project	**4.1**	**407**	**1,631**
Limiting Value	**4**	**100**	**800**
Condition Satisfied?	**Met**	**Met**	**Met**
Warrant Met	**YES**		

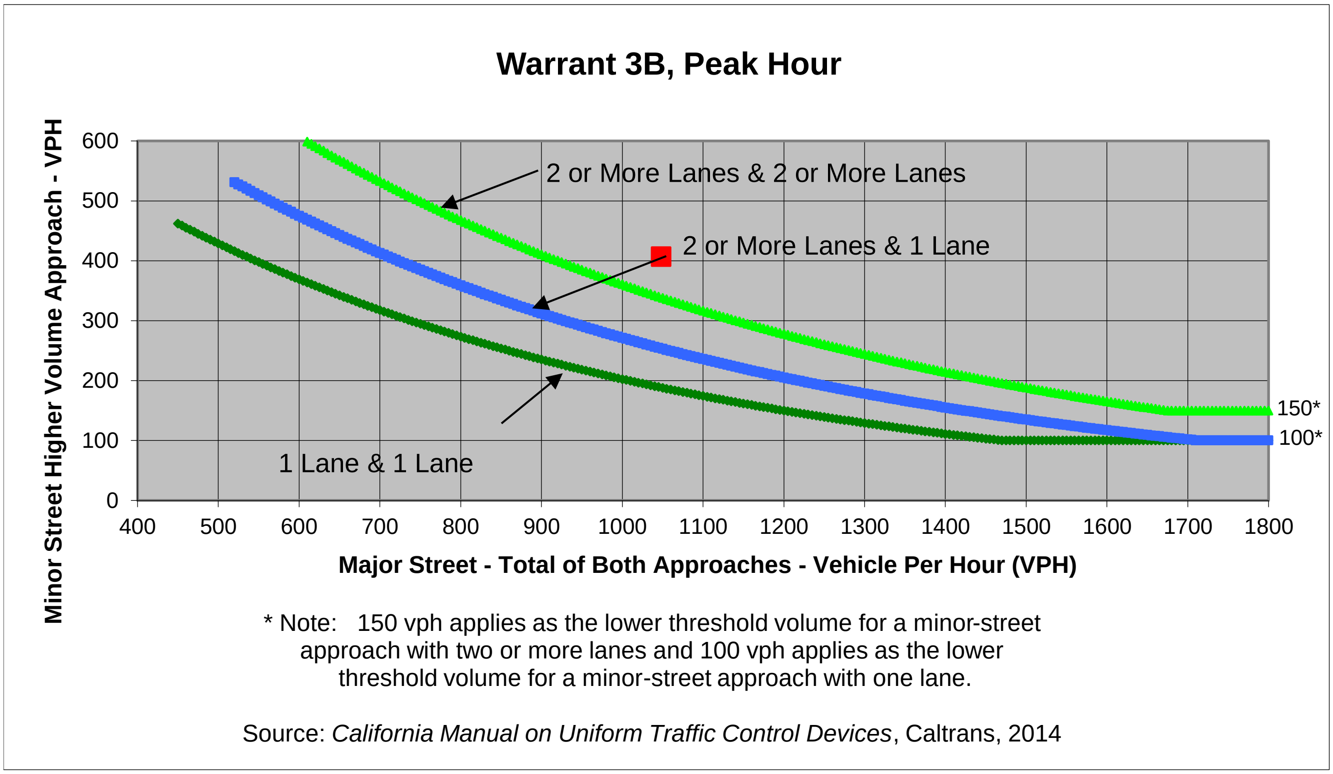
			Project	959 ECR Millbrae
Major Street	Meadow Glen Ave		Scenario	Cumulative No Project
Minor Street	Broadway /Broadway		Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	103	29	70	217
Through	101	65	288	320
Right	203	82	108	45
Total	407	176	466	582

Major Street Direction

	North/South
X	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street Meadow Glen Ave	**Minor Street** Broadway /Broadway	**Warrant Met**
Number of Approach Lanes	**2**	**1**	**YES**
Traffic Volume (VPH) *	**1,048**	**407**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

Project	959 ECR Millbrae
Scenario	Cumulative Plus Project
Peak Hour	AM

Major Street	Meadow Glen Ave
Minor Street	Broadway /Broadway

Turn Movement Volumes

	NB	SB	EB	WB
Left	49	71	114	110
Through	77	100	437	234
Right	65	136	100	54
Total	191	307	651	398

Major Street Direction

	North/South
X	East/West

Intersection Geometry

Number of Approach Lanes for Minor Street	1
Total Approaches	4

Worst Case Delay for Minor Street

Stopped Delay (seconds per vehicle)	27.4
Approach with Worst Case Delay	NB
Total Vehicles on Approach	191

Warrant 3A, Peak Hour

	Peak Hour Delay on Minor Approach (vehicle-hours)	**Peak Hour Volume on Minor Approach (vph)**	**Peak Hour Entering Volume Serviced (vph)**
Cumulative Plus Project	**1.5**	**307**	**1,547**
Limiting Value	**4**	**100**	**800**
Condition Satisfied?	**Not Met**	**Met**	**Met**
Warrant Met	**NO**		

Project 959 ECR Millbrae
Scenario Cumulative Plus Project
Peak Hour AM

Major Street Meadow Glen Ave
Minor Street Broadway /Broadway

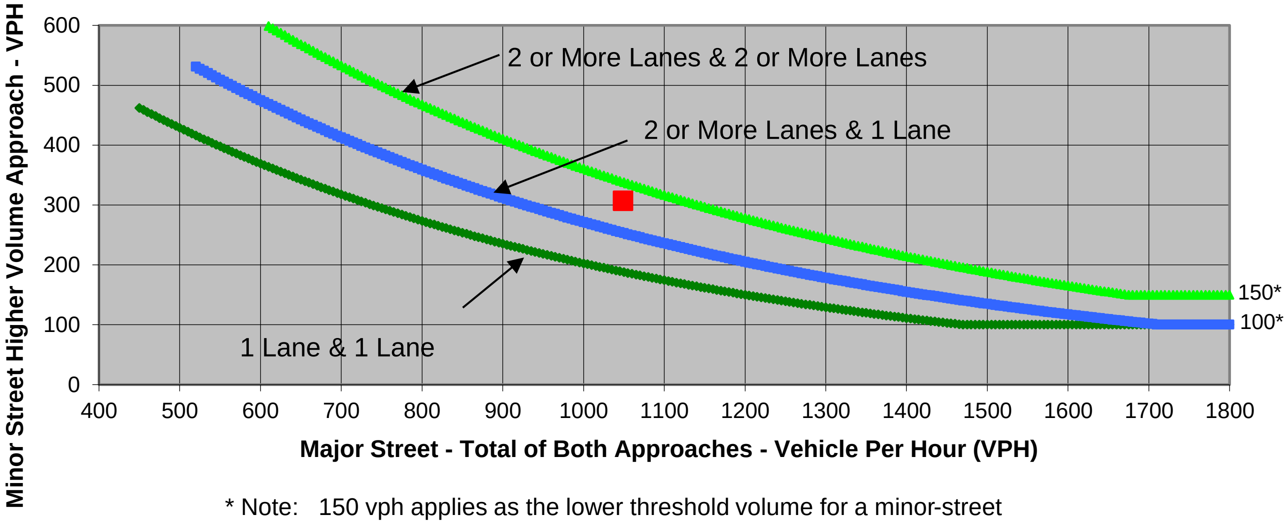
Turn Movement Volumes

	NB	SB	EB	WB
Left	49	71	114	110
Through	77	100	437	234
Right	65	136	100	54
Total	191	307	651	398

Major Street Direction

	North/South
X	East/West

Warrant 3B, Peak Hour



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street Meadow Glen Ave	**Minor Street** Broadway /Broadway	**Warrant Met**
Number of Approach Lanes	**2**	**1**	**YES**
Traffic Volume (VPH) *	**1,049**	**307**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Project	959 ECR Millbrae
Scenario	Cumulative Plus Project
Peak Hour	PM

Major Street	Meadow Glen Ave
Minor Street	Broadway /Broadway

Turn Movement Volumes

	NB	SB	EB	WB
Left	106	40	70	217
Through	102	65	292	320
Right	222	82	108	45
Total	430	187	470	582

Major Street Direction

	North/South
X	East/West

Intersection Geometry

Number of Approach Lanes for Minor Street	1
Total Approaches	4

Worst Case Delay for Minor Street

Stopped Delay (seconds per vehicle)	166.1
Approach with Worst Case Delay	NB
Total Vehicles on Approach	430

Warrant 3A, Peak Hour

	Peak Hour Delay on Minor Approach (vehicle-hours)	Peak Hour Volume on Minor Approach (vph)	Peak Hour Entering Volume Serviced (vph)
Cumulative Plus Project	**19.8**	**430**	**1,669**
Limiting Value	**4**	**100**	**800**
Condition Satisfied?	**Met**	**Met**	**Met**
Warrant Met	**YES**		

FEHR & PEERS

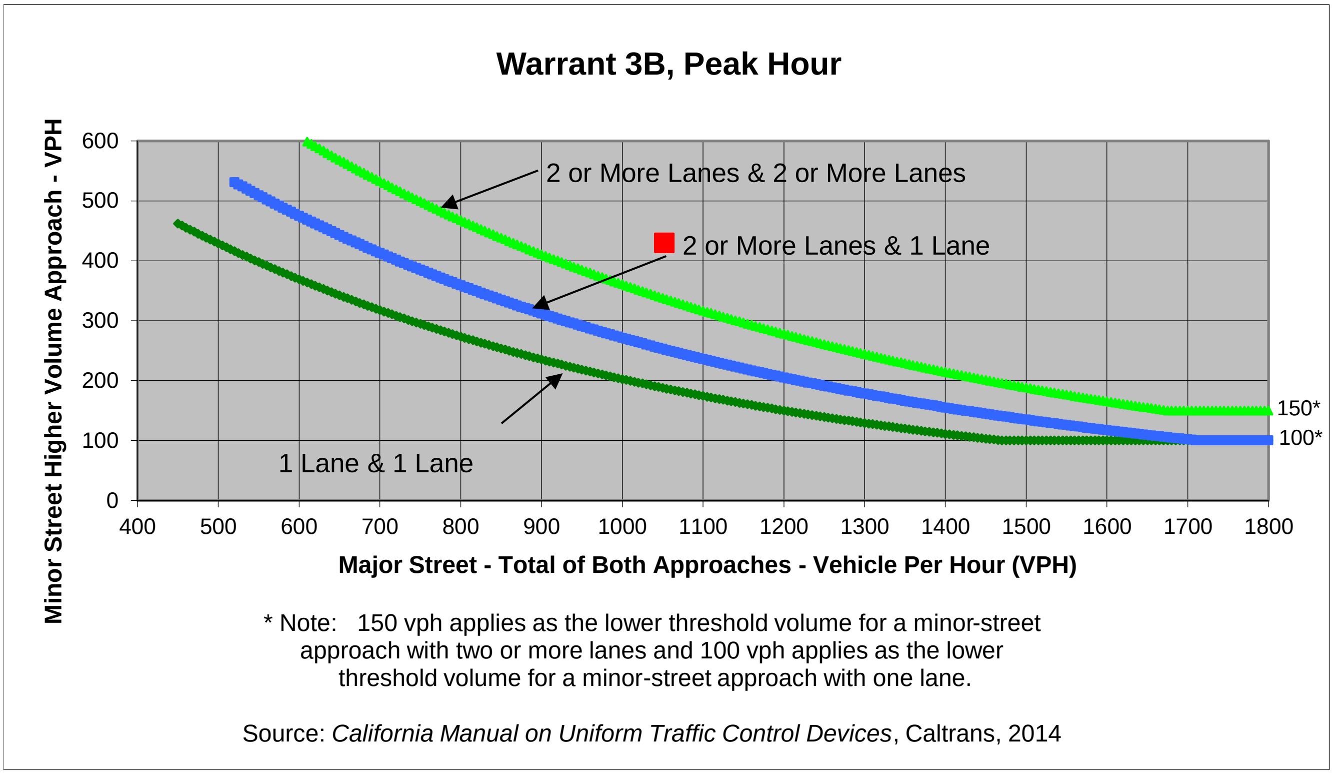
			Project	959 ECR Millbrae
Major Street	Meadow Glen Ave		Scenario	Cumulative Plus Project
Minor Street	Broadway /Broadway		Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	106	40	70	217
Through	102	65	292	320
Right	222	82	108	45
Total	430	187	470	582

Major Street Direction

	North/South
X	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street Meadow Glen Ave	Minor Street Broadway /Broadway	Warrant Met
Number of Approach Lanes	**2**	**1**	**YES**
Traffic Volume (VPH) *	**1,052**	**430**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Appendix C

Noise Technical Report

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NOISE TECHNICAL REPORT
959 EL CAMINO REAL

PREPARED FOR:

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May 23, 2022

ICF. 2022. *Noise Technical Report, 959 El Camino Real Project*. May. (ICF 104073.0.002). Prepared for the City of Millbrae, CA.

Contents

Tables

Figures

Acronyms and Abbreviations

µPa	microPascals
Caltrans	California Department of Transportation
City	City of Millbrae
CNEL	Community Noise Equivalent Level
dB	decibel
dBA	A-weighted decibel
FHWA	Federal Highway Administration
Hz	Hertz
in/s	inch per second
kHz	kilohertz
L_{dn}	day-night sound level
L_{eq}	equivalent sound level
L_{max}	maximum sound level
L_{min}	minimum sound level
LT	long-term
L_V	vibration velocity level
L_{xx}	percentile-exceeded sound level
PPV	peak particle velocity
proposed project or Project	959 El Camino Real Project
rms	root-mean-square
SLM	sound level meter
SPL	sound pressure level
ST	short-term

Chapter 1
Introduction

The purpose of this Noise Technical Report is to identify noise or vibration impacts that may be associated with the proposed 959 El Camino Real Project (proposed project or Project), to be developed in the City of Millbrae (refer to Figure 1 for the project location). The analysis provided in this report evaluates the potential for short- and long-term noise and vibration impacts associated with the construction and operation of the proposed project. The analysis includes a description of the environmental setting for the proposed project, including existing noise conditions, and applicable laws and regulations. It also documents the assumptions, methodologies, and findings used to evaluate the impacts.

1.1 Project Description

The proposed project is a mixed-use development located at 959 El Camino Real in the City of Millbrae, California (Site) (Assessor's Parcel Number No. 021-364-080). The Site is bounded by El Camino Real, Meadow Glen Avenue, Broadway, and the Millbrae Square Shopping Center's surface parking lot. The Project Sponsor, High Street Residential, has applied for the proposal under Senate Bill (SB) 330 and also seeks a density bonus and concession/incentive/waivers pursuant to State Density Bonus Law (Government Code Sections 65915 et. seq.) (SDBL). The existing 31,741-square foot vacant, single-story commercial building and surface parking lot (formerly Office Depot) on the Site would be demolished to facilitate the construction of a six-story building with two levels of below-grade parking. The Project would include 278 dwelling units with a mix of studios, one-bedroom, two-bedrooms, and three-bedrooms.

The Project would provide a total of 25,673 square feet (sf) of private and common open spaces. Common open spaces would include 17,729 sf of ground-floor covered and uncovered open spaces.[1] In addition, the Project would provide 7,944 sf of private open space through covered and uncovered private residential balconies. The Project also includes 17,210 sf of commercial space. The Project provides a total of 349 vehicle parking spaces and 68 bicycle parking spaces.

The Site is located in the City of Millbrae's (City) Commercial "C" Zoning District, which has a height limit of 40 feet, 100 percent lot coverage, and no Floor Area Ratio (FAR) limit. The Project would provide 9 percent low-income units (13% of the base allowable units would be allocated to Very Low-Income not exceeding 50% of Area Median Income), and thereby qualifies for a 20 percent density increase and one incentive/concession. The density bonus with concessions/waivers would result in an 83'-10" tall building.

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[1] Ground floor covered and uncovered open spaces include entryways, courtyards, and seating areas along both the residential and commercial uses.

\\PDCCITRDSGIS1\Projects 1\City of Milbrae\042521 959 El Camino Real\Figures\Project Location 20211001.mxd; User: 50860; Date: 10/4/2021

Figure 1
959 El Camino Real - Project Location Map

1.2 Project Location and Site Description

The area surrounding the Site is developed with commercial and residential uses. To the southeast of the Site, there is the Millbrae BART and Caltrain station approximately 0.57 mile away. The train tracks run in the same direction as El Camino Real and are approximately 900 feet from the Site. The San Francisco International Airport (SFO) is 0.45 mile northeast of the Site, with the nearest runway 0.7 mile away.

The Site is approximately 83,000 sf and is currently occupied by a vacant 31,741-sf, single-story commercial building and surface parking lot (formerly Office Depot). The existing structure would be demolished to construct the Project.

Chapter 2
Noise Fundamentals

Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a liquid or gaseous medium (e.g., air) to a hearing organ, such as a human ear. Noise is often defined as sound that is objectionable because it is unwanted, disturbing, or annoying.

In the science of acoustics, the fundamental model consists of a sound (or noise) source, a receptor, and the propagation path between the two. The loudness of the noise source and the obstructions or atmospheric factors, which affect the propagation path to the receptor, determine the sound level and the characteristics of the noise perceived by the receptor.

The following sections provide an explanation of key concepts and acoustical terms used in the analysis of environmental and community noise.

2.1 Frequency, Amplitude, and Decibels

Continuous sound can be described by its *frequency* (pitch) and *amplitude* (loudness). A low-frequency sound is perceived as low in pitch; a high-frequency sound is perceived as high-pitched. Frequency is expressed in terms of cycles per second, or Hertz (Hz) (e.g., a frequency of 250 cycles per second is referred to as 250 Hz). High frequencies are sometimes more conveniently expressed in kilohertz (kHz), or thousands of Hz. The audible frequency range for humans is generally between 20 Hz and 20,000 Hz.

The amplitude of pressure waves generated by a sound source correlates with the loudness of that source. The amplitude of a sound is typically described in terms of *sound pressure level* (SPL), also referred to simply as the sound level. The SPL refers to the root-mean-square (rms)[2] pressure of a sound wave and is measured in units called microPascals (μPa). One μPa is approximately one hundred-billionth (0.00000000001) of normal atmospheric pressure. Sound pressure amplitudes for different kinds of noise environments can range from less than 100 to over 100,000,000 μPa. Because of this large range of values, sound is rarely expressed in terms of μPa. Instead, a logarithmic scale is used to describe the SPL in terms of decibels (dB). The decibel is a logarithmic unit that describes the ratio of the actual sound pressure to a reference pressure (20 μPa is the standard reference pressure level for acoustical measurements in air). Specifically, an SPL, in dB, is calculated as follows:

$$SPL = 20 \times \log_{10}\left(\frac{X}{20\mu Pa}\right)$$

where X is the actual sound pressure and 20 μPa is the reference pressure. The threshold of hearing for young people is about 0 dB, which corresponds to 20 μPa.

---

[2] *Root-mean-square* (rms) is defined as the square root of the mean (average) value of the squared amplitude of the noise signal.

2.1.1 Decibel Calculations

Because decibels represent noise levels using a logarithmic scale, SPLs cannot be added, subtracted, or averaged through ordinary arithmetic. On the dB scale, a doubling of sound energy corresponds to a 3-dB increase. In other words, when two identical sources are each producing sound of the same loudness, their combined sound level at a given distance would be 3 dB higher than one source under the same conditions. For example, if one bulldozer produces an SPL of 80 dB, two bulldozers would not produce a combined sound level of 160 dB. Rather, they would combine to produce 83 dB. The cumulative sound level of any number of sources, such as excavators, can be determined using decibel addition. The same decibel addition is used for A-weighted decibels described in Section 2.1.2, *A-Weighting*.

Similarly, the arithmetic mean (average) of a series of noise levels does not accurately represent the overall average noise level. Instead, the values must be averaged using a linear scale before converting the result back into a logarithmic (dB) noise level. This method is typically referred to as calculating the "energy average" of the noise levels. Table 2-1 demonstrates the general results of adding noise from multiple sources, noting that the examples summarized in this table are rounded to the nearest whole number.

Table 2-1. Rules for Combining Sound Levels by Decibel Addition

When two decibel values differ by…	…add the following amount to the higher decibel value	Example
0 to 1 dB	3 dB	60 dB + 61 dB = 64 dB
2 to 3 dB	2 dB	60 dB + 63 dB = 65 dB
4 to 9 dB	1 dB	60 dB + 69 dB = 70 dB
10 dB or more	0 dB	60 dB + 75 dB = 75 dB

Source: California Department of Transportation. 2013. *Technical Noise Supplement to the Traffic Noise Analysis Protocol*. September. Available: https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tens-sep2013-a11y.pdf. Accessed December 20, 2021.
dB = decibels.

2.1.2 A-Weighting

The dB scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Although the intensity (energy per unit area) of the sound is a purely physical quantity, the loudness or human response is determined by characteristics of the human ear.

Human hearing is limited in the range of audible frequencies as well as in the way it perceives the SPL in that range. In general, people are most sensitive to the frequency range of 1,000 to 5,000 Hz and perceive sounds within that range better than sounds of the same amplitude at higher or lower frequencies. To approximate the response of the human ear, sound levels of individual frequency bands are weighted (i.e., adjusted), depending on human sensitivity to those frequencies. The resulting SPL is expressed in A-weighted decibels (dBA).

The A-weighting scale approximates the frequency response of the average young ear when listening to most ordinary sounds. When people make judgments regarding the relative loudness or annoyance of a sound, their judgments correlate well with the A-weighted sound levels of those sounds. Table 2-2 describes typical A-weighted sound levels for various noise sources.

Table 2-2. Typical A-Weighted Sound Levels

Common Outdoor Noise Source	Sound Level (dBA)	Common Indoor Noise Source
	— 110 —	Rock band
Jet flying at 1,000 feet		
	— 100 —	
Gas lawn mower at 3 feet		
	— 90 —	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	— 80 —	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower at 100 feet	— 70 —	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	— 60 —	
		Large business office
Quiet urban daytime	— 50 —	Dishwasher in next room
Quiet urban nighttime	— 40 —	Theater, large conference room (background)
Quiet suburban nighttime		
	— 30 —	Library
Quiet rural nighttime		Bedroom at night
	— 20 —	
		Broadcast/recording studio
	— 10 —	
Lowest threshold of human hearing	— 0 —	Lowest threshold of human hearing

Source: California Department of Transportation. 2013. *Technical Noise Supplement to the Traffic Noise Analysis Protocol.* September. Available: https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tens-sep2013-a11y.pdf. Accessed December 20, 2021.
dBA = A=weighted decibels.

2.2 Noise Descriptors

Because sound levels can vary markedly over a short period of time, various descriptors or noise metrics have been developed to quantify environmental and community noise. These metrics generally describe either the average character of the noise or the statistical behavior of the variations in the noise level. Some of the most common metrics used to describe environmental noise, including those metrics used in this report, are described below.

- **Equivalent Sound Level (L_{eq})** is the most common metric used to describe short-term average noise levels. Many noise sources produce levels that fluctuate over time; examples include mechanical equipment that cycles on and off or construction work, which can vary sporadically. The L_{eq} describes the average acoustical energy content of noise for an identified period of time, commonly 1 hour. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustical energy over the duration of the exposure. For many noise sources, the L_{eq} will vary depending on the time of day. A prime example is traffic noise, which rises and falls depending on the amount of traffic on a given street or freeway.

- **Maximum Sound Level (L_{max})** and **Minimum Sound Level (L_{min})** refer to the maximum and minimum sound levels, respectively, that occur during the noise measurement period. More specifically, they describe the rms sound levels that correspond to the loudest and quietest 1-second intervals that occur during the measurement.
- **Percentile-Exceeded Sound Level (L_{xx})** describes the sound level exceeded for a given percentage of a specified period. For example, the L_{50} is the sound level exceeded 50 percent of the time (such as 30 minutes per hour), and L_{25} is the sound level exceeded 25 percent of the time (such as 15 minutes per hour).
- **Community Noise Equivalent Level (CNEL)** is a measure of the 24-hour average A-weighted noise level that is also time-weighted to “penalize” noise that occurs during the evening and nighttime hours when noise is generally recognized to be more disturbing (because people are trying to rest, relax, and sleep during these times). 5 dBA is added to the L_{eq} during the evening hours of 7 p.m. to 10 p.m.; 10 dBA is added to the L_{eq} during the nighttime hours of 10 p.m. to 7 a.m.; and the energy average is then taken for the whole 24-hour day.
- **Day-Night Sound Level (L_{dn})** is very similar to the CNEL described above. L_{dn} is also a time-weighted average of the 24-hour A-weighted noise level. The only difference is that no “penalty” is applied to the evening hours of 7 p.m. to 10 p.m. 10 dBA is added to the L_{eq} during the nighttime hours of 10 p.m. to 7 a.m., and the energy average is then taken for the whole 24-hour day.

It is noted that various federal, state, and local agencies have adopted CNEL or L_{dn} as the measure of community noise. While not identical, CNEL and L_{dn} are normally within 1 dBA of each other when measured in typical community environments, and many noise standards/regulations use the two interchangeably.

2.3 Sound Propagation

When sound propagates over a distance, it changes in both level and frequency content. The manner in which noise is reduced with distance depends on the following important factors (described below). In general, noise attenuates (decreases) with distance. Roadway noise sources tend to be arranged linearly. Therefore, noise from roadway vehicular traffic attenuates at a rate of approximately 3.0 to 4.5 dB per doubling of distance from the source, depending on the intervening surface (paved or vegetated, respectively).[3] Point sources of noise, such as stationary equipment or construction equipment, typically attenuate at a rate of approximately 6.0 to 7.5 dB per doubling of distance from the source.[4] For example, a sound level of 80 dBA at 50 feet from the noise source will

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[3] Ibid.

[4] The 1.5 dB variation in attenuation rate (6 dB versus 7.5 dB) can result from ground-absorption effects, which occur as sound travels over soft surfaces such as earth or vegetation (7.5 dB attenuation rate) versus hard surfaces such as pavement or hard-packed earth (6 dB rate).

be reduced to 74 dBA at 100 feet, 68 dBA at 200 feet, and so on. Noise levels can also be attenuated by shielding the noise source or providing a barrier between the source and the receptor.

- **Geometric Spreading.** Sound from a single source (i.e., a point source) radiates uniformly outward as it travels away from the source in a spherical pattern. The sound level attenuates (or drops off) at a general rate of 6 dBA for each doubling of distance. Highway noise is not a single stationary point source of sound. The movement of vehicles on a highway makes the source of the sound appear to emanate from a line (i.e., a line source) rather than from a point. This results in cylindrical spreading rather than the spherical spreading resulting from a point source. The change in sound level (i.e., attenuation or decrease) from a line source is generally 3 dBA per doubling of distance.

- **Ground Absorption.** The noise path between the source and the observer is usually close to the ground. The excess noise attenuation from ground absorption occurs due to acoustic energy losses on sound wave reflection. For acoustically hard sites (i.e., sites with a reflective surface, such as a parking lot or a smooth body of water, between the source and the receptor), no excess ground attenuation is assumed because the sound wave is reflected without energy losses. For acoustically absorptive or soft sites (i.e., sites with an absorptive ground surface, such as soft dirt, grass, or scattered bushes and trees), an excess ground attenuation value of 1.5 dBA per doubling of distance is normally assumed. When added to the geometric spreading, the excess ground attenuation results in an overall drop-off rate of 4.5 dBA per doubling of distance for a line source and 7.5 dBA per doubling of distance for a point source.

- **Atmospheric Effects.** Research by the California Department of Transportation (Caltrans) and others has shown that atmospheric conditions can have a major effect on noise levels. Factors include wind, air temperature (including vertical temperature gradients), humidity, and turbulence. Receptors downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas receptors upwind can have lower noise levels. Increased sound levels can also occur over relatively large distances because of temperature inversion conditions (i.e., increasing temperature with elevation).

- **Shielding by Natural or Human-Made Features.** A large object or barrier in the path between a noise source and a receptor can substantially attenuate noise levels at the receptor. The amount of attenuation provided by this shielding depends on the size of the object, proximity to the noise source and receptor, surface weight, solidity, and the frequency content of the noise source. Natural terrain features (such as hills and dense woods) and human-made features (such as buildings and walls) can substantially reduce noise levels. Walls are often constructed between a source and a receptor with the specific purpose of reducing noise. In addition to the noise that diffracts over the top of a barrier, noise will also diffract around the ends of the barrier leading to “flanking” noise that can reduce the overall efficacy of the barrier. Assuming it is long enough to minimize the effects of flanking noise, a barrier that breaks the line of sight between a source and a receptor will typically result in at least 5 dB of noise reduction. A higher barrier may provide as much as 20 dB of noise reduction.

2.4 Human Response to Noise

Noise can have a range of effects on people including hearing damage, sleep interference, speech interference, performance interference, physiological responses, and annoyance. Each of these is briefly described below.

- **Hearing Damage.** A person exposed to high noise levels can suffer either gradual or traumatic hearing damage. Gradual hearing loss occurs with repeated exposure to excessive noise levels and is most commonly associated with occupational noise exposures in heavy industry or other very noisy work environments. Traumatic hearing loss is caused by sudden exposure to an extremely high noise level, such as a gunshot or explosion at very close range. The potential for noise-induced hearing loss is not generally a concern in typical community noise environments. Noise levels in neighborhoods, even in very noisy airport environs, are not sufficiently loud as to cause hearing loss.

- **Sleep Interference.** Exposure to excessive noise levels at night has been shown to cause sleep disturbance. Sleep disturbance refers not only to awakening from sleep, but also to effects on the quality of sleep such as altering the pattern and stages of sleep. World Health Organization guidelines recommend noise limits of 30 dBA L_{eq} (8-hour average) for continuous noise and 45 dBA L_{max} for single sound events inside bedrooms at night to minimize sleep disturbance (World Health Organization 1999).

- **Speech Interference.** Speech interference can be a problem in any situation where clear communication is desired but is often of particular concern in learning environments (such as schools) or situations where poor communication could jeopardize safety. Normal conversational speech inside homes is typically in the range of 50 to 65 dBA (EPA 1977) and any noise in this range or louder may interfere with speech. As background noise levels rise, the intelligibility of speech decreases and the listener will fail to recognize an increasing percentage of the words spoken. A speaker may raise his or her voice in an attempt to compensate for higher background noise levels, but this in turn can lead to vocal fatigue for the speaker.

- **Performance Interference.** Excessive noise has been found to have various detrimental effects on human performance, including information processing, concentration, accuracy, reaction times, and academic performance. Intrusive noise from individual events can also cause distraction. These effects are of obvious concern for learning and work environments.

- **Physiological Responses.** Acute noise has been shown to cause measurable physiological responses in humans, including changes in stress hormone levels, pulse rate, and blood pressure. The extent to which these responses cause harm or are signs of harm is not clearly defined, but it has been postulated that they could contribute to stress-related diseases, such as hypertension, anxiety, and heart disease. However, research indicates links between environmental noise and permanent health effects are generally weak and inconsistent. Statistically significant health risks have been found for extended exposure to very high noise levels, such as for workers exposed to high levels of industrial noise for 5 to 30 years (World Health Organization 1999).

- **Annoyance.** The subjective effects of annoyance, nuisance, and dissatisfaction are possibly the most difficult to quantify, and no accurate method exists to measure these effects. This difficulty arises primarily from differences in individual sensitivity and habituation to sound, which can vary widely from person to person. What one person considers tolerable can be unbearable to another of equal hearing acuity. An important tool in estimating the likelihood of annoyance due to a new sound is by comparing it to the existing baseline or "ambient" environment to which that person has adapted. In general, the more the level or tonal (frequency) variations of a sound exceed the previously existing ambient sound level or tonal quality, the less acceptable the new sound will be.

In most cases, effects from sounds typically found in the natural environment would be limited to annoyance or interference. Physiological effects and hearing loss would be more commonly associated with human-made noise, such as in an industrial or occupational setting.

Studies have shown that under controlled conditions in an acoustics laboratory, a healthy human ear is able to discern changes in sound levels of 1 dBA. In the normal environment, the healthy human ear can detect changes of about 2 dBA; however, it is widely accepted that a doubling of sound energy, which results in a change of 3 dBA in the normal environment, is considered just noticeable to most people. A change of 5 dBA is readily perceptible, and a change of 10 dBA is perceived as being twice as loud. Accordingly, a doubling of sound energy (e.g., doubling the volume of traffic on a highway) resulting in a 3-dBA increase in sound would generally be barely detectable.

2.5 Noise-Sensitive Land Uses

Noise-sensitive land uses are the locations most likely to be adversely affected by excessive noise levels, as well as places where quiet is an essential element of their intended purpose. As defined in the *City of Millbrae General Plan* (General Plan), examples of sensitive interior spaces include, but are not limited to, residences, schools, hospitals, libraries, churches, and convalescent homes. (City of Millbrae 1998). In the Project area, there are single-family residences located approximately 930 feet south of the Site and west of El Camino Real. There are also single-family homes located 150 feet east of the Site (and east of El Camino Real). Multi-family housing buildings are also present in the area, the closest of which are located approximately 250 feet west of the Site on Magnolia Avenue. Saint Dunstan school, a private grade school, is located approximately 950 feet northwest of the Site.

Chapter 3
Groundborne Vibration Fundamentals

This section describes basic concepts related to groundborne vibration. Groundborne vibration is a small, rapidly fluctuating motion transmitted through the ground. The effects of groundborne vibrations are typically limited to causing nuisance or annoyance to people, but at extreme vibration levels damage to buildings may also occur.

In contrast to airborne sound, groundborne vibration is not a phenomenon that most people experience every day. The ambient groundborne vibration level in residential areas is usually much lower than the threshold of human perception. Most perceptible indoor vibration is caused by sources within buildings, such as mechanical equipment while in operation, people moving, or doors slamming. Typical outdoor sources of perceptible groundborne vibration are heavy construction activity (such as blasting, pile driving, or earthmoving), steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the groundborne vibration from traffic is rarely perceptible, even in locations close to major roads. The strength of groundborne vibration from typical environmental sources diminishes (or attenuates) fairly rapidly over distance.

For the prediction of groundborne vibration, the fundamental model consists of a vibration source, a receptor, and the propagation path between the two. The power of the vibration source and the characteristics and geology of the intervening ground, which affect the propagation path to the receptor, determine the groundborne vibration level and the characteristics of the vibration perceived by the receptor.

The following sections provide an explanation of key concepts and terms used in the analysis of environmental groundborne vibration.

3.1 Displacement, Velocity, and Acceleration

When a vibration source (blasting, dynamic construction equipment, train, etc.) impacts the ground, it imparts energy to the ground, creating vibration waves that propagate away from the source along the surface and downward into the earth. As vibration waves travel outward from a source, they excite the particles of rock and soil through which they pass and cause them to oscillate. The distance that these particles move is referred to as the *displacement* and is typically very small, usually only a few ten-thousandths to a few thousandths of an inch. *Velocity* describes the instantaneous speed of the motion of the particles, and *acceleration* is the instantaneous rate of change of the speed. Each of these measures can be further described in terms of *frequency* and *amplitude*, as discussed in Section 3.2, *Frequency and Amplitude*.

Although displacement is generally easier to understand than velocity or acceleration, it is rarely used to describe groundborne vibration because most transducers used to measure vibration directly measure velocity or acceleration, not displacement.

3.2 Frequency and Amplitude

The frequency of a vibrating object describes how rapidly it is oscillating. The unit of measurement for the frequency of vibration is Hz (the same as used in the measurement of noise), which describes the number of cycles per second.

The amplitude of displacement describes the distance that a particle moves from its resting (or equilibrium) position as it oscillates and can be measured in inches. The amplitude of vibration velocity (the speed of the movement) can be measured in inches per second (in/sec). The amplitude of vibration acceleration (the rate of change of the speed) can be measured in in/sec per second.

3.3 Vibration Descriptors

There are various ways to quantify groundborne vibration based on its fundamental characteristics. Because vibration can vary markedly over a short period of time, various descriptors have been developed to quantify vibration. The two most common descriptors used in the analysis of groundborne vibration are *peak particle velocity* and *vibration velocity level*, each of which are described below.

- **Peak Particle Velocity (PPV)** is defined as the maximum instantaneous positive or negative peak amplitude of the vibration velocity. The unit of measurement for PPV is in/s. Unlike many quantities used in the study of environmental acoustics, PPV is typically presented using linear values and does not employ a dB scale. Because it is related to the stresses that are experienced by buildings, PPV is generally accepted as the most appropriate descriptor for evaluating the potential for building damage (both Federal Transit Administration[5] and Caltrans guidelines[6] recommend using PPV for this purpose). It is also used in many instances to evaluate the human response to groundborne vibration (Caltrans guidelines recommend using PPV for this purpose).
- **Vibration Velocity Level (L_V)** describes the rms vibration velocity. Due to the typically small amplitudes of groundborne vibrations, vibration velocity is often expressed in decibels, calculated as follows.

  $$L_V = 20 \times \log_{10}\left(\frac{V}{V_{ref}}\right)$$

  where V is the actual rms velocity amplitude and V_{ref} is the reference velocity amplitude. It is important to note that there is no universally accepted value for V_{ref}, but the accepted reference quantity for vibration velocity in the U.S. is 1 micro-inch per second (1×10^{-6} in/s). The abbreviation VdB is commonly used for vibration decibels to distinguish from noise level

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[5] Federal Transit Administration. *Transit Noise and Vibration Impact Assessment.* FTA Report No. 0123, 2018. Available: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf. Accessed: December 20, 2021.

[6] California Department of Transportation. 2020. *Transportation and Construction Vibration Guidance Manual*. April. Available: https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tcvgm-apr2020-a11y.pdf. Accessed: December 20, 2021.

decibels. L_V is often used to evaluate human response to vibration levels (Federal Transit Administration guidelines[7] recommend using L_V for this purpose).

3.4 Vibration Propagation

Vibration energy spreads out as it travels through the ground, causing the vibration level to diminish with distance away from the source. High-frequency vibrations reduce much more rapidly than low frequencies so that low frequencies tend to dominate the spectrum at large distances from the source. The propagation of groundborne vibration is not as simple to model as airborne noise. This is because noise in the air travels through a relatively uniform medium while groundborne vibrations travel through the earth, which may contain significant geological differences. Geological factors that influence the propagation of groundborne vibration include the following.

- **Soil conditions.** The type of soil is known to have a strong influence on the levels of groundborne vibration. Among the most important factors are the stiffness and internal damping of the soil. Hard, dense, and compacted soil; stiff clay soil; and hard rock transmit vibration more efficiently than loose, soft soils; sand; or gravel.
- **Depth to bedrock.** Shallow depth to bedrock has been linked to efficient propagation of groundborne vibration. One possibility is that shallow bedrock acts to concentrate the vibration energy near the surface, reflecting vibration waves back toward the surface that would otherwise continue to propagate farther down into the earth.
- **Soil strata.** Discontinuities in the soil strata (i.e., soil layering) can also cause diffractions or channeling effects that affect the propagation of vibration over long distances.
- **Frost conditions.** Vibration waves typically propagate more efficiently in frozen soils than in unfrozen soils. Propagation also varies depending on the depth of the frost.
- **Water conditions.** The amount of water in the soil can affect vibration propagation. The depth of the water table in the path of the propagation also appears to have substantial effects on groundborne vibration levels.

Specific conditions at the source and receiver locations can also affect the vibration levels. For instance, how the source is connected to the ground (e.g., direct contact, through rails, or via a structure) will affect the amount of energy transmitted into the ground. There are also notable differences when the source is underground (such as in a tunnel) versus on the surface. At the receiver, vibration levels can be affected by variables such as the foundation type, building construction, and acoustical absorption inside the rooms where people are located. When vibration encounters a building, a ground-to-foundation coupling loss will usually reduce the overall vibration level. However, under certain circumstances, the ground-to-foundation coupling may also amplify the vibration level due to structural resonances of the floors and walls.

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[7] Federal Transit Administration. *Transit Noise and Vibration Impact Assessment.* FTA Report No. 0123, 2018. Available: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf. Accessed: December 20, 2021.

3.5 Effects of Groundborne Vibration

Vibration can result in effects that range from annoyance to structural damage. Annoyance or disturbance of people may occur at vibration levels substantially below those that would pose a risk of damage to buildings. Each of these effects is discussed below.

3.5.1 Potential Building Damage

When groundborne vibration encounters a building, vibrational energy is transmitted to the structure, causing it to vibrate. If the vibration levels are high enough, damage to the building may occur. Depending on the type of building and the vibration levels, this damage could range from cosmetic architectural damage (e.g., cracked plaster, stucco, or tile) to more severe structural damage (e.g., cracking of floor slabs, foundations, columns, beams, or wells). Buildings can typically withstand higher levels of vibration from transient sources than from continuous or frequent intermittent sources. Transient sources are those that create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers (impact or vibratory), crack-and-seat equipment, and vibratory compaction equipment. Older, fragile buildings (which may include important historic buildings) are of particular concern. Modern commercial and industrial buildings can generally withstand much higher vibration levels before potential damage occurs.

3.5.2 Human Disturbance or Annoyance

Groundborne vibration can be annoying to people and can cause serious concern for nearby neighbors of vibration sources, even when vibration is well below levels that could cause physical damage to structures. Groundborne vibration is almost exclusively a concern inside buildings and is rarely perceived as a problem outdoors, where the motion may be discernible but there is less adverse reaction without the effects associated with the shaking of a building. The normal frequency range of most groundborne vibration that can be felt generally starts from a low frequency of less than 1 Hz to a high of about 200 Hz.

When groundborne vibration waves encounter a building, vibrational energy is transmitted to the building foundation and then propagates throughout the remainder of the structure, causing building surfaces (walls, floors, and ceilings) to vibrate. This movement may be felt directly by building occupants and may also generate a low-frequency rumbling noise as sound waves are radiated by the vibrating surfaces. At higher frequencies, building vibration can cause other audible effects, such as rattling of windows, building fixtures, or items on shelves or hanging on walls. These audible effects due to groundborne vibration are referred to as groundborne noise. Groundborne vibration levels that result in groundborne noise are often experienced as a combination of perceptible vibration and low-frequency noise. However, sources that have the potential to generate groundborne noise are likely to produce airborne noise impacts that mask the radiated groundborne noise. Any perceptible effect (vibration or groundborne noise) can lead to annoyance. The degree to which a person is annoyed depends on the activity in which they are participating at the time of the disturbance. For example, someone sleeping or reading will be more sensitive than someone who is engaged in any type of physical activity. Reoccurring vibration effects often lead people to believe that the vibration is damaging their home, although vibration levels are well below minimum thresholds for damage potential.[8]

Numerous studies have been conducted to characterize the human response to vibration, and, over the years, numerous vibration criteria and standards have been suggested by researchers, organizations, and governmental agencies. These studies suggest that the thresholds for perception and annoyance vary according to duration, frequency, and amplitude of vibration. For continuous or frequent intermittent vibration sources (such as construction activity, including the use of pile drivers or vibratory compaction equipment), the human response to vibration varies from barely perceptible at a PPV of 0.01 in/s, to distinctly perceptible at a PPV of 0.04 in/s, to strongly perceptible at a PPV of 0.1 in/s, and severe at a PPV of 0.4 in/sec (Caltrans 2020).

3.6 Vibration-Sensitive Land Uses

As noted above, the potential effects of groundborne vibration are building damage and human annoyance. Building damage would be considered harmful at all buildings regardless of the type of land use, and thus all buildings are considered sensitive to this type of impact. Fragile structures, which often include historic buildings, are most susceptible to damage; however, the majority of buildings are not considered fragile. Refer to Section 5, *Regulatory Framework*, for the vibration damage criteria for each type of building, recommended by Caltrans.

Human annoyance effects from groundborne vibration are typically only considered inside occupied buildings and not at outside areas such as residential yards, parks, or open space. Buildings where human annoyance from vibration are a potential concern are generally the same as those that would be sensitive to noise and typically include residences, schools, hospitals, libraries, churches, convalescent homes, and hotels and motels. Refer to Section 5, *Regulatory Framework*, for the vibration annoyance criteria recommended by Caltrans.

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[8] California Department of Transportation. 2020. *Transportation and Construction Vibration Guidance Manual*. April. Available: https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tcvgm-apr2020-a11y.pdf. Accessed: December 20, 2021.

Chapter 4
Existing Noise Environment

The existing ambient noise levels in the Project vicinity are dominated by vehicle traffic on major roadways in the area, such as El Camino Real. Other major noise sources affecting the ambient noise environment include Caltrain, BART, and freight rail noise; aircraft arriving and departing at SFO; and commercial/industrial activities, such as truck loading, and stationary equipment. Noise is often measured to characterize the ambient noise levels in the vicinity of a project site. To characterize the existing ambient noise environment near the Site, long- (48-hour) and short-term (15-minute) ambient noise measurements were conducted between Tuesday, September 14th, 2021, and Thursday, September 16th, 2021.

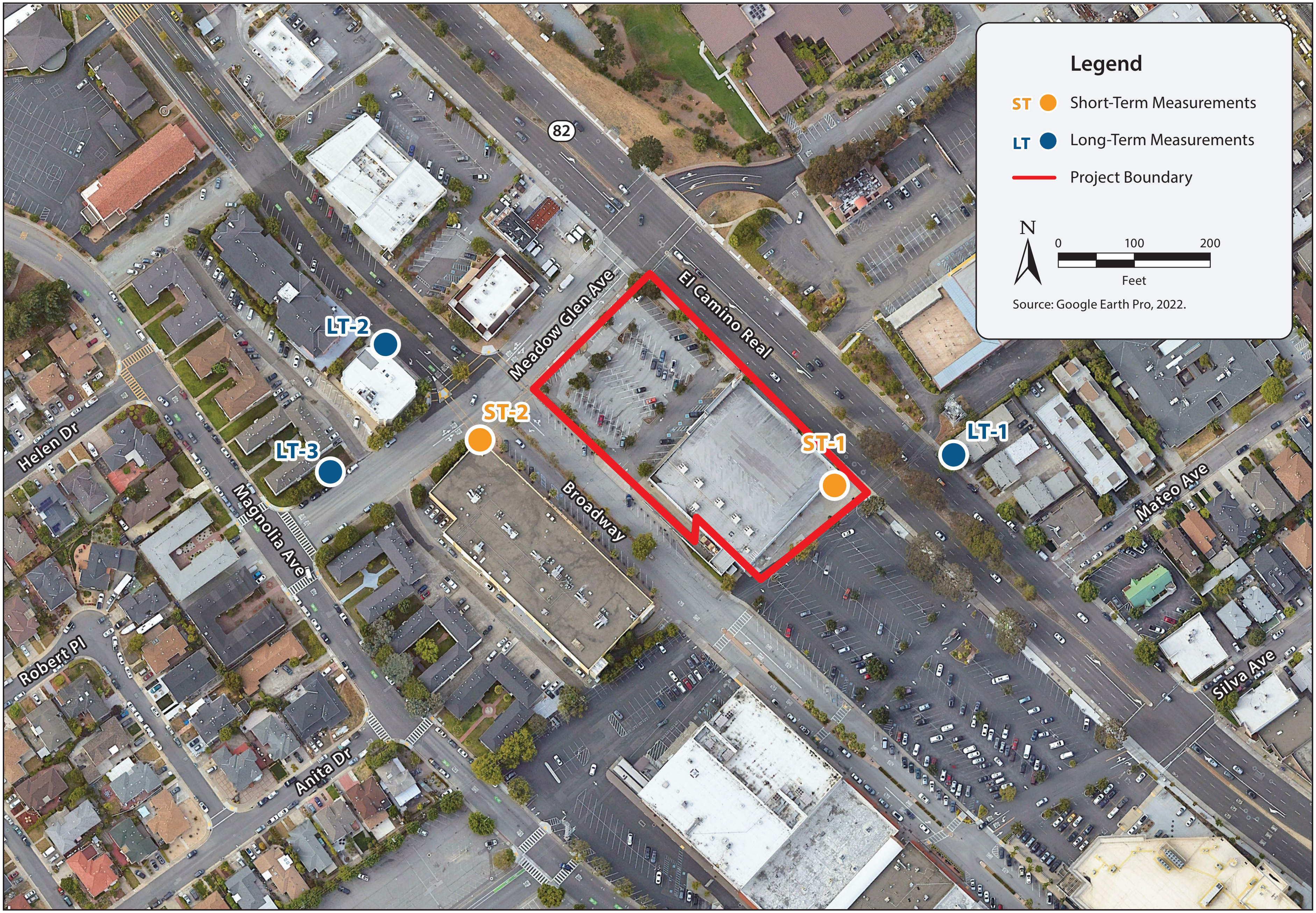
Long-term measurements were conducted using "Piccolo" type 2 sound level meters (SLM). The SLMs measured 1-hour equivalent noise levels (L_{eq}), which is an average noise level that would result over a given time interval (i.e., 1 hour). Short-term measurements were conducted using a Larson Davis LXT Type-1 SLM, which measured L_{eq} for 15-minute intervals. Weather conditions when the measurements were conducted were clear skies, with an average wind speed of 1.6 miles per hour and temperatures ranging from 66.7 to 81.3 degrees Fahrenheit.

The noise measurement locations are shown in Figure 2. The noise measurement locations were generally selected to capture noise levels in areas where noise-sensitive land uses are located. The data from the long-term noise measurements were used to calculate day-night noise levels (L_{dn}), community noise equivalent levels (CNEL), and average 12-hour L_{eq} noise levels for daytime hours (7:00 a.m. to 7:00 p.m.). In addition, the measurement data were analyzed to determine the highest and lowest one-hour L_{eq} level recorded during the measurement period. As noted above in Section 2.2, *Noise Descriptors*, the L_{dn} noise level includes a 10dB increase (e.g., a penalty) applied to each hour from 10:00 p.m. to 7:00 a.m., while the CNEL calculation includes a 5 dB increase to each hour from 7:00 p.m. to 10:00 p.m. and a 10 dB increase to each hour from 10:00 p.m. to 7:00 a.m.

Two monitoring locations in and around the Project vicinity were selected to collect short-term ambient noise data, shown in Figure 2. ST-1 was located at the northeast driveway to 959 El Camino Real, approximately 30 feet southwest of El Camino Real and 6 feet from 959 El Camino Real. The measured L_{eq} for this location was approximately 67 dBA during the 15-minute measurement interval. The dominant source of noise during the measurement was vehicle traffic from El Camino Real. ST-2 was positioned on the southeast corner of Broadway and Meadow Glen Avenue. Measurements at this location indicate that ambient noise levels are 62 dBA L_{eq}. The dominant noise source during this measurement was vehicle traffic at the intersection of Broadway and Meadow Glen Avenue. Table 4-1 summarizes the short-term noise measurement results.

Three different locations throughout the Project vicinity were selected to collect long-term ambient noise data, as shown in Figure 2. L_{dn} noise levels from the long-term measurements ranged from approximately 65 dBA L_{dn} to 77 dBA L_{dn}. Forty-eight hour measurements were collected from September 14 to September 16, 2021. Table 4-2 summarizes the long-term measurement results.

Refer to Appendix A, *Noise and Vibration Modeling Results*, for the complete dataset of measured noise levels.



Source: Google Earth Pro, 2022.

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Figure 2

Noise Measurement Locations

Table 4-1. Short-Term Noise Level Measurements in and around the Project Site

Site	Site Description	Measurement Start Time	L_{eq}	L_{max}	L_{min}	Dominant Noise Source
ST-1	Northeast corner of 959 El Camino Real	09/15/2021 12:00 p.m.	67.0	80.9	50.1	Roadway traffic noise primarily from El Camino Real
ST-2	Southeast corner of Broadway and Meadow Glen Avenue (979 Broadway)	09/15/2021 11:32 a.m.	61.9	81.1	50.6	Vehicle traffic at intersection

Note: See Appendix A for data. All noise levels are reported in A-weighted decibels (dBA).
L_{eq} = equivalent sound level.
L_{max} = maximum sound level.
L_{min} = minimum sound level.
ST = long-term (15-minute) ambient noise measurement.

Table 4-2. Long-Term Noise Level Measurements in and around the Project Site

Site	Site Description	Time Period	Day 1 L_{dn}	Day 2 L_{dn}	Lowest Hour L_{eq}[a] Time	Peak L_{eq}[b] Time	12-Hour L_{eq} Day 1	12-Hour L_{eq} Day 2	Day 1 CNEL	Day 2 CNEL	Primary Noise Sources
LT-1	850 El Camino Real	09/14/2021 – 09/16/2021	76.7	77.5	63.1 09/15/2021, 5:00 a.m.	77.6 09/15/2021, 7:00 a.m.	74.8	73.8	77.2	78.0	Roadway traffic
LT-2	North Corner of 1001 Broadway	09/14/2021 – 09/16/2021	65.9	64.0	49.7 09/14/2021, 3:00 a.m.	66.3 09/15/2021, 6:00 a.m.	62.9	62.6	66.3	64.4	Roadway traffic
LT-3	East Corner of 1010 Magnolia Ave.	09/14/2021 – 09/16/2021	65.1	65.7	51.7 09/14/2021, 3:00 a.m.	71.4 09/14/2021, 8:00 a.m.	65.9	64.3	65.6	66.0	Roadway traffic

Note: See Appendix A for data.
L_{dn} = day-night sound level.
L_{eq} = equivalent sound level.
LT = long-term (48-hour) ambient noise measurement.
CNEL = community noise equivalent levels.
[a] Lowest Hour L_{eq} is the lowest calculated L_{eq} level during a 48-hour period.
[b] Peak L_{eq} is the highest calculated L_{eq} level during a 48-hour period.

Chapter 5

Regulatory Framework

5.1 Federal

No federal laws, regulations, or policies for construction-related noise and vibration apply to the Project.

5.2 State

California Governor's Office of Planning and Research

The *State of California General Plan Guidelines,* published and updated by the Governor's Office of Planning and Research, provides guidelines for evaluating the compatibility of various land uses as a function of community noise exposure. These are guidelines for general land use planning that describe noise acceptability categories for different types of land uses considered by the state. California also requires each local government entity to perform noise studies and implement a noise element as part of its general plan. The purpose of the noise element is to limit the exposure of the community to excessive noise levels; the noise element must be used to guide decisions concerning land use. A discussion of relevant noise-related policies in the General Plan (City of Millbrae 1998) is provided below, noting that the Site is within the city of Millbrae.

California Noise Insulation Standards (Code of Regulations, Title 24)

California Code of Regulations Title 24, Part 2, *Sound Transmission*, establishes minimum noise insulation standards to protect persons within new hotels, motels, dormitories, long-term care facilities, apartment houses, and dwellings other than single-family residences. Under this regulation, interior noise levels attributable to exterior noise sources cannot exceed 45 dB in any habitable room. The noise metric is either the L_{dn} or the CNEL. Compliance with Title 24 interior noise standards occurs during the permit review process and generally protects a proposed project's users from existing ambient outdoor noise levels.

California Department of Transportation

There are no state vibration standards that directly apply to the Project. As noted below, there are also no quantitative local standards that can be used to assess project-related vibration. Therefore, while the Project would not be subject to Caltrans oversight, guidance published by the agency nonetheless provides groundborne vibration criteria that are useful in establishing thresholds for impact determinations. Caltrans' widely referenced *Transportation and Construction Vibration*

Guidance Manual[9] provides guidance for two types of potential impact: (1) damage to structures, and (2) annoyance to people. Guideline criteria for each are provided in Tables 5-1 and 5-2.

Table 5-1. Caltrans Guideline Vibration Damage Criteria

	Maximum PPV (in/s)	
Structure and Condition	**Transient Sources**	**Continuous/Frequent Intermittent Sources**
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

Source: California Department of Transportation. 2020. *Transportation and Construction Vibration Guidance Manual*. April. Available: https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tcvgm-apr2020-a11y.pdf. Accessed: December 20, 2021.
PPV = peak particle velocity.
in/s = inches per second.
Note: Transient sources create a single, isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include pile drivers (impact and vibratory), crack-and-seat equipment, and vibratory compaction equipment.

Table 5-2. Caltrans Guideline Vibration Annoyance Criteria

	Maximum PPV (in/s)	
Human Response	**Transient Sources**	**Continuous/Frequent Intermittent Sources**
Barely perceptible	0.04	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.9	0.10
Severe	2.0	0.4

Source: California Department of Transportation. 2020. Transportation and Construction Vibration Guidance Manual. April. Available: https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tcvgm-apr2020-a11y.pdf. Accessed: December 20, 2021.
PPV = peak particle velocity.
in/s = inches per second.
Note: Transient sources create a single, isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include pile drivers (impact and vibratory), crack-and-seat equipment, and vibratory compaction equipment.

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[9] California Department of Transportation. 2020. *Transportation and Construction Vibration Guidance Manual*. April. Available: https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tcvgm-apr2020-a11y.pdf. Accessed: December 20, 2021.

5.3 Local

City of Millbrae General Plan

The City is in the process of updating its General Plan, and, at the time of this analysis, the General Plan Update has not yet been adopted. Therefore, the 1998 General Plan is used in this analysis. The Noise Element of the 1998 General Plan includes land use compatibility standards that outline acceptable outdoor noise environment standards for various land use categories. In general, the intent of land use compatibility standards is to guide jurisdictions with respect to existing ambient noise levels in a community and whether those levels are compatible for a particular type of land use. The compatibility standards are used to determine whether newly developed land use would be exposed to ambient noise levels greater than what would be considered acceptable.

Refer to Policy NS 2.1 (Table 5-3 of this Noise Technical Report) for the General Plan land use compatibility guidelines for all land uses in the city (City of Millbrae 1998).

The General Plan includes the following goals and policies related to noise (City of Millbrae 1998).

Policy NS 1.2: *Protection of Residential Areas.* Protect the noise environment in existing residential areas, requiring the evaluation of mitigation measures for projects under the following circumstances:

- The project would cause the L_{dn} to increase 3 dB(A) or more.
- Any increase would result in an L_{dn} greater than 60 dB(A).
- The L_{dn} already exceeds 60 dB(A).
- The project has the potential to generate significant adverse community response.

Policy NS 1.3: *Noise Source Control*. Work with property owners to control noise at its source, maintaining existing noise levels and ensuring that noise levels do not exceed acceptable noise standards as established in the Noise and Land Use Compatibility Guidelines.

Policy NS 1.4: *Construction Noise.* Regulate construction activity to reduce noise between 7:00 p.m. and 7:00 a.m.

Policy NS 1.5: *Vehicle Noise.* Strive to reduce traffic noise levels, especially as they impact residential areas, and continue enforcement of vehicle noise standards through noise readings and enforcement actions. In particular, strive to minimize truck traffic in residential areas and ensure enforcement of Vehicle Code provisions which prohibit alteration of vehicular exhaust systems in a way that increases noise emissions.

Policy NS 2.1: *Land Use Compatibility Standards*. New development must meet acceptable exterior noise level standards. The “normally acceptable” noise standards for new land uses are established in the Noise and Land Use Compatibility Guidelines, as modified below:

a. The goal for maximum outdoor noise levels in residential areas is an L_{dn} of 60 dB. This level is a requirement to guide the design and location of future development and a goal for the reduction of noise in existing development. However, 60 L_{dn} is a goal which cannot necessarily be reached in all residential areas within the realm of economic or aesthetic feasibility. This goal will be applied where outdoor use is a major consideration (e.g., backyards in single-family housing developments and recreation areas in multi-family housing projects). The outdoor standard will not normally be applied to the small decks associated with apartments and condominiums but these will be evaluated on a case-by-case basis. Where the city determines that providing an L_{dn} of 60 dB or lower outdoors is not feasible, the outdoor goal may be increased to an L_{dn} of 65 dB. If the noise source is a railroad, then the outdoor noise exposure criterion should be 70 L_{dn} for future development, recognizing that train noise is characterized by relatively few loud events.

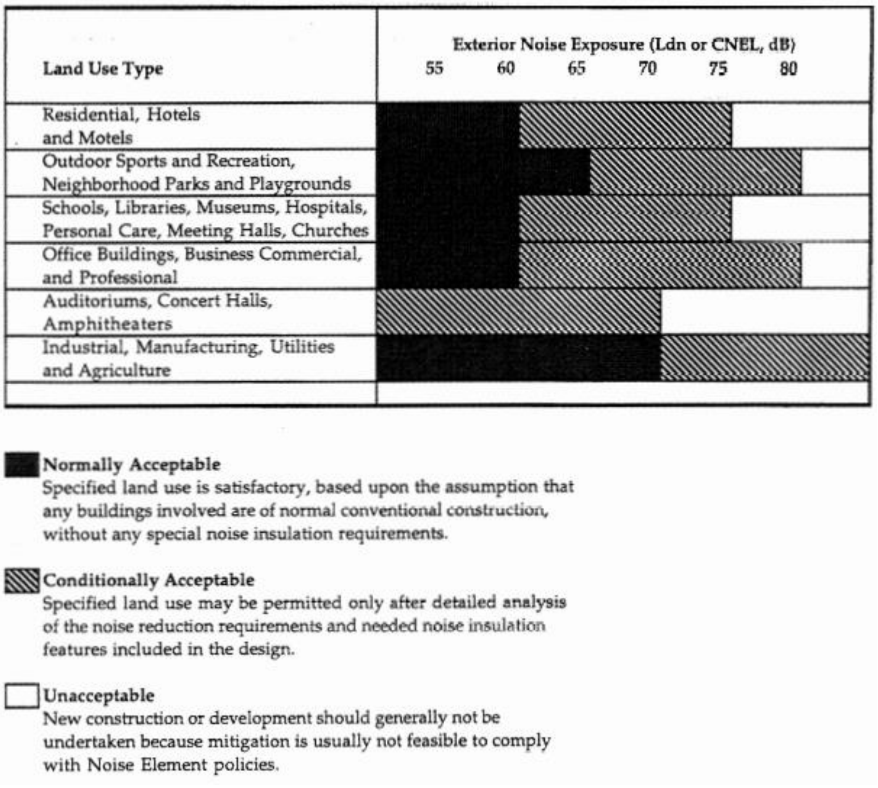
b. The indoor noise level as required by the State of California Noise Insulation Standards must not exceed an L_{dn} of 45 dB in multi-family dwellings. This indoor criterion shall also be the maximum acceptable indoor noise level in new single-family homes.

c. Interior noise levels in new single-family and multi-family residential units exposed to an L_{dn} of 60 dB or greater should be limited to a maximum instantaneous noise level in the bedrooms of 50 dBA. Maximum instantaneous noise levels in other rooms should not exceed 55 dB.

d. Appropriate interior noise levels in commercial, industrial, and office buildings are a function of the use of space. For example, the noise level in private offices should generally be quieter than for data processing rooms. Interior noise levels in offices generally should be maintained at 45 L_{eq} (hourly average) or less.

e. If an area is below the desired noise standard, an increase in noise up to the maximum should not necessarily be allowed. The impact of a proposed project on an existing land use should be evaluated in terms of the increase in existing noise levels and potential for adverse community impact, regardless of the compatibility guidelines.

Table 5-3. Land Use Compatibility for Community Noise Environments



Land Use Type	Exterior Noise Exposure (Ldn or CNEL, dB)					
	55	60	65	70	75	80
Residential, Hotels and Motels	■	▨	▨	▨	□	□
Outdoor Sports and Recreation, Neighborhood Parks and Playgrounds	■	■	▨	▨	▨	□
Schools, Libraries, Museums, Hospitals, Personal Care, Meeting Halls, Churches	■	▨	▨	▨	□	□
Office Buildings, Business Commercial, and Professional	■	▨	▨	▨	▨	□
Auditoriums, Concert Halls, Amphitheaters	▨	▨	▨	□	□	□
Industrial, Manufacturing, Utilities and Agriculture	■	■	■	▨	▨	▨

■ **Normally Acceptable**
Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

▨ **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.

□ **Unacceptable**
New construction or development should generally not be undertaken because mitigation is usually not feasible to comply with Noise Element policies.

Policy NS 2.2: *Noise Contour Map***.** The City will review development proposals to assure consistency with noise standards by using the noise contours shown on Map 7-1 (of the General Plan).

Policy NS 2.3: *Acoustical Studies.* The City will use the noise guidelines and contours to determine if additional noise studies are needed for a proposed new development.

Policy NS 2.4: *Residential and Other Noise Sensitive Uses in Commercial or Industrial Areas*. New residential or other noise sensitive development or activities will not be allowed where the noise level due to commercial or industrial noise sources will exceed the noise level standards set forth in the table titled Land Use Compatibility for Community Noise Environments, [Table 5-3 of this Noise Technical Report] with the following modifications:

a. In the event the measured ambient noise level exceeds the applicable noise level standard in any category expressed in the table, the applicable standard will be adjusted so as to equal the ambient noise level to establish a noise standard capable of being enforced through the City's Noise Ordinance.

b. Each of the noise level standards specified in the table above [Table 5-3 of this Noise Technical Report] be reduced by 5 dB for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises due to the greater annoyance factor associated with these types of noise.

Policy NS 2.4: *Commercial or Industrial Source Noise*. Noise created by commercial or industrial sources associated with new projects of developments shall be controlled so as not to exceed the noise level standards set forth in the table below [Table 5-4 of this Noise Technical Report] (Maximum Allowable Noise Exposure for Stationary Noise Sources; see Policy NS2.4 in the Millbrae Noise Element), as measured at any affected residential land use.

Table 5-4. Maximum Allowable Noise Exposure for Stationary Noise Sources [a]

	Daytime[e] **(7:00 a.m. to 10:00 p.m.)**	**Nighttime**[b, e] **10:00 PM to 7:00 AM)**
Hourly L_{eq}, dB[c]	55	45
Maximum Level, dB[c]	70	65
Maximum Level, dB – Impulsive Noise[d]	65	60

L_{eq} = sound equivalent level.
dB = decibels.
[a] As determined at the property line of the receiving land use. When determining the effectiveness of noise mitigation measures, the standards may be applied on the receptor side of the noise barriers or other property line noise mitigation measures.
[b] Applies only where the receiving land use operates or is occupied during nighttime hours.
[c] Sound level measurements made with "slow" meter response.
[d] Sound level measurements made with "fast" meter response.
[e] Allowable levels shall be raised to the ambient noise levels where the ambient levels exceed the allowable levels. Allowable levels shall be reduced by 5 dB if the ambient hourly L_{eq} is at least 10 dB lower than the allowable level.

Policy NS2.5: *Noise Sensitive Uses*. The City will protect schools, hospitals, libraries, churches, convalescent homes, and other noise sensitive uses from noise levels exceeding those allowed in residential areas. Projects located near noise sensitive uses should be oriented away from noise sources unless mitigation measures are included in development plans and regulation occurs of the activities or uses generating noise that might cause noise disturbances for noise sensitive uses.

Policy NS 2.6: *Noise Reduction Techniques*. As appropriate, based on design, use, site layout and other considerations, require mitigation measures to reduce noise impacts on adjacent properties through the following and other means, as a condition of development approval:

a. Screen and control noise sources such as parking, outdoor activities, and mechanical equipment.

b. Increase setbacks for noise sources from adjacent dwellings.

c. Wherever possible do not remove fences, walls or landscaping that serve as noise buffers, although design, safety, and other impacts must be addressed.

d. Require soundwalls, earth berms, and/or other landscape features to provide an adequate noise buffer.

e. Use soundproofing materials and double-glazed windows.

f. Control hours of operation, including deliveries and trash pickup to minimize noise impacts.

Policy NS 2.7: *Compliance with State Noise Insulation Standards*. The adopted Noise Element will serve as a guideline for compliance with the State's noise insulation standards. Recognizing the need to provide acceptable habitation environments, State law requires noise insulation of new multi-family dwellings constructed within the 60 dB L_{dn} noise exposure contours. It is a function of the Noise Element to provide noise contour information around all major sources in support of the sound transmission control standards (Chapter 2-35, Part 2, Title 24, California Administrative Code).

Policy NS 3.1: *BART Extension Noise Impacts*. Ensure that BART construction activity and ongoing operations of BART's Millbrae Station and train service do not result in undue noise impacts on adjacent properties and neighborhoods.

Policy NS 3.2: *Coordination with Other Agencies*. Work with the county Airport Land Use Commission (ALUC), State Office of Noise Control (ONC), Caltrans, San Francisco International Airport, Joint Powers Board and other agencies to reduce noise generated from sources outside the City's jurisdiction.

Policy NS 3.3: *Airport Noise Mitigation*. Negotiate with the Airport for implementation of all feasible noise reduction measures and participate in the Airport Community Roundtable to ensure ongoing reduction of Airport Noise.

City of Millbrae Municipal Code

The City of Millbrae Municipal Code contains noise regulations to protect the community from excessive noise and specifies how noise will be measured and regulated. Specifically, the City Municipal Code addresses noise issues and protects the community from disruptive noise sources, such as construction activity, animals, amplified sound, and stationary equipment.

Regarding noise from construction and demolition activities, Section 105.8 from Chapter 9.05 (Building Code) of the Municipal Code restricts the hours of construction activity to the hours of 7:30 a.m. and 7:00 p.m., Monday through Friday. Construction is permitted between 8:00 a.m. and

6:00 p.m. on Saturdays, and between 9:00 a.m. and 6:00 p.m. on Sundays and holidays. Any work outside these hours is prohibited without prior written permission from City officials. During these hours, the Municipal Code does not include noise limits that apply to construction noise.

Section 10.25.120(O) of the Municipal Code requires all permanent mechanical equipment (e.g., motors, compressors, pumps, and compactors) be structurally isolated when the building official of the city identifies the equipment as a source for structural vibration or structure-borne noise. In addition, Section 10.25.120(P) specifies that greater consideration will be given to independent systems for heating, ventilation, and air conditioning (HVAC), allowing each unit's occupant to control the temperature.

City of Millbrae Conditions of Approval for Noise

In addition to the regulations and guidelines contained in the City Municipal Code and General Plan, Millbrae has also drafted standard Conditions of Approval for Noise that apply to all projects in the City. These are detailed below.

16. **Airport Noise and Land Use Compatibility.** All projects located within the Airport Influence Area (AIA) of the San Francisco International Airport shall comply with the requirements of the Comprehensive Airport Land Use Compatibility Plan for the Environs of San Francisco International Airport (November 2012, or updated version), including, but not limited to, the following:

    a. Land uses located within the AIA shall meeting the land use compatibility criteria for maximum acceptable airport noise levels, described in terms of Community Noise Equivalent Level (CNEL).

    b. For any residential building located within the 65 CNEL Zone, (as determined by the 2012 Noise Contour Map (or updated version), as published in the C/CAG Comprehensive Airport Land Use Compatibility Plan) which is either newly constructed or renovated at a cost equal to or greater than 25% of the valuation (as assessed by the County Assessor) the building shall meet a Sound Transmission Class[1] (STC) Rating of 35.

    When Required: Addressed on the construction plans submitted for any building permit for construction of a building, including the permit for grading or foundation, and shall be satisfied prior to issuance of the first permit for the project

    Conformance Approval: Community Development Department (Building Division)

    Monitoring/Inspection Responsible Party: Community Development Department (Building Division)

17. **Construction Days/Hours.** For all projects involving construction, the applicant shall comply with the following restrictions concerning construction days and hours:

    a. Construction activities are limited to between 7:30 a.m. and 7:00 p.m. Monday through Friday.

    b. Construction activities are limited to between 8:00 a.m. and 6:00 p.m. on Saturdays.

c. Construction activities are limited to between 9:00 a.m. and 6:00 p.m. on Sundays and federal holidays.

Construction activities include, but are not limited to, truck idling, moving equipment or materials, deliveries, and construction meetings held on-site in a non-enclosed area. In order to proceed with instances of nighttime construction activities for projects, the Project Sponsor must obtain approval from the City Building Official to conduct work outside of the standard daytime hours noted above. Work outside of these hours may be approved by the Building Official when requested, in writing, a minimum of 48 hours in advance. If approval is not received, nighttime construction shall not occur.

When Required: At all times during the construction phase of the project. Approval for nighttime construction shall be submitted to the Building Official with a minimum of 48 hours in advance.

Conformance Approval: Community Development Department (Building Division)

Monitoring/Inspection Responsible Party: Community Development Department (Building Division)

18. Construction Best Management Noise Practices. For all projects involving construction, the following conditions of approval indicate best management practices to be implemented by the applicant during project construction:

a. All construction equipment and vehicles shall utilize the best available noise control techniques (e.g., manufacturer-approved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures, and noise-attenuating shields or shrouds), wherever feasible.

b. All mobile or fixed construction equipment that is regulated for noise output by a governmental agency shall comply with such regulation.

c. Prohibit unnecessary idling of internal combustion engines.

d. All construction equipment shall be operated only when necessary and shall be switched off when not in use.

e. Locate stationary noise-generating equipment as far as possible from sensitive receptors that adjoin construction sites.

f. Construction employees shall be trained in the proper operation and use of the equipment to avoid careless or improper operation of equipment that could increase noise levels.

g. Construction site speed limits of 20 mph or less shall be established, posted as necessary, and enforced during the construction period.

h. To the maximum extent feasible, route construction-related traffic along major roadways and away from sensitive receptors.

i. The use of noise-producing signals, including horns, whistles, alarms, and bells, shall be for safety warning purposes only.

When Required: At all times during the construction phase of the project

Conformance Approval: Community Development Department (Building Division)

Monitoring/Inspection Responsible Party: Community Development Department (Building Division)

19. **Noise Land Use Compatibility.** The applicant shall ensure that new development meets acceptable exterior noise level standards. The "normally acceptable" noise standards for new land uses are established in the land use compatibility standards in the City of Millbrae General Plan.

    New residential or other noise sensitive development or activities shall not be allowed where the noise level due to commercial or industrial noise sources shall exceed the noise level standards for land use compatibility set forth in the contemporaneous City of Millbrae General Plan.

    When Required: Addressed on the construction plans submitted for any demolition permit, and shall be satisfied prior to issuance of the permit for the project

    Conformance Approval: Community Development Department (Building Division)

    Monitoring/Inspection Responsible Party: Community Development Department (Building Division)

20. **Commercial and Industrial Stationary Noise.** Noise created by commercial or industrial sources associated with new projects shall be controlled by the applicant so as not to exceed the exterior noise compatibility noise level standards set forth in the contemporaneous City of Millbrae General Plan, as measured at any affected residential land use. If noise levels exceed these standards, the activity causing the noise shall be abated until appropriate noise reduction measures have been installed and compliance verified by the City.

    When Required: At all times that the building or use authorized by the planning approval occupies the subject property

    Conformance Approval: Community Development Department (Building Division)

    Monitoring/Inspection Responsible Party: Community Development Department (Building Division)

Chapter 6
Impacts and Mitigation Measures

6.1 Methods

The noise impact analysis evaluates temporary noise and vibration levels resulting from Project construction activities, operational noise generated by sound-generating equipment and on-site activities, and traffic noise associated with Project-related changes in traffic patterns. The methodology used for the analysis of each noise or vibration source is included below.

6.1.1 Construction Noise

The analysis of construction noise considers the equipment that would be required for Project demolition and construction, as identified by the Project Sponsor. Noise from construction varies, depending on the type of equipment in use, how many pieces of equipment are operating at any one time, the proximity of the equipment to a noise receptor, and the duration of equipment use.

Estimates of combined construction and demolition noise levels were based on reference noise levels from the Federal Highway Administration (FHWA) roadway construction noise model (Federal Highway Administration 2006) and the Federal Transit Administration general assessment construction noise analysis method,[10] which recommends combining noise levels from the two loudest pieces of equipment expected to operate simultaneously in roughly the same location. A slight modification is often made to this methodology, modeling based on the three loudest pieces of equipment as opposed to the two loudest pieces of equipment, to ensure conservative modeling results. In this assessment, the three loudest pieces of equipment expected to operate in a given construction phase were assumed to operate simultaneously and in roughly the same location on the project site.

The FHWA noise source data used in construction modeling include the A-weighted L_{max} noise levels measured at a distance of 50 feet from the construction equipment, as well as the utilization factors for the equipment. The utilization factor is the percentage of time each piece of construction equipment is typically operating at full power over the specified period of time and used to estimate L_{eq} values from L_{max} values. For example, the L_{eq} value for a piece of equipment that operates at full power over 50 percent of the time is 3 dB less than the L_{max} value (Federal Highway Administration 2006).

An initial screening analysis was conducted to determine which phases of Project construction would require the use of the loudest equipment. It was determined that the demolition phase would use the loudest equipment. Combined L_{eq} noise levels from the three loudest pieces of equipment for the demolition subphase (e.g., a concrete saw and two dozers) are assessed to estimate reasonable worst-case noise levels from daytime Project construction activities. In addition, nighttime construction is proposed for the Project.

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[10] Federal Transit Administration. *Transit Noise and Vibration Impact Assessment*. FTA Report No. 0123, 2018. Available: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf. Accessed: December 20, 2021.

6.1.2 Construction Haul Truck Noise

Construction haul truck noise was also considered in the analysis. Based on the estimated reasonable worst-case daily construction haul truck trips, construction haul truck noise was analyzed as part of the construction noise analysis. According to the Project construction details provided by the Project Sponsor, up to 106 total one-way haul truck trips to and from the Project site would occur on a worst-case construction day.

At this time, haul truck routes have not been identified by the Project Sponsor. To provide a conservative analysis for this EIR, the analysis assumed that all haul trucks would use all main roadway segments in the immediate Project vicinity that provide access to nearby freeways (e.g., El Camino Real north and south of Meadow Glen Avenue, Broadway south of Meadow Glen Avenue, and Meadow Glen Avenue, east of Broadway).

6.1.3 Construction Vibration

Building Damage

The operation of heavy-duty construction equipment can generate localized groundborne vibration and noise at buildings adjacent to the construction areas. Groundborne vibration rarely causes damage to normal buildings. However, a structure's susceptibility to vibration-induced damage depends on its age, condition, distance from the vibration source, and the vibration level.

Construction-related vibration resulting from the Project was analyzed using data and modeling methodologies provided by Caltrans' *Transportation and Construction Vibration Guidance Manual* (Caltrans 2020). This guidance manual provides typical vibration source levels for various types of construction equipment, as well as methods for estimating the propagation of groundborne vibration over distance. The following equation from the guidance manual was used to estimate the change in PPV levels over distance:

$$PPV_{rec} = PPV_{ref} \times (25/D)^{n}$$

where PPV_{rec} is the PPV at a receptor; PPV_{ref} is the reference PPV at 25 feet from the equipment; D is the distance from the equipment to the receiver, in feet; and n is a value related to the vibration attenuation rate through ground (the default recommended value for n is 1.5). This equation was used to estimate the PPV at each of the closest vibration-sensitive receivers based on the worst-case (closest) distance between each source and receiver. Estimated vibration levels are then compared to the Caltrans Guideline Vibration Damage Criteria for buildings to determine if vibration-related damage impacts would be expected at nearby structures.

Annoyance and Sleep Disturbance

Regarding the potential for annoyance-related vibration impacts, residential land uses are considered to be most sensitive to vibration during nighttime hours when people generally sleep. Nighttime Project construction activities were modeled to estimate resulting vibration levels. Estimated vibration levels in excess of the Caltrans "strongly perceptible" threshold (0.1 PPV in/sec for frequent intermittent sources of vibration) would be considered to result in significant annoyance-related vibration impacts.

6.1.4 Operational Noise

Stationary Equipment

The primary operational noise sources associated with the project would be the mechanical equipment including roof-top heating and cooling equipment. To evaluate the noise levels that would be generated by these noise sources, acoustical data (i.e., source noise levels) for these items were derived from various sources, including manufacturers' specifications sheets, data from previous noise assessments prepared for similar projects, and equipment information provided by the Project Sponsor. Modeling was conducted to estimate noise from individual and combined equipment, as appropriate, based on estimated locations of project equipment as provided by the Project Sponsor. Estimated noise levels from equipment operations were compared to applicable thresholds and required General Plan policies were considered to reduce potential noise exceedances to below the allowable limits.

Operational Traffic Noise

Traffic noise levels were modeled for the following scenarios to determine if noise impacts associated with Project-related increases in traffic would occur.

Traffic noise modeling was conducted for Existing and Existing plus Project conditions using a spreadsheet based on the FHWA Traffic Noise Model, version 2.5. This spreadsheet calculates the traffic noise level at a fixed distance from the centerline of a roadway (50 feet for this analysis), based on the traffic volume, roadway speed, and vehicle mix for each roadway segment. Average daily traffic volumes, roadway speeds, and vehicle mix percentages (i.e., the proportion of automobiles, trucks, buses, and other vehicles) provided by Fehr & Peers were used to model traffic noise levels with and without Project implementation along the roadways in the vicinity of the Project site.[11] Traffic noise was evaluated in terms of how Project-related traffic noise increases could affect existing noise-sensitive land uses in the Project vicinity.

6.2 Thresholds of Significance

In accordance with Appendix G of the California Environmental Quality Act Guidelines, the proposed project would be considered to have a significant effect if it would result in any of the conditions listed below.

a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

b) Generation of excessive groundborne vibration or groundborne noise levels.

c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, exposure of people residing or working in the project area to excessive noise levels.

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[11] Personal Communication. Email from Emily Chen, Fehr & Peers (Transportation Planner) to Jennifer Andersen from ICF (Senior Environmental Planner) dated November 10, 2021.

6.2.1 Construction Noise Criteria

Construction noise in the City is regulated per the requirements of Section 105.8 from Chapter 9.05 (Building Code) of City of Millbrae Municipal Code. Chapter 9.05 (Building Code) of the City Municipal Code states construction activities may occur between the hours of 7:30 a.m. and 7:00 p.m., Monday through Friday; 8:00 a.m. to 6:00 p.m. on Saturday; and 9:00 a.m. to 6:00 p.m. on Sunday. During which time, no quantitative criteria apply to construction noise. In addition, note that up to 8 individual nights of construction activities may take place during the 27-month construction duration. Nighttime construction activities would start around 9:00 p.m. and be completed around 7:00 a.m. In the city of Millbrae, and per Section 105.8 from Chapter 9.05 (Building Code) of the Municipal Code, noise generating construction activity are generally limited to the hours of 7:30 a.m. to 7:00 p.m. Monday through Friday, 8:00 a.m. to 6:00 p.m. Saturdays and 9:00 a.m. to 6:00 p.m. on Sundays and Holidays, unless work outside of these hours has been approved by the Building Official in writing. Daytime and nighttime construction noise impacts are evaluated to determine if compliance with local applicable guidelines and General Plan policies would be achieved.

6.2.2 Construction Haul Truck Noise Criteria

The temporary addition of construction-related haul truck trips on local roadway segments was evaluated to determine if hauling activity would result in substantial increases to the ambient noise levels at nearby noise-sensitive land uses. The City of Millbrae municipal code does not specify noise thresholds pertaining to construction haul truck noise. Therefore, anticipated daily haul truck noise was assessed to determine if a 3-dB increase, or a barely perceptible increase in noise over existing traffic noise levels, would occur at nearby noise-sensitive land uses.

6.2.3 Construction Vibration Criteria

Estimated vibration levels from the Project construction area are compared to the Caltrans Guideline Vibration Damage Criteria for buildings to determine if vibration-related damage impacts would be expected at nearby structures. In addition, annoyance-related vibration impacts would be considered significant should nighttime Project construction activities result in vibration levels in excess of the Caltrans “strongly perceptible” threshold (0.1 PPV in/sec for frequent intermittent sources of vibration).

6.2.4 Traffic Noise Criteria

Human sound perception, in general, is such that a change in sound level of 1 dB cannot typically be perceived by the human ear, a change in sound level of 3 dB is just noticeable, and a change of 5 dB is clearly noticeable. As a result, when assessing traffic noise impacts, the following thresholds are applied to determine the significance of Project-related traffic noise increases.

1. An increase of more than 5 dBA is considered a significant traffic noise increase, regardless of the existing ambient noise level.
2. In places where the existing or resulting noise environment is “conditionally acceptable,” “normally unacceptable,” or “clearly unacceptable,” based on the City Land Use Compatibility Guidelines for Community Noise Environments (shown in Table 5-3 of this of this Noise

Technical Report), any noise increase greater than 3 dBA is considered a significant traffic noise increase.

6.2.5 Stationary Equipment Noise Criteria

General Plan policies would apply to the Project, and require the noise associated with stationary sources be controlled such that existing noise levels are maintained, and acceptable noise levels are achieved, as established in the City Noise and Land Use Compatibility Guidelines. According to General Plan Policy NS 2.4 (Commercial or Industrial Source Noise), noise created by commercial or industrial sources associated with new projects or developments “shall be controlled so as not to exceed the noise level standards set forth in the table below [Table 5-4 of this Noise Technical Report] (Maximum Allowable Noise Exposure for Stationary Noise Sources).” According to this table, maximum hourly L_{eq} noise levels are limited to 55 dBA during daytime hours and 45 dBA during nighttime hours at the property line of the receiving land use. Allowable levels shall be raised to the ambient noise levels where the ambient levels exceed the allowable levels. Noise from project mechanical equipment is evaluated to determine compliance with these noise limits, and applicable local General Plan policies.

6.2.6 Groundborne Vibration Criteria

Although there are currently no comprehensive local regulatory standards for groundborne vibration that are applicable to the proposed project, the previously cited Caltrans vibration criteria included in the Caltrans *Transportation and Construction Vibration Guidance Manual* are routinely used to evaluate a variety of projects (not merely transit) proposed by local jurisdictions. This guidance and these thresholds are used in this analysis.

6.3 Project Impacts

Impact Noise-1: Would the project generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in a local general plan or noise ordinance or applicable standards of other agencies? (Less than Significant)

Construction Noise

Daytime Construction Noise

The Project would consist of six key construction stages, or subphases: demolition, site preparation, grading, building construction, paving, and architectural coating. The overall construction duration is expected to be approximately 27 months. In addition, utility construction (water and sewer lines) is proposed along Meadow Glen Avenue, between El Camino Real and Broadway. This work is expected to take place for a total of 3 weeks during the aforementioned 27-month construction period.

Chapter 9.05 (Building Code) of the City Municipal Code states construction activities may occur between the hours of 7:30 a.m. and 7:00 p.m., Monday through Friday; 8:00 a.m. to 6:00 p.m. on Saturday; and 9:00 a.m. to 6:00 p.m. on Sunday. Typical construction work hours would be between 7:30 a.m. to 7:00 p.m., Monday through Friday, in accordance with the allowable hours for construction activity in the city. There is a potential that up to six instances of nighttime concrete pours may be required; in addition, the erection and dismantling of the proposed electric crane may occur during nighttime hours.

Equipment proposed for use on the main Site during construction include concrete saws, excavators, dozers, tractors, loaders, backhoes, graders, cranes, generators, welders, pavers, rollers, air compressors, concrete pump trucks, and concrete mixer trucks. Utility construction in Meadow Glen Avenue is expected to use equipment such as a backhoe, excavator, skid steer, dump truck, and roller. Refer to Appendix A, *Noise and Construction Modeling Results*, for the full construction equipment list by phase for the Project.

Estimated combined construction noise levels for a reasonable worst-case day were estimated for each construction subphase for both on-and off-site activities (e.g., waterline work). This analysis assumes that the three loudest pieces of equipment expected to be used during a given phase of construction would be operating simultaneously and close to one another on the Site. A screening analysis was conducted to determine which subphase would result in the loudest combined noise levels. According to the screening analysis described above, the construction phase expected to result in worst-case noise would be demolition.

Combining the noise level from the three loudest pieces of equipment and assuming they are all operating very close to one another and near the closest offsite sensitive receptor results in a reasonably conservative worst-case combined noise level. This is the approach recommended by the Federal Transit Administration.[12] Refer to Table 6-1 for the construction noise modeling results for the demolition subphase, which is expected to result in the loudest combined noise levels.

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[12] Federal Transit Administration, *Transit Noise and Vibration Impact Assessment*, FTA Report No. 0123, 2018, https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf, accessed December 20, 2021.

Table 6-1. Daytime Combined Construction Noise for On-Site Activities, Demolition

Source Data:	Maximum Sound Level (dBA)	Utilization Factor	L_{eq} Sound Level (dBA)
Construction Condition: Demolition			
Source 1: Concrete saw – Sound level (dBA) at 50 feet =	90	20%	83.0
Source 2: Dozer – Sound level (dBA) at 50 feet =	82	40%	78.0
Source 3: Dozer – Sound level (dBA) at 50 feet =	82	40%	78.0
Calculated Data			
All Sources Combined – L_{max} sound level (dBA) at 50 feet =			91 L_{max}
All Sources Combined – L_{eq} sound level (dBA) at 50 feet =			85 L_{eq}

Distance between Source and Receiver (feet)	Geometric Attenuation (dB)	Calculated L_{max} Sound Level (dBA)	Calculated L_{eq} Sound Level (dBA)
50	0	91	85
100	-6	85	79
150	**-10**	**82**	**76**
250	**-14**	**77**	**71**
280	**-15**	**76**	**70**
500	-20	71	65
600	-22	70	64
850	-25	67	61
1000	-26	65	59
1200	-28	64	58

Source: Federal Highway Administration. 2006. *FHWA Roadway Construction Noise Model User's Guide*. FHWA-HEP-05-054. January. Available: https://www.fhwa.dot.gov/ENVIRonment/noise/construction_noise/rcnm/rcnm.pdf. Accessed: December 20, 2021.
dB = decibels.
dBA = A=weighted decibels.
L_{eq} = sound equivalent level.
L_{max} = maximum sound level.
Notes:

- Geometric attenuation based on a 6 dB per doubling of distance.
- This calculation does not include the effects, if any, of local shielding or ground attenuation from walls, topography, or other barriers that may reduce sound levels further.
- Noise levels are based on source noise levels from the FHWA Roadway Construction Noise Model.
- **Bold** denotes distance and sound levels from the Site to the nearest sensitive receivers.

As shown in Table 6-1, the three loudest pieces of equipment proposed for use during demolition include a concrete saw and two dozers. Use of this equipment could occur as close as 150 feet from the nearest sensitive land use, a single-family residence located east of the Site across El Camino Real. Based on the modeling results shown above, demolition could result in noise levels of approximately 76 dBA L_{eq} at this nearby noise-sensitive use during daytime hours. Multi-family residential land uses are also located in relatively close proximity to the Project at distances of approximately 250 and 280 feet northwest of the Site. At these distances, noise levels from demolition could result in approximate noise levels of up to 71 and 70 dBA L_{eq}.

With regard to the in-street utility construction, the three loudest pieces of equipment proposed for use during utility construction include an excavator, front end loader, and roller. Use of this equipment could occur as close as 150 feet from the nearest sensitive land uses, which are multi-family residences located northwest of the proposed utility lines, north of Meadow Glen Avenue along Broadway. Modeling results for utility construction activities are shown in Table 6-2.

Table 6-2. Daytime Construction Noise from Off-Site Utility Construction

Source Data:	**Maximum Sound Level (dBA)**	**Utilization Factor**	**L_{eq} Sound Level (dBA)**
Construction Condition: Utility Construction			
Source 1: Excavator - Sound level (dBA) at 50 feet =	81	40%	77.0
Source 2: Front end loader - Sound level (dBA) at 50 feet =	79	40%	75.0
Source 3: Roller - Sound level (dBA) at 50 feet =	80	20%	73.0
Calculated Data			
All Sources Combined – L_{max} sound level (dBA) at 50 feet =			85 L_{max}
All Sources Combined – L_{eq} sound level (dBA) at 50 feet =			80 L_{eq}

Distance between Source and Receiver (feet)	**Geometric Attenuation (dB)**	**Calculated L_{max} Sound Level (dBA)**	**Calculated L_{eq} Sound Level (dBA)**
50	0	85	80
100	-6	79	74
150	**-10**	**75**	**71**
250	-14	71	66
280	-15	70	65
500	-20	65	60
600	-22	63	59
850	-25	60	55
1000	-26	59	54
1200	-28	57	52

Source: Federal Highway Administration. 2006. *FHWA Roadway Construction Noise Model User's Guide*. FHWA-HEP-05-054. January. Available: https://www.fhwa.dot.gov/ENVIRonment/noise/construction_noise/rcnm/rcnm.pdf. Accessed: December 20, 2021.
dB = decibels.
dBA = A=weighted decibels.
L_{eq} = sound equivalent level.
L_{max} = maximum sound level.
Notes:

- Geometric attenuation based on a 6 dB per doubling of distance.
- This calculation does not include the effects, if any, of local shielding or ground attenuation from walls, topography, or other barriers that may reduce sound levels further.
- Noise levels are based on source noise levels from the FHWA Roadway Construction Noise Model.
- **Bold** denotes distance and sound levels from the waterline construction to the nearest noise-sensitive receiver (multi-family residential land uses, in this case).

Based on the modeling results shown in Table 6-2, noise from utility construction could be up to 71 dBA L_{eq} at a distance of 150 feet (the distance to the nearest residential land use). Although construction noise from the utility work may reach this noise level at the nearest residences, utility construction would be linear in nature and would move along Meadow Glen Avenue, along the proposed utility alignment. Therefore, utility construction would not be taking place 150 feet from the nearest residences for the duration of the construction subphase.

Proposed construction activities, both on and off site, are expected to take place between the hours of 7:30 a.m. and 7:00 p.m., Monday through Friday. Based on the modeling results presented above, on-site construction activities could result in a noise level of up to 76 dBA L_{eq} at the nearest residence during daytime hours, and utility construction could result in a noise level of up to 71 dBA L_{eq} at the nearest sensitive residence. Although temporary noise increases during daytime hours would occur during project construction, construction noise would be limited to the allowable daytime hours in the city, during which time no specific numerical thresholds apply to construction noise. In addition, implementation of City of Millbrae COAs, *Construction Day/Hours,* and *Construction Best Management Noise Practices,* would help reduce noise levels during construction. Specifically, noise-producing construction activities would generally be limited to the daytime hours defined in the COAs. Further, measures described in the *Construction Best Management Noise Practices* COA, such as ensuring equipment mufflers are installed, limiting the use of noise-producing signals, prohibiting unnecessary idling, and others, would be implemented, and would help reduce noise levels during construction. For the reasons described above, daytime construction noise for the project would be in compliance with local applicable thresholds. Impacts related to Project construction during daytime hours would be ***less than significant***.

Nighttime Construction Noise

Although the vast majority of Project construction would take place during daytime hours, as described above, up to six instances of nighttime concrete pours may take place during nighttime hours. In addition, 1 night of crane erection (at the start of Project construction) and 1 night of crane dismantling (near the end of Project construction) may take place outside of the standard daytime construction hours. When nighttime work is needed, it is expected to commence at 9:00 p.m. and continue until 7:00 a.m. Overall, nighttime construction work would be rare, occurring only 6 to 8 nights during the 27-month construction duration. In addition, work would not take place on back-to back nights; there would always be at least 2 weeks (and often much longer) between instances of nighttime construction work.

Although nighttime construction activities would be temporary and intermittent, quantitative modeling was conducted to estimate reasonable worst-case combined noise levels from on-site construction during nighttime hours. Utility construction activity would all take place during daytime hours.

Nighttime concrete pours would require more equipment than crane assembly and disassembly and are therefore the focus of the nighttime construction noise analysis. During a nighttime concrete pour, the three loudest pieces of equipment expected to operate simultaneously would be a concrete pump truck and two concrete mixer trucks. Refer to Table 6-3 for the nighttime concrete pour noise modeling results. Noise levels from crane assembly and disassembly would likely be lower than the estimated noise levels shown in Table 6-3 because it would involve less construction equipment (e.g., one crane may be operating at a given time). However, it is conservatively assumed that all nighttime construction could result in similar noise levels in case additional small equipment is utilized during nighttime crane assembly.

Table 6-3. Nighttime Construction Noise, Concrete Pours

Source Data:	Maximum Sound Level (dBA)	Utilization Factor	L_{eq} Sound Level (dBA)
Construction Condition: Concrete Pouring			
Source 1: Concrete pump truck - Sound level (dBA) at 50 feet =	81	20%	74.0
Source 2: Concrete mixer truck - Sound level (dBA) at 50 feet =	79	40%	75.0
Source 3: Concrete mixer truck - Sound level (dBA) at 50 feet =	79	40%	75.0
Calculated Data			
All Sources Combined – L_{max} sound level (dBA) at 50 feet =			85.0 L_{max}
All Sources Combined – L_{eq} sound level (dBA) at 50 feet =			79.0 L_{eq}

Distance between Source and Receiver (feet)	Geometric Attenuation (dB)	Calculated L_{max} Sound Level (dBA)	Calculated L_{eq} Sound Level (dBA)
50	0	85	79
100	-6	79	73
150	**-10**	**75**	**70**
250	**-14**	**71**	**66**
280	**-15**	**70**	**65**
500	-20	63	58
600	-22	60	55
850	-25	60	55
1000	-26	59	53

Source: Federal Highway Administration. 2006. *FHWA Roadway Construction Noise Model User's Guide*. FHWA-HEP-05-054. January. Available: https://www.fhwa.dot.gov/ENVIRonment/noise/construction_noise/rcnm/rcnm.pdf. Accessed: December 20, 2021.

dB = decibels.
dBA = A=weighted decibels.
L_{eq} = sound equivalent level.
L_{max} = maximum sound level.

Notes:

- Geometric attenuation based on a 6 dB per doubling of distance.
- This calculation does not include the effects, if any, of local shielding or ground attenuation from walls, topography, or other barriers that may reduce sound levels further.
- Noise levels are based on source noise levels from the FHWA Roadway Construction Noise Model.
- **Bold** denotes distance and sound levels from the Project site to the nearest sensitive receiver.

Based on the modeling results shown above, concrete pour activities could result in a noise level of up to 70 dBA L_{eq} at the nearest residential land uses (single-family residential), located about 150 feet from the Site (east of El Camino Real). Noise from nighttime concrete pour activities may be up to 66 dBA Leq at a distance of 250 feet, the distance to the nearest multi-family residential land uses.

As described previously, noise measurements were conducted in the project vicinity to characterize existing ambient noise levels. The lowest 1-hour L_{eq} noise level recorded during the noise measurement survey at the nearest residential land use (150 feet from the Site, east of El Camino Real) was 63.1 dBA L_{eq}.[13] At the nearest multi-family residences (located 250 feet or more

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[13] Refer to Table 4-2 for Lowest Hour L_{eq} ambient noise levels near this location.

northwest of the project site), the lowest 1-hour L_{eq} noise level recorded was 49.7 dBA L_{eq}.[14] Therefore, estimated noise levels from nighttime construction could be approximately 7 to 16 dB louder than the measured lowest 1-hour L_{eq} noise levels at nearby noise-sensitive uses.

In the city of Millbrae, and per Section 105.8 from Chapter 9.05 (Building Code) of the Municipal Code, noise generating construction activity are generally limited to the hours of 7:30 a.m. to 7:00 p.m. Monday through Friday, 8:00 a.m. to 6:00 p.m. Saturdays and 9:00 a.m. to 6:00 p.m. on Sundays and Holidays. As a result, nighttime construction activities would not comply with the applicable portion of the City Code regarding construction noise. However, the Municipal Code also states that work outside of these hours may be approved by the Building Official when requested, in writing, a minimum of 48 hours in advance. In order to proceed with 6 to 8 instances of nighttime construction activities for the proposed project, the Project Sponsor must obtain approval from the City Building Official to conduct work outside of the standard daytime hours of 7:30 a.m. to 7:00 p.m. weekdays (the Project's proposed hours for typical daytime construction). Should approval not be received, nighttime construction would not occur.

Because the Project applicant must request an exemption to the allowable daytime hours defined in the City Code in order to Sponsor nighttime work, and because nighttime construction would be infrequent (only 6 to 8 nights during a 27-month construction duration) and intermittent (not occurring on back-to-back nights), any temporary increases in the ambient noise level during infrequent nighttime construction activities would not be considered substantial. In addition, implementation of City of Millbrae COA, *Construction Best Management Noise Practices,* would help reduce noise levels during construction. Specifically, measures such as ensuring equipment mufflers are installed, limiting the use of noise-producing signals, prohibiting unnecessary idling, and others, would be implemented, and would help reduce noise levels during construction. For the reasons described above, impacts related to temporary nighttime construction noise would be ***less than significant.***

Construction Haul Truck Noise

The temporary addition of haul trucks on the local roadway network can result in temporary increases in noise at nearby sensitive land uses. Based on the expected material export required for the Project, and on information provided by the Project Sponsor, Project construction would involve up to 106 one-way haul truck trips on a worst-case day. During many construction days, there would be fewer truck trips than 106. However, haul truck noise from a reasonable worst-case day is analyzed to provide a conservative assessment. At this time, haul truck routes have not been finalized by the Project Sponsor. To ensure a conservative assessment, this analysis assumes that haul trucks would travel on main roadway segments in the project vicinity to access the nearest freeway on-ramps. Therefore, haul trucks were assumed to travel along El Camino Real, both north and south of Meadow Glen Avenue, Broadway, south of Meadow Glen Avenue, and Meadow Glen Avenue, east of Broadway.

The temporary addition of 106 haul trucks trips per day on these roadway segments was evaluated to determine if hauling activity would result in substantial increases to the ambient noise levels at nearby noise-sensitive land uses. The City of Millbrae municipal code does not specify noise thresholds pertaining to construction haul truck noise. Therefore, anticipated daily haul truck noise

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[14] Refer to Table 4-2 for Lowest Hour L_{eq} ambient noise levels near this location.

was assessed to determine if a 3-dB increase, or a barely perceptible increase in noise over existing traffic noise levels, would occur at nearby noise-sensitive land uses.

Modeling was conducted to estimate average daily traffic noise levels with and without the addition of Project haul truck trips (e.g., a comparison of noise from Existing to Existing plus Project haul truck conditions). Should noise increases related to haul truck activity be predicted, additional analysis would be conducted based on the actual distances between roadway centerlines and the nearest residential or noise-sensitive land uses along a given segment. Refer to Table 6-4 for estimated traffic noise levels along the roadway segments under Existing and Existing plus Project haul truck conditions based on the assumptions described above.

Table 6-4. Existing and Existing Plus Haul Condition Truck Noise Levels

Roadway	Segment	Truck Trips on Segment (per day)	Modeled Distance	Modeled Existing Traffic Noise Level (dBA L_{dn})	Existing plus Haul Truck Trip Noise Level (dBA L_{dn})	Delta dBA L_{dn}
El Camino Real	North of Meadow Glen	106	50	68.9	68.9	0.0
El Camino Real	South of Meadow Glen	106	50	68.7	68.7	0.0
Broadway	South of Meadow Glen	106	50	59.3	60.7	1.4
Meadow Glen	East of Broadway	106	50	59.8	61.2	1.4

dBA = A=weighted decibels.
L_{dn} =day-night sound level.
Note: Haul truck routes have not been identified by the Project Sponsor. Segments shown above are likely to be used as haul truck routes.

As shown in Table 6-4, noise increases due to haul truck activity would not be expected to result in a greater than 3-dB, or barely perceptible, increase in traffic noise along any of the analyzed segments. The greatest increase in noise from hauling activity was modeled to be 1.4 dB. In addition, the distance to the nearest residential land use along most segments is greater than the 50-foot screening distance utilized in this assessment; therefore, actual haul truck noise levels would likely be lower than those presented in Table 6-4. Because project haul truck activity would result in a less than 3 dB increase in noise along all analyzed segments, Project haul truck noise impacts would be ***less than significant*****.**

Project Operation

Roof Top Mechanical Equipment

The Project would involve the use of heating, ventilation, and air conditioning (HVAC) systems and equipment. The roof of the building would consist of two boilers, one garage exhaust fan, and 283 air conditioning compressors (one associated with each of the 278 individual apartment heating and cooling systems, and 5 for ground-floor commercial). The air conditioning units for individual apartments would most likely be split system units; however, final make and models for these units has not yet been selected. All the equipment above would be located behind a solid wall taller than the equipment, which would help reduce noise. This solid wall would result in at least 10 dB of noise reduction.

Boilers, such as the proposed standby electric boiler and condensing boiler, can produce noise levels of approximately 67 dBA at 50 feet.[15] Exhaust/ventilation fans, such as the one garage exhaust fan proposed, can generate noise levels at 50 feet of approximately 79 dBA.[16] Air handling units and standard HVAC package units, such as the 283 air condensers proposed for the Project, can produce sound levels in the range of about 70 to 75 dBA at 50 feet,[17] depending on the size of the unit. As the majority of these would be smaller units for individual apartments, a noise level of 70 dBA is assumed for each HVAC system. Based on these source noise levels, combined noise from two boilers, one exhaust fan, and 283 air condensing units at a distance of 50 feet could be up to 94.7 dBA without accounting for attenuation, assuming all equipment was operational simultaneously and relatively close to one another. When accounting for the approximately 10 dB of reduction from the solid parapet wall, combined noise would be reduced to approximately 84.7 dBA L_{eq}.

The nearest off-site land use to the Site is a single-family residence, across El Camino Real. This residence is located over 150 feet from the Site. As a result of a 25-foot setback located along the southeast perimeter of the Site, and because the project designs show mechanical equipment set back from the perimeter of the project building, the distance from mechanical equipment to this residence would be even greater.

Based on project designs, mechanical equipment would be located approximately 250 horizonal feet from the nearest residence located across El Camino Real. Based on the source noise levels stated above, noise from this equipment at a distance of 250 feet would be approximately 70.7 dBA L_{eq}. The closest multi-family residences could be approximately 300 feet from the aforementioned mechanical equipment based on the project design. At this distance, noise from mechanical equipment would be further reduced to approximately 69.1 dBA L_{eq}.

The General Plan contains numerous policies that would apply to the proposed project. Policy NS 2.4 (Commercial or Industrial Source Noise) would be required because the mixed-use project building would contain commercial uses. Under this policy, noise created by commercial or industrial sources associated with new projects of developments "shall be controlled so as not to exceed the noise level standards set forth in the table below [Table 5-4 of this Noise Technical Report] (Maximum Allowable Noise Exposure for Stationary Noise Sources." According to this policy, maximum hourly L_{eq} noise levels are limited to 55 dBA during daytime hours and 45 dBA during nighttime hours at the property line of the receiving land use. Allowable levels shall be raised to the ambient noise levels where the ambient levels exceed the allowable levels.

Based on the noise modeling results presented above, unattenuated mechanical noise at the nearest off-site single-family residence would be approximately 71 dBA L_{eq}. Measured noise levels at this residence (represented by LT-1) during daytime hours were between 74 and 75 dBA L_{eq} (12-hour). However, the lowest recorded 1-hour L_{eq} during the measurement was 63.1 dBA L_{eq} (which occurred at 5:00 a.m.). Therefore, noise would conservatively be limited to 63.1 dBA L_{eq} at this

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[15] Hoover and Keith. 2000. *Noise Control for Buildings, Manufacturing Plants, Equipment, and Products*. Houston, TX.

[16] Federal Highway Administration. 2006. FHWA Roadway Construction Noise Model User's Guide. FHWA-HEP-05-054. January. Available: https://www.gsweventcenter.com/Draft_SEIR_References/2006_01_Roadway_Construction_Noise_Model_User_Guide_FHWA.pdf. Accessed: October 20, 2020.

[17] Hoover and Keith. 2000. *Noise Control for Buildings, Manufacturing Plants, Equipment, and Products*. Houston, TX.

location. The modeled equipment noise level of 71 dBA Leq at this location would consequently exceed the existing ambient noise level, and the allowable noise limit, by up to approximately 8 dB. However, because the Project would be required to comply with Policy NS 2.4 as a condition of receiving building permits, compliance with the maximum allowable noise levels from Policy NS 2.4 must be demonstrated prior to the commencement of Project construction. This compliance can be achieved through the incorporation of attenuation features, such as selecting quitter equipment or enclosing equipment, among other options.

In addition, Policy NS 1.3 (Noise Source Control) requires property owners to control noise at its source, maintaining existing noise levels and ensuring that noise levels do not exceed acceptable noise standards as established in the Noise and Land Use Compatibility Guidelines.

Further, according to General Plan Policy NS 2.6 (Noise Reduction Techniques), mitigation measures shall be required (as appropriate, based on design, use, site layout and other considerations) to reduce noise impacts on adjacent properties through the following and other means, as a condition of development approval.

a. Screen and control noise sources such as parking, outdoor activities, and mechanical equipment.

b. Increase setbacks for noise sources from adjacent dwellings.

c. Wherever possible do not remove fences, walls or landscaping that serve as noise buffers, although design, safety, and other impacts must be addressed.

d. Require soundwalls, earth berms, and/or other landscape features to provide an adequate noise buffer.

e. Use soundproofing materials and double-glazed windows.

f. Control hours of operation, including deliveries and trash pickup to minimize noise impacts.

Finally, implementation of the City COA *Commercial and Industrial Stationary Noise,* which requires that noise associated with new commercial projects be controlled to not exceed the City noise level standards, would ensure that project rooftop equipment would not result in noise levels in excess of thresholds.

Implementation of required policies under the General Plan along with the City COA pertaining to Commercial and Industrial Stationary Noise would ensure noise levels from equipment are reduced to the allowable limits as a condition of development approval. Impacts related to mechanical equipment noise would be ***less than significant*** with implementation of required General Plan policies.

Operational Traffic

Once operational, the Project would result in an increase in traffic in the vicinity of the Project. Project-specific traffic data, including average daily traffic volumes, roadway speeds, and vehicle mix percentages (i.e., the proportion of automobiles, trucks, buses, and other vehicles) were provided by Fehr & Peers. The Project proposes a RIRO, or Right-In-Right-Out, driveway configuration. This indicates that vehicle traffic can only enter or exit the site by making a right-hand turn. Modeling was conducted for Existing and Existing plus Project conditions. Traffic noise modeling for Cumulative No Project and Cumulative plus Project conditions was also conducted; these results are presented in Appendix A, *Noise and Vibration Modeling Results*, for informational purposes, but are not used in the assessment of the Project's direct traffic noise impacts. Human sound perception, in general, is such that a change in sound level of 1 dB cannot typically be perceived by the human ear, a change in sound level of 3 dB is just noticeable, and a change of 5 dB is clearly noticeable. When assessing traffic noise impacts, the following thresholds are applied to determine the significance of Project-related traffic noise increases.

1. An increase of more than 5 dBA is considered a significant traffic noise increase, regardless of the existing ambient noise level.
2. In places where the existing or resulting noise environment is conditionally acceptable, normally unacceptable, or clearly unacceptable, based on the City Land Use Compatibility Guidelines, any noise increase greater than 3 dBA is considered a significant traffic noise increase.

According to the Noise Element of the General Plan, noise levels up to 60 dBA L_{dn} is considered normally acceptable for all residential land uses. Conditionally acceptable noise levels for residential land uses are between 60 and 75 dB L_{dn}. Noise levels above 75 dBA L_{dn} are considered unacceptable for residential land uses. Therefore, in areas where existing and resulting traffic noise levels are below 60 dBA L_{dn} along segments with residential land uses, a 5 dB increase is allowed before a significant traffic noise impact is identified. In areas where existing and resulting noise levels are in excess of 60 dBA L_{dn}, a 3 dB increase is allowed before a significant traffic noise impact is identified.

As described in Section 6.1, *Methods*, traffic noise modeling was conducted using a spreadsheet based on the FHWA Traffic Noise Model, version 2.5, and using provided traffic volumes, roadway speeds, and vehicle mix percentages. Traffic noise was evaluated in terms of how Project-related traffic noise increases could affect existing noise-sensitive land uses in the Project area. Refer to Table 6-5 for the traffic noise modeling results.

Table 6-5. Modeled Traffic Noise Levels

Roadway	Segment Location	Existing L_{dn}	Existing plus Project L_{dn}	Change (dB)
El Camino Real	North of Meadow Glen	68.9	68.9	0.0
El Camino Real	South of Meadow Glen	68.7	68.8	0.1
Broadway	North of Meadow Glen	56.3	56.5	0.2
Broadway	South of Meadow Glen	59.3	59.5	0.2
Magnolia	North of Meadow Glen	57.5	57.7	0.2
Magnolia	South of Meadow Glen	57.8	57.8	0.0
Meadow Glen	East of Broadway	59.8	60.1	0.3
Meadow Glen	West of Broadway	59.3	59.5	0.2
Meadow Glen	East of El Camino Real	51.3	51.3	0.0

Refer to Appendix A for the complete traffic noise modeling results, including modeling results for Cumulative no Project, and Cumulative Plus Project conditions (which are not used in this analysis).

As shown in Table 6-5, traffic noise modeling demonstrated that noise levels along the Site's adjacent roadway segments would increase by a maximum of 0.3 dB as a result of Project implementation. As described previously, a 3-dB increase is considered barely noticeable and would not constitute a significant increase in noise along any roadway segment, regardless of the existing noise environment. Therefore, traffic noise increases of up to 0.3 dB would not be considered substantial based on the thresholds defines previously. Traffic noise impacts resulting from Project implementation would be ***less than significant.***

Loading Dock Noise

With regard to loading dock and activity noise, the Project loading dock would be located in the Project parking garage. All loading would take place internally. An estimated 1 to 5 truck deliveries would occur per day for commercial land uses, with up to 278 annual loading activities for residential move in or move out activities. The infrequent truck loading and unloading activities in the Project garage would not be expected to result in a substantial increase in ambient noise levels external to the Project buildings. Noise impacts from loading activity would be ***less than significant.***

Impact Noise-2: Would the project result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels? (Less than Significant)

Damage to Structures

Construction of the Project would involve the use of construction equipment that could generate groundborne vibration. The most vibration-intensive equipment proposed for use during Project construction are vibratory rollers, excavators, and rubber-tired dozers; no pile driving is proposed for the Project. Estimated vibration levels associated construction equipment proposed for use under the project at a reference distance of 25 feet, and other distances, are shown in Table 6-6.

Table 6-6. Vibration Source Levels for Construction Equipment

Equipment	PPV at 25 Feet	PPV at 50 Feet	PPV at 85 Feet	PPV at 150 Feet	PPV at 250 Feet
Vibratory roller	**0.210**	0.074	**0.033**	**0.014**	0.007
Large dozer [a]	**0.089**	0.031	0.014	0.006	0.003
Small dozer [b]	**0.003**	0.001	0.000	**0.000**	0.000

Source: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment*, FTA Report No. 0123, 2018, https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf, accessed December 20, 2021.
Note: **Bold** values are discussed in the analysis.
[a] Representative of an excavator and rubber-tired dozer.
[b] Representative of a backhoe, front-end loader, and concrete mixer truck.

The nearest off-site structures to the Site are two commercial buildings. One commercial building is located approximately 85 feet to the northwest, across Meadow Glen Avenue (a Citibank building), and one is located approximately 85 feet to the southwest, across Broadway from the Site (a commercial building with multiple commercial establishments). The nearest single-family residences are located approximately 150 feet to the east of the Site, across El Camino Real, and the nearest multi-family residences are located approximately 250 feet to the northwest of the Site, across Meadow Glen Avenue.

Table 5-1 includes the Caltrans Guidelines for vibration-related damage. The commercial buildings located near the project site would be classified as “modern industrial/commercial buildings” under these guidelines, with an applicable vibration-related damage criterion of 0.5 PPV inches per second (in/sec). The single- and multi-family residential land uses located near the project site may be most similar to "new residential structures;" however, to ensure a conservative analysis, this vibration assessment considers nearby residences to be more similar to the "older residential structures" category shown in Table 5-1.

With regard to construction activities taking place on the Project site, the most-vibration intensive equipment proposed is a vibratory roller. As shown in Table 6-6 above, a vibratory roller can result in a vibration level of 0.03 PPV in/sec at a distance of 85 feet. This is below the 0.5 PPV in/sec Caltrans damage criterion for modern industrial/commercial buildings.[18]

At a distance of 150 feet, the distance to the closest residential land use from the Project site, a vibratory roller could result in a vibration level of up to 0.014 PPV in/sec. This level is below the 0.3 PPV in/sec Caltrans damage criterion for older residential structures. The nearest multi-family residential buildings to the Site are located farther away, at an estimated distance of 250 feet. Vibration levels from a vibratory roller, and the other less vibration-intensive equipment proposed, would be even lower at these structures.

Because the estimated ground vibration levels at the nearest structures would be below the applicable Caltrans damage criteria, vibration-related damage impacts from Site construction would be less than significant.

In addition to construction activities proposed for the Site, some off-site construction may take place to install new utility lines within Meadow Glen Avenue. This work would be relatively short-term (taking place for a total of 3 weeks) and would move linearly along the alignment of the utility work. Construction equipment expected to be used for this activity are a backhoe, excavator, loader, dump truck, and a roller.

The most vibration intensive equipment that would be required for this work is a vibratory roller. The nearest existing structure to the proposed utility construction area would be the Citibank commercial building, located approximately 25 feet from the nearest utility work area at the northwest corner of Meadow Glen Avenue and Broadway. Because this structure is a modern industrial/commercial building, the applicable Caltrans damage criterion would be 0.5 PPV in/sec. At a distance of 25 feet, a vibratory roller would result in an estimated vibration level of 0.21 PPV in/sec. All other construction equipment would result in even lower vibration levels, as shown in Table 6-6. In addition, vibration levels from utility construction would be even lower at other off-site structures located more than 25 feet from this work. Therefore, vibration-related damage effects from utility construction to nearby off-site structures would be less than significant.

Based on the analysis presented above, construction at the Project site and within Meadow Glen Avenue (for the proposed utility line replacement) would result in vibration levels below the applicable damage criteria at nearby structures. Damage-related vibration impacts from Project construction activities would be ***less than significant.***

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[18] California Department of Transportation. 2020 (April). *Transportation and Construction Vibration Guidance Manual*. Sacramento, CA: Noise, Division of Environmental Analysis. Sacramento, CA. Available: https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tcvgm-apr2020-a11y.pdf. Accessed: October 20, 2021. Page 38.

Vibration-Related Annoyance

Regarding annoyance-related vibration impacts, vibration-related annoyance is considered to be substantial if it is expected to result in sleep disturbance at nearby residences. Sleep disturbance from vibration typically occurs only if residences are very close to nighttime ground-disturbing construction activities. For the purposes of this analysis, a significant vibration impact related to sleep disturbance could occur if nighttime construction activities generate prolonged vibration levels that are strongly perceptible (i.e., PPV of 0.01 in/sec) at locations where people sleep.

Construction for the Project would typically occur during the daytime allowable hours in the city of 7:30 a.m. to 7:00 p.m., Monday through Friday, 8:00 a.m. and 6:00 p.m. on Saturdays, and between 9:00 a.m. and 6:00 p.m. on Sundays and holidays. However, limited instances of nighttime construction may occur for major concrete pours and crane erection and dismantling. Specifically, 1 night of crane erection, 1 night of crane dismantling, and up to 6 nights of concrete pours may take place over the project construction period.

The construction activity proposed for nighttime hours with the greatest potential to result in vibration-related annoyance impacts would be the concrete pours. Concrete mixer trucks and concrete pumps do not typically generate high levels of vibration. In general, this equipment generates vibration levels similar to, or lower than, that of a small bulldozer. At a reference distance of 25 feet, a small bulldozer could produce vibration levels as high as 0.003 PPV in/sec.

The specific staging areas for nighttime concrete pours are not known at this time, so it is conservatively assumed that concrete pours could take place anywhere on the Site. The nearest sensitive land use (e.g., place where people sleep) to the Site would be the single-family residence located 150 feet east of the Project, across El Camino Real. At a distance of 150 feet, the vibration level from a small dozer (representative of concrete pump and mixer trucks) would be approximately 0.0002 PPV in/sec. This vibration level is well below the Caltrans “strongly perceptible” criterion for vibration-related annoyance of 0.1 PPV in/sec.[19] Nighttime concrete pours would typically take place even farther from nearby residential land uses, resulting in even lower vibration levels. Because nighttime Project construction would not exceed this criterion, vibration impacts related to annoyance would be ***less than significant***.

Impact Noise-3: For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project expose of people residing or working in the project area to excessive noise levels (No Impact)

The closest airport to the Project site is SFO, and the runway at this airport is approximately 0.7 mile to the northeast of the Project site. This airport is within a 2-mile radius of the Project, and thus the 2012 Comprehensive Airport Land Use Compatibility Plan for the Environs of San Francisco

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[19] California Department of Transportation. 2020 (April). Transportation and Construction Vibration Guidance Manual. Sacramento, CA: Noise, Division of Environmental Analysis. Sacramento, CA. Available: https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tcvgm-apr2020-a11y.pdf. Accessed: December 20, 2021. Page 38.

International Airport [20] is used to evaluate the airport's noise contours in relation to the Site. The Site is approximately 1,400 feet outside of the 65 dB noise contour line of SFO, and, based on the Comprehensive Airport Land Use Compatibility Plan for the Environs of San Francisco International Airport, residential land uses located outside of the 65 dB CNEL contour are deemed compatible with the airport-related noise. As such, the Project would not expose people working or residing in the Project area to excessive noise levels resulting from either a public or public use airport or private airstrip. There would be ***no impact*** related to aircraft noise from private airstrips or public use airports.

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[20] City/County Association of Governments. 2012. *Comprehensive Airport Land Use Compatibility Plan for the Environs of San Francisco International Airport*. November. Available: https://ccag.ca.gov/wp-content/uploads/2014/10/Consolidated_CCAG_ALUCP_November-20121.pdf. Accessed: December 4, 2021.

Appendix A

Noise and Vibration Modeling Results

Construction Traffic Noise Modeling

Constructin Equipment from the Applicant

Phase	Equipment	Fuel Type	Quantity	Engine Size	Utilization for Duration	Project Sponsor Load Factor	Construction Equipment Terminology	Lmax Noise Level 50 feet
Demolition	Concrete/Industrial Saws	Diesel	1	81	8	0.73	Concrete Saw	90
	Excavators	Diesel	3	158	8	0.38	Excavator	81
	Rubber Tired Dozers	Diesel	2	247	8	0.4	Dozer	82
Site Preparation	Rubber Tired Dozers	Diesel	3	247	8	0.4	Dozer	82
	Tractors/Loaders/Backhoes	Diesel	4	97	8	0.37	Tractor	84
Grading	Excavators	Diesel	1	158	8	0.38	Excavator	81
	Graders	Diesel	1	187	8	0.41	Grader	85
	Rubber Tired Dozers	Diesel	1	247	8	0.4	Dozer	82
	Tractors/Loaders/Backhoes	Diesel	3	97	8	0.37	Tractor	84
Building Construction	Cranes	Electric	1	231	7	0.29	Crane	81
	Forklifts	Diesel	3	89	8	0.2	Tractor	84
	Generator Sets	Diesel	1	84	8	0.74	Generator	81
	Tractors/Loaders/Backhoes	Diesel	3	97	7	0.37	Tractor	84
	Welders	Diesel	1	46	8	0.45	Welder / Torch	74
Paving	Pavers	Diesel	2	130	8	0.42	Paver	77
	Paving Equipment	Diesel	2	132	8	0.36	Paver	77
	Rollers	Diesel	2	80	8	0.38	Roller	80
Architectural Coating	Air Compressors	Diesel	1	78	6	0.48	Compressor (air)	78
Concrete Pouring	Concrete Pump	--	1	--	--	--	Concrete Pump Truck	81
	Concrete Mixer Trucks	--	2	--	--	--	Concrete Mixer Truck	79
Crane Assembly and dismantling	Cranes	--	1	--	--	--	Crane	81

Construction Noise Summary

Phase	**Distance**	**Calculated Leq (dBA)**	**Worst case, Nearest Sensitive Use**	**Attenuation**	**Noise Level at Nearest Receptors**
Demolition	50	85	150	-9.5	76
Site Preparation	50	84	150	-9.5	75
Grading	50	85	150	-9.5	76
Building Construction	50	84	150	-9.5	75
Paving	50	78	150	-9.5	69
Architectural Coating	50	74	150	-9.5	64
Nighttime Construction Activities	50	79	150	-9.5	70

Table 1. Construction Noise

Source Data:	Maximum Sound Level (dBA)	Utilization Factor	Leq Sound Level (dBA)
Construction Condition: Demolition			
Source 1: Concrete saw - Sound level (dBA) at 50 feet =	90	20%	83.0
Source 2: Dozer - Sound level (dBA) at 50 feet =	82	40%	78.0
Source 3: Dozer - Sound level (dBA) at 50 feet =	82	40%	78.0
Calculated Data:			
All Sources Combined - Lmax sound level (dBA) at 50 feet =			91
All Sources Combined - Leq sound level (dBA) at 50 feet =			85

Distance Between Source and Receiver (ft.)	Geometric Attenuation (dB)	Ground Effect Attenuation (dB)	Calculated Lmax Sound Level (dBA)	Calculated Leq Sound Level (dBA)
50	0	0.0	91	85
65	-2	0.0	89	83
100	-6	0.0	85	79
150	-10	0.0	82	76
250	-14	0.0	77	71
280	-15	0.0	76	70
500	-20	0.0	71	65
600	-22	0.0	70	64
850	-25	0.0	67	61
1000	-26	0.0	65	59
1200	-28	0.0	64	58

Geometric attenuation based on 6 dB per doubling of distance.

Note: This calculation does not include the effects, if any, of local shielding from walls, topography or other barriers which may reduce sound levels further.

Table 2. Construction Noise

Source Data:	Maximum Sound Level (dBA)	Utilization Factor	Leq Sound Level (dBA)
Construction Condition: Site Preparation			
Source 1: Tractor - Sound level (dBA) at 50 feet =	84	40%	80.0
Source 2: Tractor - Sound level (dBA) at 50 feet =	84	40%	80.0
Source 3: Dozer - Sound level (dBA) at 50 feet =	82	40%	78.0
Calculated Data:			
All Sources Combined - Lmax sound level (dBA) at 50 feet =			88
All Sources Combined - Leq sound level (dBA) at 50 feet =			84

Distance Between Source and Receiver (ft.)	Geometric Attenuation (dB)	Ground Effect Attenuation (dB)	Calculated Lmax Sound Level (dBA)	Calculated Leq Sound Level (dBA)
50	0	0.0	88	84
65	-2	0.0	86	82
100	-6	0.0	82	78
150	-10	0.0	79	75
250	-14	0.0	74	70
280	-15	0.0	73	69
500	-20	0.0	68	64
600	-22	0.0	67	63
850	-25	0.0	64	60
1000	-26	0.0	62	58
1200	-28	0.0	61	57

Geometric attenuation based on 6 dB per doubling of distance.

Note: This calculation does not include the effects, if any, of local shielding from walls, topography or other barriers which may reduce sound levels further.

Table 3. Construction Noise

Source Data:	**Maximum Sound Level (dBA)**	**Utilization Factor**	**Leq Sound Level (dBA)**
Construction Condition: Grading			
Source 1: Grader - Sound level (dBA) at 50 feet =	85	40%	81.0
Source 2: Tractor - Sound level (dBA) at 50 feet =	84	40%	80.0
Source 3: Tractor - Sound level (dBA) at 50 feet =	84	40%	80.0
Calculated Data:			
All Sources Combined - Lmax sound level (dBA) at 50 feet =			89
All Sources Combined - Leq sound level (dBA) at 50 feet =			85

Distance Between Source and Receiver (ft.)	Geometric Attenuation (dB)	Ground Effect Attenuation (dB)	Calculated Lmax Sound Level (dBA)	Calculated Leq Sound Level (dBA)
50	0	0.0	89	85
65	-2	0.0	87	83
100	-6	0.0	83	79
150	-10	0.0	80	76
250	-14	0.0	75	71
280	-15	0.0	74	70
500	-20	0.0	69	65
600	-22	0.0	68	64
850	-25	0.0	65	61
1000	-26	0.0	63	59
1200	-28	0.0	62	58

Geometric attenuation based on 6 dB per doubling of distance.

Note: This calculation does not include the effects, if any, of local shielding from walls, topography or other barriers which may reduce sound levels further.

Table 4. Construction Noise

Source Data:	Maximum Sound Level (dBA)	Utilization Factor	Leq Sound Level (dBA)
Construction Condition: Building Construction			
Source 1: Generator - Sound level (dBA) at 50 feet =	81	50%	78.0
Source 2: Tractor - Sound level (dBA) at 50 feet =	84	40%	80.0
Source 3: Tractor - Sound level (dBA) at 50 feet =	84	40%	80.0
Calculated Data:			
All Sources Combined - Lmax sound level (dBA) at 50 feet =			88
All Sources Combined - Leq sound level (dBA) at 50 feet =			84

Distance Between Source and Receiver (ft.)	Geometric Attenuation (dB)	Ground Effect Attenuation (dB)	Calculated Lmax Sound Level (dBA)	Calculated Leq Sound Level (dBA)
50	0	0.0	88	84
65	-2	0.0	86	82
100	-6	0.0	82	78
150	-10	0.0	78	75
250	-14	0.0	74	70
280	-15	0.0	73	69
500	-20	0.0	68	64
600	-22	0.0	66	63
850	-25	0.0	63	60
1000	-26	0.0	62	58
1200	-28	0.0	60	57

Geometric attenuation based on 6 dB per doubling of distance.

Note: This calculation does not include the effects, if any, of local shielding from walls, topography or other barriers which may reduce sound levels further.

Table 5. Construction Noise

Source Data:	**Maximum Sound Level (dBA)**	**Utilization Factor**	**Leq Sound Level (dBA)**
Construction Condition: Paving			
Source 1: Roller - Sound level (dBA) at 50 feet =	80	20%	73.0
Source 2: Roller - Sound level (dBA) at 50 feet =	80	20%	73.0
Source 3: Paver - Sound level (dBA) at 50 feet =	77	50%	74.0
Calculated Data:			
All Sources Combined - Lmax sound level (dBA) at 50 feet =			84
All Sources Combined - Leq sound level (dBA) at 50 feet =			78

Distance Between Source and Receiver (ft.)	Geometric Attenuation (dB)	Ground Effect Attenuation (dB)	Calculated Lmax Sound Level (dBA)	Calculated Leq Sound Level (dBA)
50	0	0.0	84	78
65	-2	0.0	82	76
100	-6	0.0	78	72
150	-10	0.0	74	69
250	-14	0.0	70	64
280	-15	0.0	69	63
500	-20	0.0	64	58
600	-22	0.0	62	57
850	-25	0.0	59	54
1000	-26	0.0	58	52
1200	-28	0.0	56	51

Geometric attenuation based on 6 dB per doubling of distance.

Note: This calculation does not include the effects, if any, of local shielding from walls, topography or other barriers which may reduce sound levels further.

Table 6. Construction Noise

Source Data:	**Maximum Sound Level (dBA)**	**Utilization Factor**	**Leq Sound Level (dBA)**
Construction Condition: Architectural Coating			
Source 1: Air Compressor - Sound level (dBA) at 50 feet =	78	40%	74.0
Calculated Data:			
All Sources Combined - Lmax sound level (dBA) at 50 feet =			78
All Sources Combined - Leq sound level (dBA) at 50 feet =			74

Distance Between Source and Receiver (ft.)	Geometric Attenuation (dB)	Ground Effect Attenuation (dB)	Calculated Lmax Sound Level (dBA)	Calculated Leq Sound Level (dBA)
50	0	0.0	78	74
65	-2	0.0	76	72
100	-6	0.0	72	68
150	-10	0.0	68	64
250	-14	0.0	64	60
280	-15	0.0	63	59
500	-20	0.0	58	54
600	-22	0.0	56	52
850	-25	0.0	53	49
1000	-26	0.0	52	48
1200	-28	0.0	50	46

Geometric attenuation based on 6 dB per doubling of distance.
Note: This calculation does not include the effects, if any, of local shielding
from walls, topography or other barriers which may reduce sound levels further.

Table 7. Construction Noise

Source Data:	**Maximum Sound Level (dBA)**	**Utilization Factor**	**Leq Sound Level (dBA)**
Construction Condition: Nighttime Concrete Pouring			
Source 1: Concrete pump truck - Sound level (dBA) at 50 feet =	81	20%	74.0
Source 2: Concrete mixer truck - Sound level (dBA) at 50 feet =	79	40%	75.0
Source 3: Concrete mixer truck - Sound level (dBA) at 50 feet =	79	40%	75.0
Calculated Data:			
All Sources Combined - Lmax sound level (dBA) at 50 feet =			85
All Sources Combined - Leq sound level (dBA) at 50 feet =			79

Distance Between Source and Receiver (ft.)	Geometric Attenuation (dB)	Ground Effect Attenuation (dB)	Calculated Lmax Sound Level (dBA)	Calculated Leq Sound Level (dBA)
50	0	0.0	85	79
65	-2	0.0	82	77
100	-6	0.0	79	73
150	**-10**	**0.0**	**75**	**70**
250	**-14**	**0.0**	**71**	**66**
280	**-15**	**0.0**	**70**	**65**
500	-20	0.0	65	59
600	-22	0.0	63	58
850	-25	0.0	60	55
1000	-26	0.0	59	53
1200	-28	0.0	57	52

Geometric attenuation based on 6 dB per doubling of distance.

Note: This calculation does not include the effects, if any, of local shielding from walls, topography or other barriers which may reduce sound levels further.

Table 8. Construction Noise

Source Data:	**Maximum Sound Level (dBA)**	**Utilization Factor**	**Leq Sound Level (dBA)**
Construction Condition: Nighttime Crane Assembly			
Source 1: Crane - Sound level (dBA) at 50 feet =	81	16%	73.0
Calculated Data:			
All Sources Combined - Lmax sound level (dBA) at 50 feet =			81
All Sources Combined - Leq sound level (dBA) at 50 feet =			73

Distance Between Source and Receiver (ft.)	Geometric Attenuation (dB)	Ground Effect Attenuation (dB)	Calculated Lmax Sound Level (dBA)	Calculated Leq Sound Level (dBA)
50	0	0.0	81	73
65	-2	0.0	79	71
100	-6	0.0	75	67
150	**-10**	**0.0**	**71**	**63**
250	**-14**	**0.0**	**67**	**59**
280	**-15**	**0.0**	**66**	**58**
500	-20	0.0	61	53
600	-22	0.0	59	51
850	-25	0.0	56	48
1000	-26	0.0	55	47
1200	-28	0.0	53	45

Geometric attenuation based on 6 dB per doubling of distance.

Note: This calculation does not include the effects, if any, of local shielding from walls, topography or other barriers which may reduce sound levels further.

Traffic Noise Modeling
Data and Results

Traffic Noise Analysis, Received Data

Roadway	Segment	Heavy Truck %	Speed Limit	Existing	Existing + Project (Full Access Driveway) *NOT USED*	Existing + Project (RIRO Driveway)	Cumulative 2040	Cumulative 2040 + Project (Full Access driveway) *NOT USED*	Cumulative 2040 + Project (RIRO driveway)
El Camino Real	North of Meadow Glen	3%	35	26,600	27,040	26,800	33,920	34,360	34,120
El Camino Real	South of Meadow Glen	3%	35	25300	25990	25560	32260	32950	32520
Broadway	North of Meadow Glen	3%	25	2,590	2,680	2,740	3,310	3,400	3,460
Broadway	South of Meadow Glen	3%	25	5280	5520	5550	6730	6970	7000
Magnolia	North of Meadow Glen	3%	25	3,440	3,560	3,490	4,390	4,510	4,440
Magnolia	South of Meadow Glen	3%	25	3630	3700	3660	4640	4710	4670
Meadow Glen	East of Broadway	3%	25	5,970	6,280	6,380	7,610	7,920	8,020
Meadow Glen	West of Broadway	3%	25	5,260	5,450	5,340	6,700	6,890	6,780
Meadow Glen	East of El Camino Real	3%	25	720	720	720	910	910	910

Direct Traffic Noise Analysis, RIRO Driveway Summary

							Existing Traffic Noise Levels (dBA)			Existing + Project (RIRO Driveway) Traffic Noise Levels (dBA)			
Roadway	Segment	Heavy Truck %	Speed Limit (MPH)	Existing	Existing + Project (RIRO Driveway)	Traffic Increase (%)	Ldn	CNEL	Leq	Ldn	CNEL	Leq	Change in Sound Level (dBA Ldn)
El Camino Real	North of Meadow Glen	3%	35	26,600	26,800	1%	68.9	69.5	68.1	68.9	69.5	68.1	0.03
El Camino Real	South of Meadow Glen	3%	35	25300	25560	1%	68.7	69.2	67.8	68.7	69.3	67.9	0.04
Broadway	North of Meadow Glen	3%	25	2,590	2,740	6%	56.3	56.9	55.4	56.6	57.2	55.6	0.23
Broadway	South of Meadow Glen	3%	25	5280	5550	5%	59.3	59.9	58.5	59.5	60.1	58.7	0.21
Magnolia	North of Meadow Glen	3%	25	3,440	3,490	1%	57.5	58.1	56.6	57.6	58.2	56.7	0.06
Magnolia	South of Meadow Glen	3%	25	3630	3660	1%	57.8	58.3	56.8	57.8	58.4	56.9	0.03
Meadow Glen	East of Broadway	3%	25	5,970	6,380	7%	59.8	60.4	59.0	60.1	60.7	59.3	0.28
Meadow Glen	West of Broadway	3%	25	5,260	5,340	2%	59.3	59.9	58.4	59.4	60.0	58.5	0.06
Meadow Glen	East of El Camino Real	3%	25	720	720	0%	51.3	51.9	50.0	51.3	51.9	50.0	0.00

Cumulative Traffic Noise Analysis, RIRO Driveway Summary

							Cumulative Traffic Noise Levels (dBA)			Existing + Project (RIRO Driveway) Traffic Noise Levels (dBA)			
Roadway	Segment	Heavy Truck %	Speed Limit (MPH)	Cumulative (2040)	Cumulative 2040 + Project (RIRO Driveway)	Traffic Increase (%)	Ldn	CNEL	Leq	Ldn	CNEL	Leq	Change in Sound Level (dBA Ldn)
El Camino Real	North of Meadow Glen	3%	35	33,920	34,120	1%	69.9	70.5	69.1	69.9	70.5	69.1	0.03
El Camino Real	South of Meadow Glen	3%	35	32260	32520	1%	69.7	70.3	68.9	69.7	70.3	68.9	0.03
Broadway	North of Meadow Glen	3%	25	3,310	3,460	5%	57.4	57.9	56.4	57.6	58.1	56.6	0.18
Broadway	South of Meadow Glen	3%	25	6730	7000	4%	60.4	60.9	59.5	60.5	61.1	59.7	0.17
Magnolia	North of Meadow Glen	3%	25	4,390	4,440	1%	58.5	59.1	57.7	58.6	59.2	57.7	0.05
Magnolia	South of Meadow Glen	3%	25	4640	4670	1%	58.8	59.4	57.9	58.8	59.4	57.9	0.03
Meadow Glen	East of Broadway	3%	25	7,610	8,020	5%	60.9	61.5	60.0	61.1	61.7	60.3	0.22
Meadow Glen	West of Broadway	3%	25	6,700	6,780	1%	60.3	60.9	59.5	60.4	61.0	59.5	0.05
Meadow Glen	East of El Camino Real	3%	25	910	910	0%	52.2	52.8	51.0	52.2	52.8	51.0	0.00

Existing Traffic Noise Modeling Results

This spreadsheet calculates traffic noise levels based on TNM Version 2.5 Lookup Tables.

**** Type in yellow cells only.**

Traffic Data:

● Enter ADT Traffic

○ Enter Loudest-hour Traffic

Units:

○ Metric

● English

Calculate

ICF INTERNATIONAL®

Link	Roadway	Segment Location	Hard or Soft Ground (H or S)	BARRIER			Total Daily Traffic Volumes (ADT)	Traffic Mix		Vehicle Speed	Sound Levels at Receiver Locations			
				Present 1=yes	Height min. 7 ft. max. 32 ft.	Distance 35 ft. or 100 ft.		Number #	Description	mph max. 80	Distance feet, min. 33 max. 1000	dB Ldn	dB CNEL	dBA Leq1h (loudest hour)
1	El Camino Real	North of Meadow Glen	H				26,600	1	3% HT	35	50	68.9	69.5	68.1
2	El Camino Real	South of Meadow Glen	H				25,300	1	3% HT	35	50	68.7	69.2	67.8
3	Broadway	North of Meadow Glen	H				2,590	1	3% HT	25	50	56.3	56.9	55.4
4	Broadway	South of Meadow Glen	H				5,280	1	3% HT	25	50	59.3	59.9	58.5
5	Magnolia	North of Meadow Glen	H				3,440	1	3% HT	25	50	57.5	58.1	56.6
6	Magnolia	South of Meadow Glen	H				3,630	1	3% HT	25	50	57.8	58.3	56.8
7	Meadow Glen	East of Broadway	H				5,970	1	3% HT	25	50	59.8	60.4	59.0
8	Meadow Glen	West of Broadway	H				5,260	1	3% HT	25	50	59.3	59.9	58.4
9	Meadow Glen	East of El Camino Real	H				720	1	3% HT	25	50	51.3	51.9	50.0

Existing plus Project Traffic Noise Modeling Results

This spreadsheet calculates traffic noise levels based on TNM Version 2.5 Lookup Tables.

**** Type in yellow cells only.**

Traffic Data:

● **Enter ADT Traffic**

○ **Enter Loudest-hour Traffic**

Units:

○ **Metric**

● **English**

Calculate

INTERNATIONAL®

Link	Roadway	Segment Location	Hard or Soft Ground (H or S)	BARRIER Present 1=yes	 Height min. 7 ft. max. 32 ft.	 Distance 35 ft. or 100 ft.	Total Daily Traffic Volumes **(ADT)**	Traffic Mix Number #	 Description	Vehicle Speed mph max. 80	Sound Levels at Receiver Locations Distance feet, min. 33 max. 1000	 dB Ldn	 dB CNEL	 dBA Leq1h (loudest hour)
1	**El Camino Real**	**North of Meadow Glen**	H				26,800	1	3% HT	35	50	**68.9**	**69.5**	**68.1**
2	**El Camino Real**	**South of Meadow Glen**	H				25,560	1	3% HT	35	50	**68.7**	**69.3**	**67.9**
3	**Broadway**	**North of Meadow Glen**	H				2,740	1	3% HT	25	50	**56.6**	**57.2**	**55.6**
4	**Broadway**	**South of Meadow Glen**	H				5,550	1	3% HT	25	50	**59.5**	**60.1**	**58.7**
5	**Magnolia**	**North of Meadow Glen**	H				3,490	1	3% HT	25	50	**57.6**	**58.2**	**56.7**
6	**Magnolia**	**South of Meadow Glen**	H				3,660	1	3% HT	25	50	**57.8**	**58.4**	**56.9**
7	**Meadow Glen**	**East of Broadway**	H				6,380	1	3% HT	25	50	**60.1**	**60.7**	**59.3**
8	**Meadow Glen**	**West of Broadway**	H				5,340	1	3% HT	25	50	**59.4**	**60.0**	**58.5**
9	**Meadow Glen**	**East of El Camino Real**	H				720	1	3% HT	25	50	**51.3**	**51.9**	**50.0**

Cumulative Traffic Noise Modeling Results

This spreadsheet calculates traffic noise levels based on TNM Version 2.5 Lookup Tables.

**** Type in yellow cells only.**

Traffic Data: Units:

● **Enter ADT Traffic**

○ **Enter Loudest-hour Traffic**

Calculate

Link	Roadway	Segment Location	Hard or Soft Ground (H or S)	BARRIER			Total Daily Traffic Volumes (ADT)	Traffic Mix		Vehicle Speed	Sound Levels at Receiver Locations			
				Present 1=yes	Height min. 7 ft. max. 32 ft.	Distance 35 ft. or 100 ft.		Number #	Description	mph max. 80	Distance feet, min. 33 max. 1000	dB Ldn	dB CNEL	dBA Leq1h (loudest hour)
1	**El Camino Real**	**North of Meadow Glen**	H				33,920	1	3% HT	35	50	**69.9**	**70.5**	**69.1**
2	**El Camino Real**	**South of Meadow Glen**	H				32,260	1	3% HT	35	50	**69.7**	**70.3**	**68.9**
3	**Broadway**	**North of Meadow Glen**	H				3,310	1	3% HT	25	50	**57.4**	**57.9**	**56.4**
4	**Broadway**	**South of Meadow Glen**	H				6,730	1	3% HT	25	50	**60.4**	**60.9**	**59.5**
5	**Magnolia**	**North of Meadow Glen**	H				4,390	1	3% HT	25	50	**58.5**	**59.1**	**57.7**
6	**Magnolia**	**South of Meadow Glen**	H				4,640	1	3% HT	25	50	**58.8**	**59.4**	**57.9**
7	**Meadow Glen**	**East of Broadway**	H				7,610	1	3% HT	25	50	**60.9**	**61.5**	**60.0**
8	**Meadow Glen**	**West of Broadway**	H				6,700	1	3% HT	25	50	**60.3**	**60.9**	**59.5**
9	**Meadow Glen**	**East of El Camino Real**	H				910	1	3% HT	25	50	**52.2**	**52.8**	**51.0**

Cumulative plus Project Traffic Noise Modeling Results

This spreadsheet calculates traffic noise levels based on TNM Version 2.5 Lookup Tables.

**** Type in yellow cells only.**

Traffic Data:

● **Enter ADT Traffic**

○ **Enter Loudest-hour Traffic**

Units:

○ **Metric**

● **English**

Calculate

Link	Roadway	Segment Location	Hard or Soft Ground (H or S)	BARRIER			Total Daily Traffic Volumes (ADT)	Traffic Mix		Vehicle Speed	Sound Levels at Receiver Locations			
				Present 1=yes	Height min. 7 ft. max. 32 ft.	Distance 35 ft. or 100 ft.		Number #	Description	mph max. 80	Distance feet, min. 33 max. 1000	dB Ldn	dB CNEL	dBA Leq1h (loudest hour)
1	El Camino Real	North of Meadow Glen	H				34,120	1	3% HT	35	50	69.9	70.5	69.1
2	El Camino Real	South of Meadow Glen	H				32,520	1	3% HT	35	50	69.7	70.3	68.9
3	Broadway	North of Meadow Glen	H				3,460	1	3% HT	25	50	57.6	58.1	56.6
4	Broadway	South of Meadow Glen	H				7,000	1	3% HT	25	50	60.5	61.1	59.7
5	Magnolia	North of Meadow Glen	H				4,440	1	3% HT	25	50	58.6	59.2	57.7
6	Magnolia	South of Meadow Glen	H				4,670	1	3% HT	25	50	58.8	59.4	57.9
7	Meadow Glen	East of Broadway	H				8,020	1	3% HT	25	50	61.1	61.7	60.3
8	Meadow Glen	West of Broadway	H				6,780	1	3% HT	25	50	60.4	61.0	59.5
9	Meadow Glen	East of El Camino Real	H				910	1	3% HT	25	50	52.2	52.8	51.0

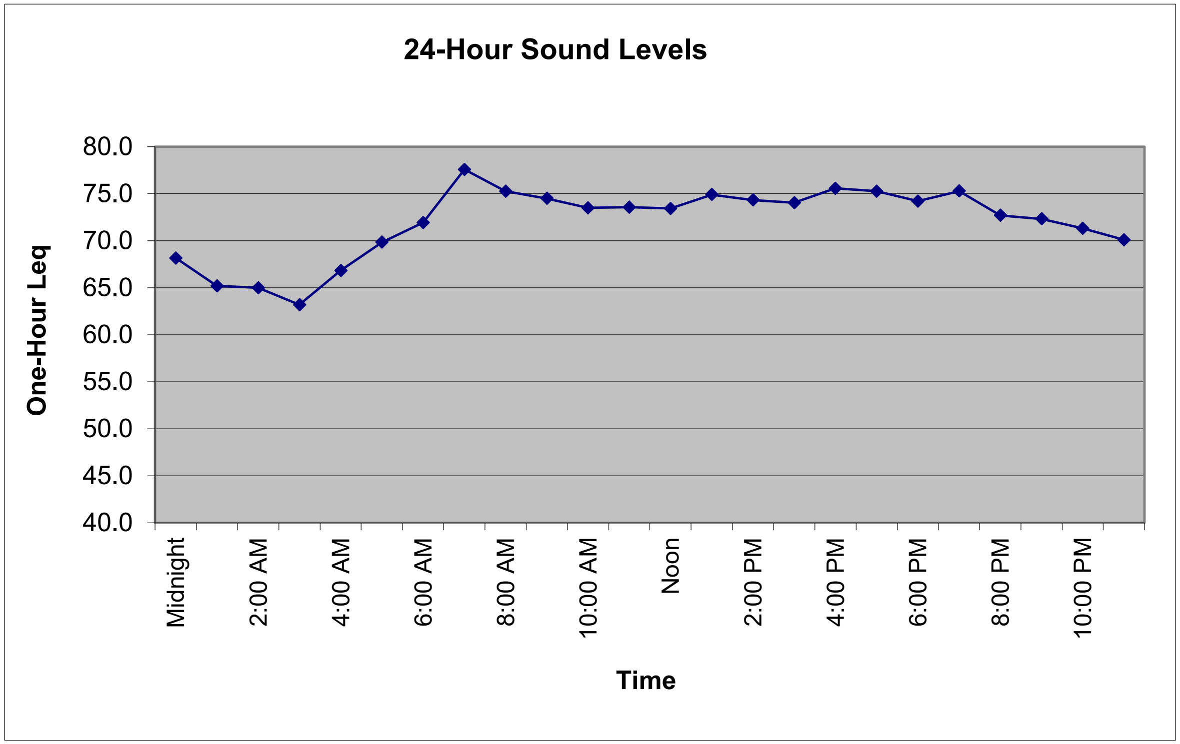
Noise Appendix

Long Term Measurement Data

Ldn/CNEL Calculation Spreadsheet

Project: 959 El Camino Real Date: 9/14/2021 Analyst: Schumaker, N
Location: LT-1

Time	Tuesday 9/14/2021	Leq(24)	Ldn	CNEL	Worst Hour Leq	Ldn minus Worst Hour Leq	CNEL minus Ldn	Day
Midnight	68.1	73.2	76.7	77.2	77.6	-0.9	0.5	Evening
1:00 AM	65.2		-0.9	-0.3				Night
2:00 AM	65.0							
3:00 AM	63.2							
4:00 AM	66.8							
5:00 AM	69.8							
6:00 AM	71.9							
7:00 AM	77.6							
8:00 AM	75.2							
9:00 AM	74.5							
10:00 AM	73.5							
11:00 AM	73.5							
Noon	73.4							
1:00 PM	74.9							
2:00 PM	74.3							
3:00 PM	74.0							
4:00 PM	75.6							
5:00 PM	75.2							
6:00 PM	74.2							
7:00 PM	75.3							
8:00 PM	72.7							
9:00 PM	72.3							
10:00 PM	71.3							
11:00 PM	70.1							



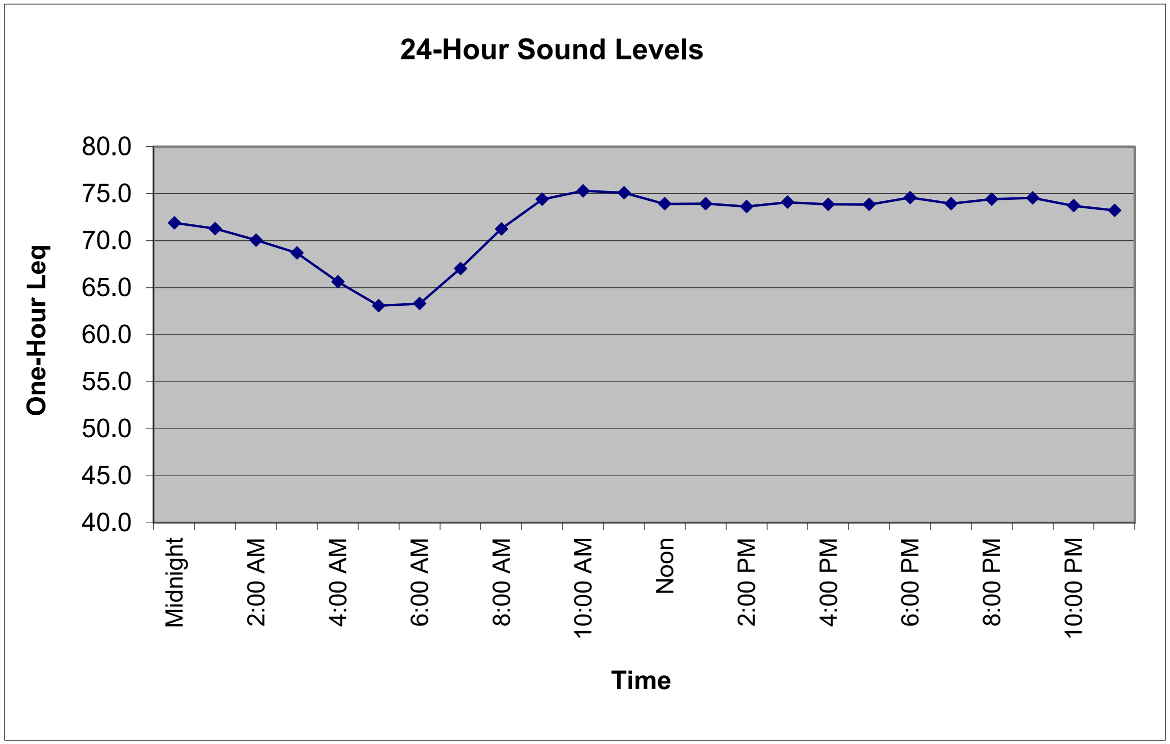
Ldn	76.7
Worst Hour Leq	77.6
Lowest Hour LEQ	63.2
12-hour Leq	74.8

Ldn/CNEL Calculation Spreadsheet

Project: 959 El Camino Real Date: 9/15/2021 Analyst: Schumaker, N

Location: LT-1

Time	Wednesday 9/15/2021	Leq(24)	Ldn	CNEL	Worst Hour Leq	Ldn minus Worst Hour Leq	CNEL minus Ldn	Day
Midnight	71.9	72.9	77.5	78.0	75.3	2.2	0.5	Evening
1:00 AM	71.3		10.5	11.0				Night
2:00 AM	70.0							
3:00 AM	68.7							
4:00 AM	65.6							
5:00 AM	63.1							
6:00 AM	63.3							
7:00 AM	67.0							
8:00 AM	71.2							
9:00 AM	74.4							
10:00 AM	75.3							
11:00 AM	75.1							
Noon	73.9							
1:00 PM	73.9							
2:00 PM	73.6							
3:00 PM	74.1							
4:00 PM	73.9							
5:00 PM	73.8							
6:00 PM	74.6							
7:00 PM	73.9							
8:00 PM	74.4							
9:00 PM	74.5							
10:00 PM	73.7							
11:00 PM	73.2							

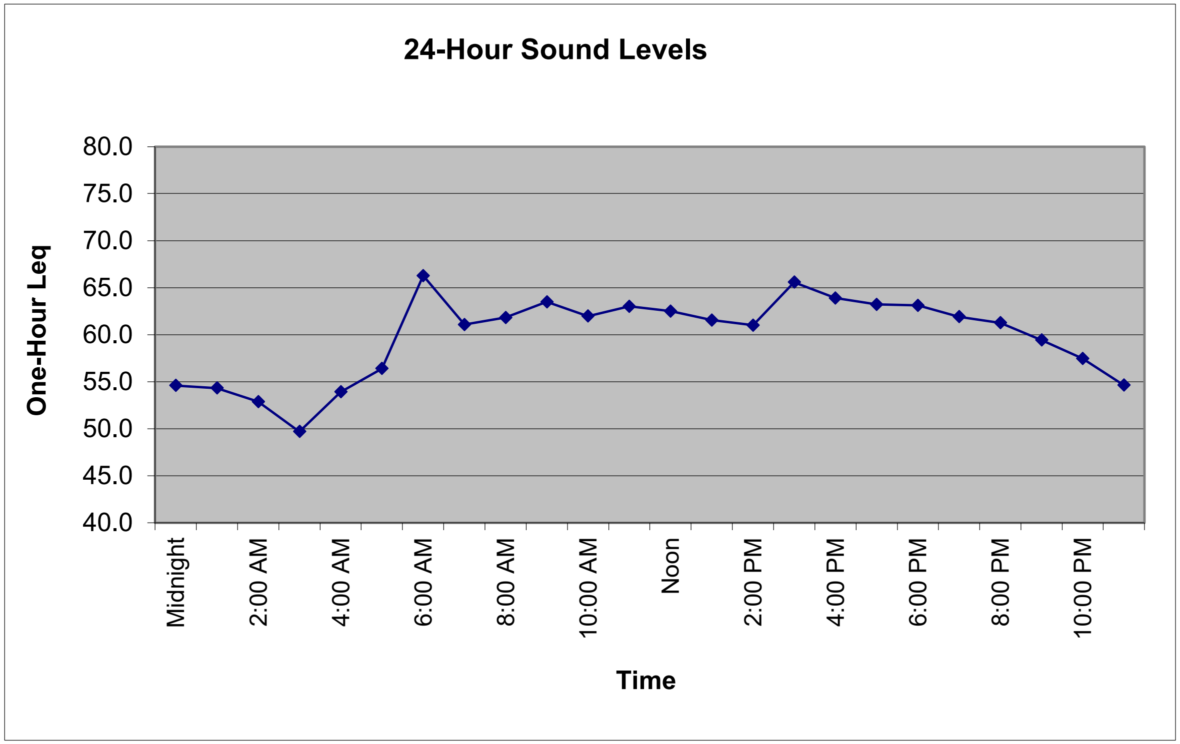


Ldn	77.5
Worst Hour Leq	75.3
Lowest Hour LEQ	63.1
12-hour Leq	73.8

Ldn/CNEL Calculation Spreadsheet

Project: 959 El Camino Real Date: 9/14/2021 Analyst: Schumaker, N
Location: LT-2

Time	Tuesday 9/14/2021	Leq(24)	Ldn	CNEL	Worst Hour Leq	Ldn minus Worst Hour Leq	CNEL minus Ldn	Day
Midnight	54.6	61.5	65.9	66.3	66.3	-0.4	0.4	Evening
1:00 AM	54.3		4.8	5.2				Night
2:00 AM	52.9							
3:00 AM	49.7							
4:00 AM	53.9							
5:00 AM	56.4							
6:00 AM	66.3							
7:00 AM	61.1							
8:00 AM	61.8							
9:00 AM	63.5							
10:00 AM	62.0							
11:00 AM	63.0							
Noon	62.5							
1:00 PM	61.5							
2:00 PM	61.0							
3:00 PM	65.6							
4:00 PM	63.9							
5:00 PM	63.2							
6:00 PM	63.1							
7:00 PM	61.9							
8:00 PM	61.3							
9:00 PM	59.4							
10:00 PM	57.5							
11:00 PM	54.6							

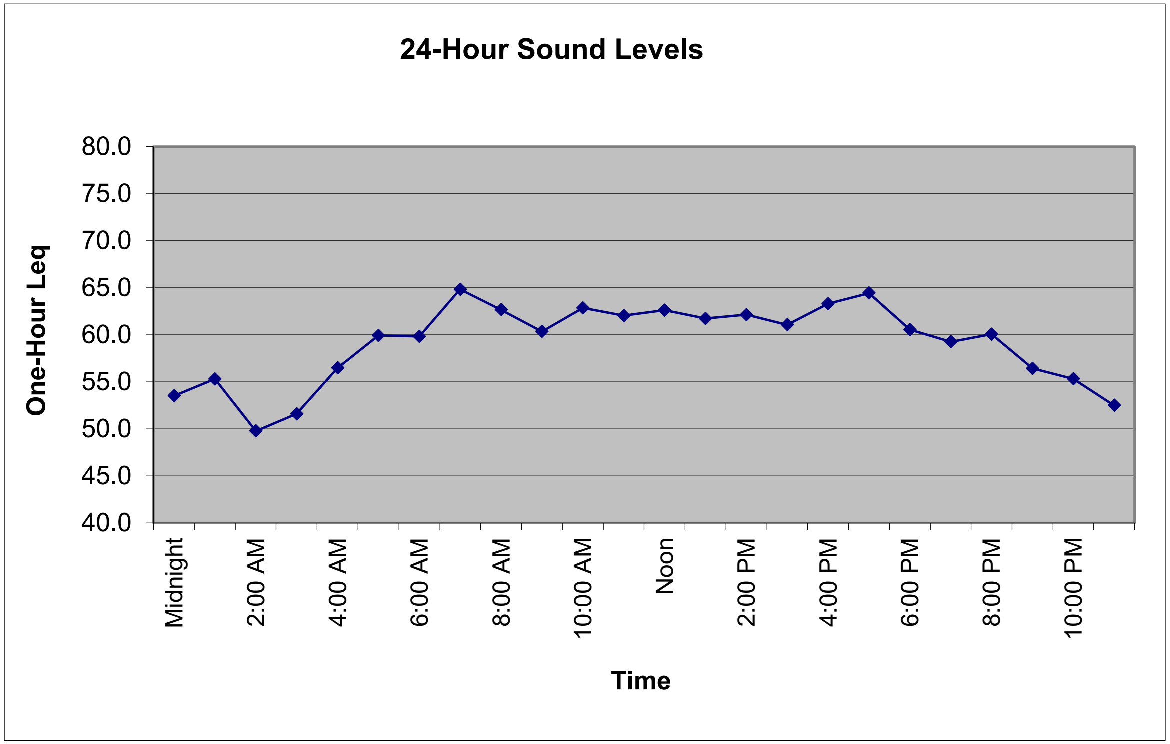


Ldn	65.9
Worst Hour Leq	66.3
Lowest Hour LEQ	49.7
12-hour Leq	62.9

Ldn/CNEL Calculation Spreadsheet

Project: 959 El Camino Real Date: 9/15/2021 Analyst: Schumaker, N
Location: LT-2

Time	Wednesday 9/15/2021	Leq(24)	Ldn	CNEL	Worst Hour Leq	Ldn minus Worst Hour Leq	CNEL minus Ldn	Day
Midnight	53.5	60.6	64.0	64.4	64.8	-0.8	0.3	Evening
1:00 AM	55.3		-0.8	-0.4				Night
2:00 AM	49.8							
3:00 AM	51.6							
4:00 AM	56.5							
5:00 AM	59.9							
6:00 AM	59.8							
7:00 AM	64.8							
8:00 AM	62.7							
9:00 AM	60.3							
10:00 AM	62.8							
11:00 AM	62.0							
Noon	62.6							
1:00 PM	61.7							
2:00 PM	62.1							
3:00 PM	61.1							
4:00 PM	63.3							
5:00 PM	64.4							
6:00 PM	60.5							
7:00 PM	59.3							
8:00 PM	60.0							
9:00 PM	56.4							
10:00 PM	55.3							
11:00 PM	52.5							

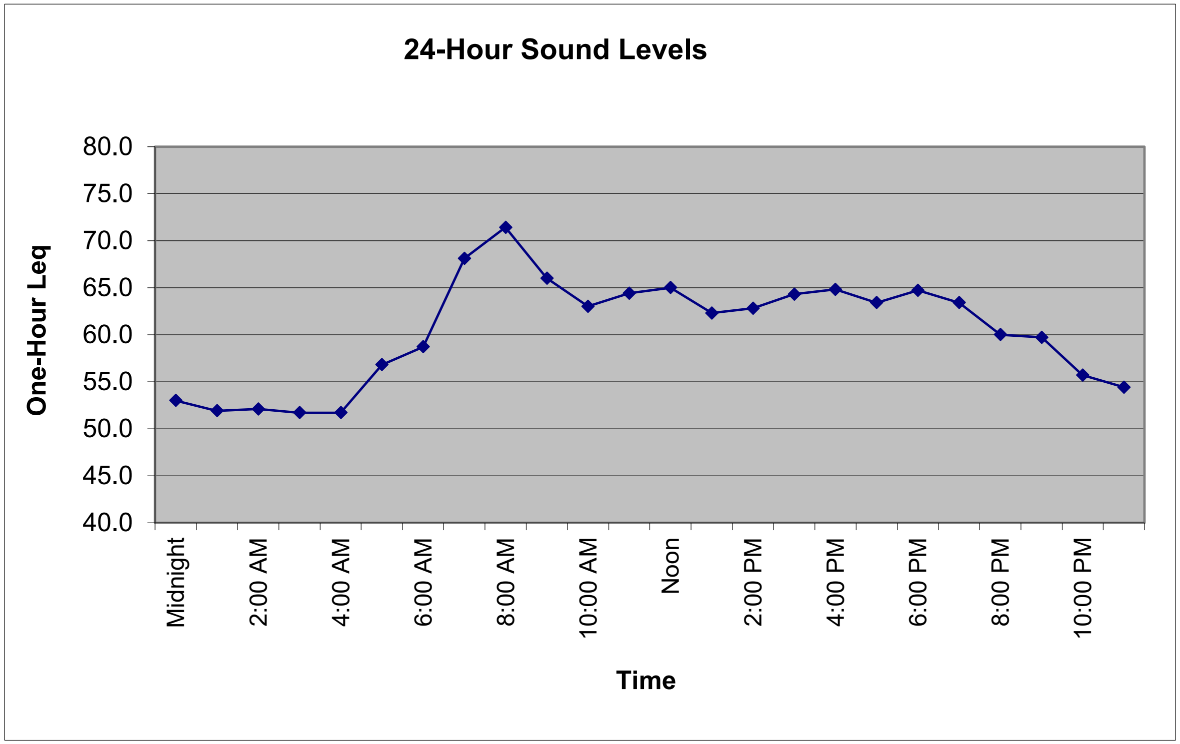


Ldn	64.0
Worst Hour Leq	64.8
Lowest Hour LEQ	49.8
12-hour Leq	62.6

Ldn/CNEL Calculation Spreadsheet

Project: Milpitas TASP
Date: 9/14/2021
Analyst: Schumaker, N
Location: LT-3

Time	Tuesday 9/14/2021	Leq(24)	Ldn	CNEL	Worst Hour Leq	Ldn minus Worst Hour Leq	CNEL minus Ldn	Day
Midnight	53.0	63.5	65.1	65.6	71.4	-6.3	0.5	Evening
1:00 AM	51.9		-3.0	-2.5				Night
2:00 AM	52.1							
3:00 AM	51.7							
4:00 AM	51.7							
5:00 AM	56.8							
6:00 AM	58.7							
7:00 AM	68.1							
8:00 AM	71.4							
9:00 AM	66.0							
10:00 AM	63.0							
11:00 AM	64.4							
Noon	65.0							
1:00 PM	62.3							
2:00 PM	62.8							
3:00 PM	64.3							
4:00 PM	64.8							
5:00 PM	63.4							
6:00 PM	64.7							
7:00 PM	63.4							
8:00 PM	60.0							
9:00 PM	59.7							
10:00 PM	55.7							
11:00 PM	54.4							

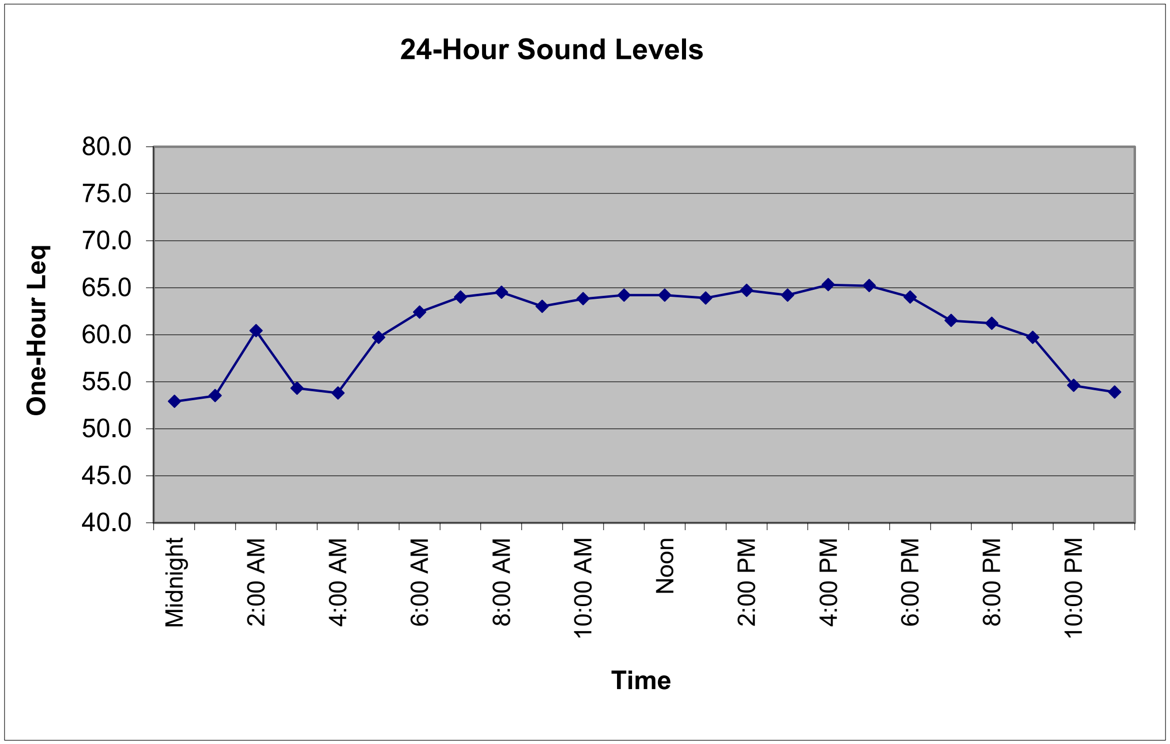


Ldn	65.1
Worst Hour Leq	71.4
Lowest Hour LEQ	51.7
12-hour Leq	65.9

Ldn/CNEL Calculation Spreadsheet

Project: Milpitas TASP Date: 9/15/2021 Analyst: Schumaker, N
Location: LT-3

Time	Wednesday 9/15/2021	Leq(24)	Ldn	CNEL	Worst Hour Leq	Ldn minus Worst Hour Leq	CNEL minus Ldn	Day
Midnight	52.9	62.3	65.7	66.0	65.3	0.4	0.4	Evening
1:00 AM	53.5		1.7	2.0				Night
2:00 AM	60.4							
3:00 AM	54.3							
4:00 AM	53.8							
5:00 AM	59.7							
6:00 AM	62.4							
7:00 AM	64.0							
8:00 AM	64.5							
9:00 AM	63.0							
10:00 AM	63.8							
11:00 AM	64.2							
Noon	64.2							
1:00 PM	63.9							
2:00 PM	64.7							
3:00 PM	64.2							
4:00 PM	65.3							
5:00 PM	65.2							
6:00 PM	64.0							
7:00 PM	61.5							
8:00 PM	61.2							
9:00 PM	59.7							
10:00 PM	54.6							
11:00 PM	53.9							



Ldn	65.7
Worst Hour Leq	65.3
Lowest Hour LEQ	52.9
12-hour Leq	64.3

Noise Appendix

Short Term Measurement Data

ST-1 Summary

File Name on Meter	LxT_Data.023.s
File Name on PC	LxT_0004004-20210915 120000-LxT_Data.023.ldbin
Serial Number	0004004
Model	SoundTrack LxT®
Firmware Version	2.404
User	
Location	
Job Description	
Note	

Measurement

Description	
Start	2021-09-15 12:00:00
Stop	2021-09-15 12:15:00
Duration	00:15:00.4
Run Time	00:15:00.4
Pause	00:00:00.0
Pre-Calibration	2021-09-15 11:55:20
Post-Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting
Peak Weight	Z Weighting
Detector	Slow
Preamplifier	PRMLxT1L
Microphone Correction	Off
Integration Method	Linear
Overload	123.5 dB

	A	**C**	**Z**
Under Range Peak	80.1	77.1	**82.1** dB
Under Range Limit	**24.6**	25.9	32.3 dB
Noise Floor	15.4	16.8	23.2 dB

Results

LAeq	67.0	
LAE	96.6	
EA	503.398 µPa²h	
EA8	16.102 mPa²h	
EA40	80.508 mPa²h	
LZpeak (max)	2021-09-15 12:02:49	103.7 dB
LASmax	2021-09-15 12:14:36	80.9 dB
LASmin	2021-09-15 12:06:22	50.1 dB
SEA	-99.9 dB	

LAS > 85.0 dB (Exceedance Counts / Duration)	0	0.0 s
LAS > 115.0 dB (Exceedance Counts / Duration)	0	0.0 s
LZpeak > 135.0 dB (Exceedance Counts / Duration)	0	0.0 s
LZpeak > 137.0 dB (Exceedance Counts / Duration)	0	0.0 s
LZpeak > 140.0 dB (Exceedance Counts / Duration)	0	0.0 s

Community Noise	**Ldn**	**LDay 07:00-22:00**	**LNight 22:00-07:00**	**Lden**	**LDay 07:00-19:00**	**LEvening 19:00-22:00**
	67.0	67.0	-99.9	67.0	67.0	-99.9

LCeq	74.7 dB
LAeq	67.0 dB
LCeq - LAeq	7.7 dB
LAIeq	68.9 dB
LAeq	67.0 dB
LAIeq - LAeq	1.9 dB

	A		**C**		**Z**	
	dB	**Time Stamp**	**dB**	**Time Stamp**	**dB**	**Time Stamp**
Leq	67.0		74.7			
Ls(max)	80.9	2021/09/15 12:14:36				
Ls(min)	50.1	2021/09/15 12:06:22				
LPeak(max)					103.7	2021/09/15 12:02:49

Overload Count	0
Overload Duration	0.0 s

Dose Settings

Dose Name	OSHA-1	OSHA-2
Exchange Rate	5	5 dB
Threshold	90	80 dB
Criterion Level	90	90 dB
Criterion Duration	8	8 h

Results

Dose	-99.94	0.00 %
Projected Dose	-99.94	0.02 %
TWA (Projected)	-99.9	28.8 dB
TWA (t)	-99.9	3.8 dB
Lep (t)	52.0	52.0 dB

Statistics

LA5.00	71.6 dB
LA10.00	70.4 dB
LA33.30	67.0 dB
LA50.00	65.3 dB
LA66.60	63.4 dB
LA90.00	57.7 dB

ST-2 Summary

File Name on Meter	LxT_Data.022.s
File Name on PC	LxT_0004004-20210915 113208-LxT_Data.022.ldbin
Serial Number	0004004
Model	SoundTrack LxT®
Firmware Version	2.404
User	
Location	
Job Description	
Note	

Measurement

Description	
Start	2021-09-15 11:32:08
Stop	2021-09-15 11:47:08
Duration	00:15:00.6
Run Time	00:15:00.6
Pause	00:00:00.0
Pre-Calibration	2021-09-15 11:27:10
Post-Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting		
Peak Weight	Z Weighting		
Detector	Slow		
Preamplifier	PRMLxT1L		
Microphone Correction	Off		
Integration Method	Linear		
Overload	123.4 dB		
	A	**C**	**Z**
Under Range Peak	80.0	77.0	**82.0** dB
Under Range Limit	**24.5**	25.8	32.2 dB
Noise Floor	15.4	16.7	23.0 dB

Results

LAeq	61.9	
LAE	91.4	
EA	155.052 µPa²h	
EA8	4.958 mPa²h	
EA40	24.792 mPa²h	
LZpeak (max)	2021-09-15 11:40:46	100.3 dB
LASmax	2021-09-15 11:40:46	81.1 dB
LASmin	2021-09-15 11:44:58	50.6 dB
SEA	-99.9 dB	
LAS > 85.0 dB (Exceedance Counts / Duration)	0	0.0 s
LAS > 115.0 dB (Exceedance Counts / Duration)	0	0.0 s
LZpeak > 135.0 dB (Exceedance Counts / Duration)	0	0.0 s
LZpeak > 137.0 dB (Exceedance Counts / Duration)	0	0.0 s
LZpeak > 140.0 dB (Exceedance Counts / Duration)	0	0.0 s

Community Noise	**Ldn**	**LDay 07:00-22:00**	**LNight 22:00-07:00**	**Lden**	**LDay 07:00-19:00**	**LEvening 19:00-22:00**
	61.9	61.9	-99.9	61.9	61.9	-99.9

LCeq	72.5 dB
LAeq	61.9 dB
LCeq - LAeq	10.6 dB
LAIeq	63.5 dB
LAeq	61.9 dB
LAIeq - LAeq	1.6 dB

	A		**C**		**Z**	
	dB	**Time Stamp**	**dB**	**Time Stamp**	**dB**	**Time Stamp**
Leq	61.9		72.5			
Ls(max)	81.1	2021/09/15 11:40:46				
Ls(min)	50.6	2021/09/15 11:44:58				
LPeak(max)					100.3	2021/09/15 11:40:46

Overload Count	0
Overload Duration	0.0 s

Dose Settings

Dose Name	OSHA-1	OSHA-2
Exchange Rate	5	5 dB
Threshold	90	80 dB
Criterion Level	90	90 dB
Criterion Duration	8	8 h

Results		
Dose	-99.94	0.00 %
Projected Dose	-99.94	0.03 %
TWA (Projected)	-99.9	30.8 dB
TWA (t)	-99.9	5.9 dB
Lep (t)	46.9	46.9 dB

Statistics	
LA5.00	64.8 dB
LA10.00	63.2 dB
LA33.30	60.3 dB
LA50.00	58.7 dB
LA66.60	57.5 dB
LA90.00	54.6 dB

ST-1 Time History

Record #	Record Type	Date	Time	LAeq	LZpeak	LASmax	LASmin	OVLD
1	Calibration Change	2021-09-15	11:55:20					
2	Run	2021-09-15	12:00:00					
3		2021-09-15	12:00:00	66.0	89.9	69.5	60.0	No
4		2021-09-15	12:00:10	63.2	87.6	67.6	61.4	No
5		2021-09-15	12:00:20	68.2	91.8	70.9	64.6	No
6		2021-09-15	12:00:30	59.7	85.2	65.6	57.1	No
7		2021-09-15	12:00:40	59.9	84.7	62.2	56.4	No
8		2021-09-15	12:00:50	70.7	91.8	72.5	57.2	No
9		2021-09-15	12:01:00	67.7	93.9	71.6	61.6	No
10		2021-09-15	12:01:10	68.7	90.4	70.8	65.8	No
11		2021-09-15	12:01:20	68.5	94.6	70.6	65.5	No
12		2021-09-15	12:01:30	65.4	93.1	68.6	61.8	No
13		2021-09-15	12:01:40	59.3	88.1	66.9	54.6	No
14		2021-09-15	12:01:50	61.8	86.3	66.0	55.8	No
15		2021-09-15	12:02:00	70.0	91.5	72.5	56.7	No
16		2021-09-15	12:02:10	68.5	88.8	71.1	65.3	No
17		2021-09-15	12:02:20	63.6	84.7	67.5	59.5	No
18		2021-09-15	12:02:30	70.1	92.2	72.5	57.0	No
19		2021-09-15	12:02:40	70.1	103.7	73.9	65.7	No
20		2021-09-15	12:02:50	64.4	92.5	73.3	58.7	No
21		2021-09-15	12:03:00	53.5	84.9	59.0	50.9	No
22		2021-09-15	12:03:10	53.2	81.7	55.3	50.9	No
23		2021-09-15	12:03:20	59.3	86.2	63.9	52.5	No
24		2021-09-15	12:03:30	58.8	86.0	61.6	53.7	No
25		2021-09-15	12:03:40	67.1	88.6	69.4	53.4	No
26		2021-09-15	12:03:50	69.5	90.8	72.0	66.7	No
27		2021-09-15	12:04:00	70.5	89.5	72.4	67.0	No
28		2021-09-15	12:04:10	71.2	99.5	74.8	65.4	No
29		2021-09-15	12:04:20	66.3	87.8	70.1	61.8	No
30		2021-09-15	12:04:30	65.7	88.5	69.0	60.2	No
31		2021-09-15	12:04:40	68.6	90.2	69.7	65.8	No
32		2021-09-15	12:04:50	67.9	87.1	70.1	65.4	No
33		2021-09-15	12:05:00	68.3	93.1	70.2	65.8	No
34		2021-09-15	12:05:10	64.6	88.1	68.0	61.3	No
35		2021-09-15	12:05:20	63.3	93.3	68.6	58.7	No
36		2021-09-15	12:05:30	71.5	101.0	76.5	63.3	No
37		2021-09-15	12:05:40	64.1	88.9	66.4	60.0	No
38		2021-09-15	12:05:50	64.1	87.3	67.6	59.3	No
39		2021-09-15	12:06:00	59.6	87.8	65.1	55.1	No
40		2021-09-15	12:06:10	51.8	83.9	55.6	50.2	No
41		2021-09-15	12:06:20	51.6	83.4	53.1	50.1	No
42		2021-09-15	12:06:30	57.9	84.2	63.1	50.4	No
43		2021-09-15	12:06:40	67.8	89.3	71.2	59.3	No
44		2021-09-15	12:06:50	69.5	88.5	71.4	66.4	No
45		2021-09-15	12:07:00	66.6	90.0	70.1	58.8	No
46		2021-09-15	12:07:10	64.4	85.9	66.7	57.6	No
47		2021-09-15	12:07:20	64.3	87.2	66.2	63.0	No
48		2021-09-15	12:07:30	66.5	89.2	67.6	64.4	No
49		2021-09-15	12:07:40	64.6	86.5	67.3	61.1	No
50		2021-09-15	12:07:50	68.6	90.7	71.0	60.9	No
51		2021-09-15	12:08:00	66.7	88.6	69.5	62.1	No
52		2021-09-15	12:08:10	64.4	87.5	67.7	61.9	No
53		2021-09-15	12:08:20	70.4	90.5	73.7	61.6	No
54		2021-09-15	12:08:30	70.1	95.2	73.7	66.6	No
55		2021-09-15	12:08:40	66.2	87.4	68.5	63.8	No
56		2021-09-15	12:08:50	66.7	87.7	68.6	64.4	No
57		2021-09-15	12:09:00	63.0	85.0	67.0	60.0	No

58		2021-09-15	12:09:10	61.7	86.2	65.4	58.2	No
59		2021-09-15	12:09:20	66.9	88.3	69.5	63.2	No
60		2021-09-15	12:09:30	67.1	90.7	69.4	62.8	No
61		2021-09-15	12:09:40	62.6	87.7	66.8	57.5	No
62		2021-09-15	12:09:50	65.2	88.3	67.1	57.5	No
63		2021-09-15	12:10:00	64.2	89.5	67.7	60.5	No
64		2021-09-15	12:10:10	63.3	88.5	65.0	61.8	No
65		2021-09-15	12:10:20	65.8	91.5	67.2	62.3	No
66		2021-09-15	12:10:30	64.4	92.3	66.0	62.6	No
67		2021-09-15	12:10:40	67.3	92.1	69.9	62.6	No
68		2021-09-15	12:10:50	68.0	89.9	70.9	63.7	No
69		2021-09-15	12:11:00	66.7	89.3	68.8	63.8	No
70		2021-09-15	12:11:10	69.2	91.2	72.6	63.5	No
71		2021-09-15	12:11:20	69.2	95.4	75.2	64.7	No
72		2021-09-15	12:11:30	67.1	90.2	69.2	64.4	No
73		2021-09-15	12:11:40	63.4	87.4	65.4	62.2	No
74		2021-09-15	12:11:50	65.7	93.7	68.3	61.7	No
75		2021-09-15	12:12:00	59.9	86.4	61.7	57.7	No
76		2021-09-15	12:12:10	64.0	92.5	65.4	60.2	No
77		2021-09-15	12:12:20	63.9	89.4	66.7	59.8	No
78		2021-09-15	12:12:30	68.0	90.9	70.7	61.5	No
79		2021-09-15	12:12:40	68.8	89.9	70.4	66.8	No
80		2021-09-15	12:12:50	65.1	88.3	67.1	62.5	No
81		2021-09-15	12:13:00	61.4	88.6	66.1	56.7	No
82		2021-09-15	12:13:10	65.5	91.1	67.1	63.8	No
83		2021-09-15	12:13:20	66.2	89.4	67.5	63.9	No
84		2021-09-15	12:13:30	61.4	85.0	66.1	59.7	No
85		2021-09-15	12:13:40	56.1	83.0	60.0	53.3	No
86		2021-09-15	12:13:50	67.9	93.5	71.1	56.2	No
87		2021-09-15	12:14:00	68.7	101.2	72.5	64.5	No
88		2021-09-15	12:14:10	66.1	93.8	69.9	64.9	No
89		2021-09-15	12:14:20	73.8	100.4	77.4	66.2	No
90		2021-09-15	12:14:30	74.6	98.6	80.9	67.5	No
91		2021-09-15	12:14:40	68.5	91.3	72.7	63.2	No
92		2021-09-15	12:14:50	60.4	83.4	63.2	59.0	No
93		2021-09-15	12:15:00	60.6	82.9	60.4	60.2	No
94	Stop	2021-09-15	12:15:01					

ST-2 Time History

Record #	Record Type	Date	Time	LAeq	LZpeak	LASmax	LASmin	OVLD
1	Calibration Change	2021-09-15	11:27:10					
2	Run	2021-09-15	11:32:07					
3		2021-09-15	11:32:08	57.5	84.9	60.0	55.9	No
4		2021-09-15	11:32:18	59.7	88.2	63.1	56.9	No
5		2021-09-15	11:32:28	59.2	87.8	61.0	54.8	No
6		2021-09-15	11:32:38	56.4	83.9	58.0	54.3	No
7		2021-09-15	11:32:48	57.9	83.0	58.6	56.7	No
8		2021-09-15	11:32:58	56.9	84.1	58.6	54.9	No
9		2021-09-15	11:33:08	54.9	82.2	57.1	53.7	No
10		2021-09-15	11:33:18	53.4	88.0	57.4	52.0	No
11		2021-09-15	11:33:28	59.0	84.1	61.9	52.1	No
12		2021-09-15	11:33:38	59.3	83.3	63.7	55.4	No
13		2021-09-15	11:33:48	58.9	88.8	64.5	53.7	No
14		2021-09-15	11:33:58	57.4	91.5	59.5	52.7	No
15		2021-09-15	11:34:08	60.7	87.5	63.9	56.0	No
16		2021-09-15	11:34:18	60.1	87.1	62.5	55.9	No
17		2021-09-15	11:34:28	60.9	88.8	63.5	56.3	No
18		2021-09-15	11:34:38	58.2	86.2	60.8	56.5	No
19		2021-09-15	11:34:48	55.8	86.5	58.5	54.5	No
20		2021-09-15	11:34:58	57.6	85.7	58.2	55.4	No
21		2021-09-15	11:35:08	61.2	88.0	62.7	58.2	No
22		2021-09-15	11:35:18	63.7	89.9	66.8	59.8	No
23		2021-09-15	11:35:28	61.0	90.3	63.9	56.8	No
24		2021-09-15	11:35:38	61.5	90.5	63.9	56.5	No
25		2021-09-15	11:35:48	57.2	89.3	60.6	55.1	No
26		2021-09-15	11:35:58	59.7	91.0	62.1	57.2	No
27		2021-09-15	11:36:08	58.9	87.0	60.9	56.2	No
28		2021-09-15	11:36:18	62.5	88.4	65.0	57.8	No
29		2021-09-15	11:36:28	61.2	89.4	63.2	58.8	No
30		2021-09-15	11:36:38	60.1	91.5	61.9	57.6	No
31		2021-09-15	11:36:48	62.4	91.1	64.6	59.5	No
32		2021-09-15	11:36:58	59.8	89.6	62.0	54.7	No
33		2021-09-15	11:37:08	59.6	84.0	62.4	53.6	No
34		2021-09-15	11:37:18	57.7	81.7	59.6	55.8	No
35		2021-09-15	11:37:28	59.8	83.8	61.7	58.1	No
36		2021-09-15	11:37:38	67.1	90.7	69.6	58.5	No
37		2021-09-15	11:37:48	61.6	86.6	64.9	57.8	No
38		2021-09-15	11:37:58	55.4	82.9	58.2	53.5	No
39		2021-09-15	11:38:08	60.9	85.6	63.9	54.6	No
40		2021-09-15	11:38:18	57.2	89.2	61.2	52.7	No
41		2021-09-15	11:38:28	59.0	89.6	61.6	57.0	No
42		2021-09-15	11:38:38	59.9	86.7	61.6	56.0	No
43		2021-09-15	11:38:48	58.3	84.4	61.0	54.3	No
44		2021-09-15	11:38:58	60.5	90.6	62.7	56.2	No
45		2021-09-15	11:39:08	58.7	84.5	63.2	51.6	No
46		2021-09-15	11:39:18	57.5	85.5	63.2	55.3	No
47		2021-09-15	11:39:28	60.2	87.6	62.4	55.6	No
48		2021-09-15	11:39:38	57.6	83.5	60.1	56.8	No
49		2021-09-15	11:39:48	60.2	87.5	62.2	57.5	No
50		2021-09-15	11:39:58	58.2	85.4	61.4	53.2	No
51		2021-09-15	11:40:08	56.4	85.6	58.1	52.8	No
52		2021-09-15	11:40:18	57.8	86.2	59.1	56.7	No
53		2021-09-15	11:40:28	64.5	90.8	65.9	58.6	No
54		2021-09-15	11:40:38	75.7	100.3	81.1	64.4	No
55		2021-09-15	11:40:48	71.5	97.3	79.8	57.4	No
56		2021-09-15	11:40:58	56.2	84.7	58.8	54.5	No
57		2021-09-15	11:41:08	58.4	85.6	59.9	57.4	No

58		2021-09-15	11:41:18	63.0	85.6	66.6	57.0	No
59		2021-09-15	11:41:28	59.9	84.5	63.1	58.1	No
60		2021-09-15	11:41:38	58.5	87.4	60.5	56.2	No
61		2021-09-15	11:41:48	57.4	84.2	61.3	51.5	No
62		2021-09-15	11:41:58	54.4	81.9	55.6	51.5	No
63		2021-09-15	11:42:08	62.0	89.2	66.6	54.4	No
64		2021-09-15	11:42:18	60.1	91.5	61.3	58.5	No
65		2021-09-15	11:42:28	59.3	84.5	60.5	57.6	No
66		2021-09-15	11:42:38	63.7	87.7	66.6	58.8	No
67		2021-09-15	11:42:48	62.2	88.6	64.5	60.3	No
68		2021-09-15	11:42:58	62.5	90.2	64.0	60.3	No
69		2021-09-15	11:43:08	63.7	96.3	66.1	60.7	No
70		2021-09-15	11:43:18	56.4	88.0	61.2	54.2	No
71		2021-09-15	11:43:28	61.9	83.8	62.9	58.9	No
72		2021-09-15	11:43:38	64.6	85.8	67.4	61.1	No
73		2021-09-15	11:43:48	60.8	86.1	64.0	58.7	No
74		2021-09-15	11:43:58	58.2	84.4	60.6	57.1	No
75		2021-09-15	11:44:08	58.2	83.3	58.7	57.7	No
76		2021-09-15	11:44:18	58.9	89.7	61.2	55.8	No
77		2021-09-15	11:44:28	60.0	87.1	61.6	56.6	No
78		2021-09-15	11:44:38	55.0	83.6	58.2	53.4	No
79		2021-09-15	11:44:48	55.6	82.3	58.8	50.9	No
80		2021-09-15	11:44:58	53.1	88.1	56.1	50.6	No
81		2021-09-15	11:45:08	54.4	80.9	56.0	52.9	No
82		2021-09-15	11:45:18	57.5	83.8	60.5	52.6	No
83		2021-09-15	11:45:28	58.2	84.4	60.8	55.2	No
84		2021-09-15	11:45:38	61.4	87.6	63.2	59.5	No
85		2021-09-15	11:45:48	56.6	82.0	60.5	55.6	No
86		2021-09-15	11:45:58	57.0	82.8	58.7	55.4	No
87		2021-09-15	11:46:08	60.7	86.7	63.9	55.1	No
88		2021-09-15	11:46:18	59.2	86.8	62.2	57.1	No
89		2021-09-15	11:46:28	59.1	88.8	61.6	53.8	No
90		2021-09-15	11:46:38	56.3	85.3	58.7	53.6	No
91		2021-09-15	11:46:48	62.3	86.5	68.8	55.8	No
92		2021-09-15	11:46:58	59.9	86.7	67.1	59.0	No
93		2021-09-15	11:47:08	57.7	83.8	59.1	58.5	No
94	Stop	2021-09-15	11:47:09					

Noise Appendix

Field Sheets

NOISE MEASUREMENT SITE INFORMATION SHEET

Jones & Stokes

PROJECT NAME: 959 El Camino Real

PROJECT #:

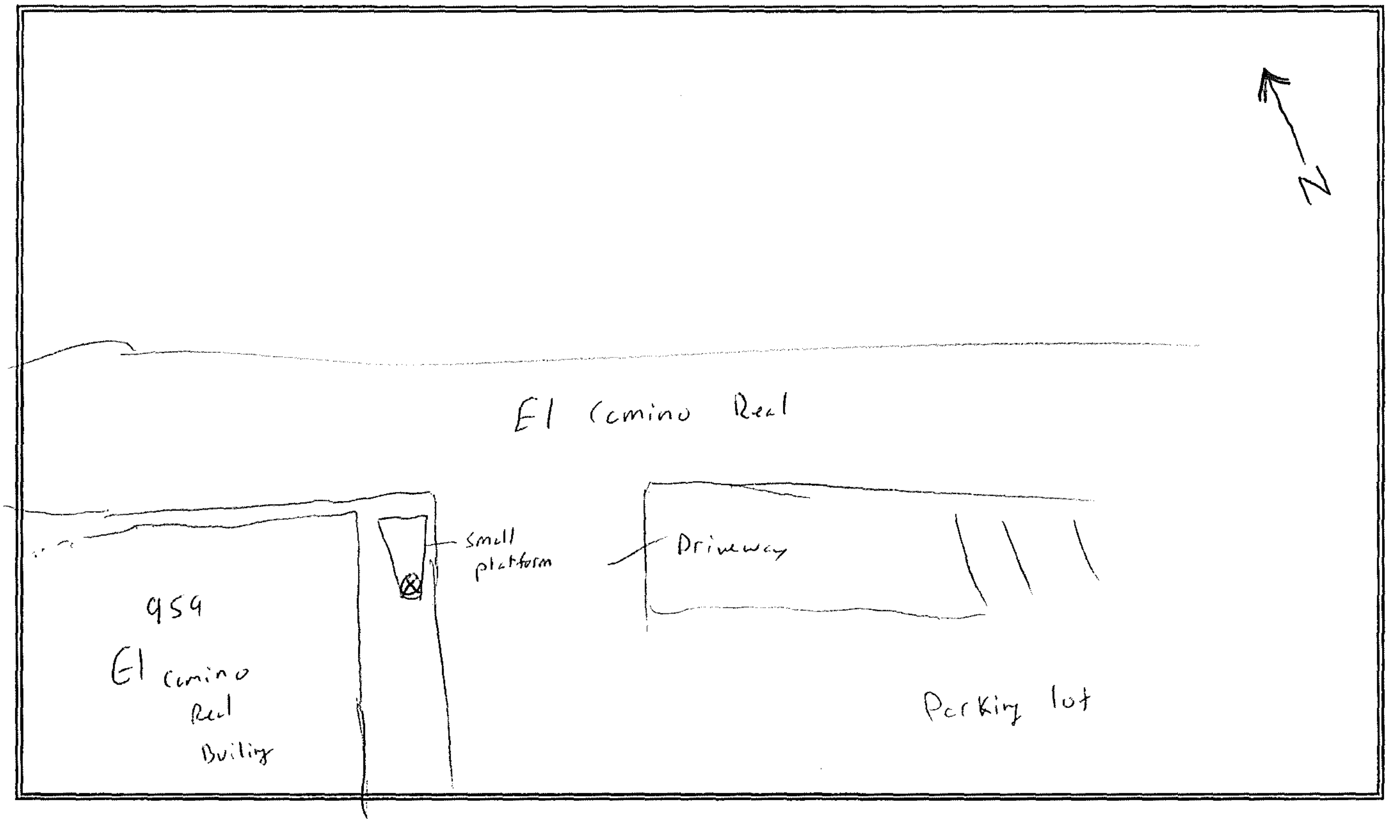
SITE NUMBER: ST-1

DATE/TIME: 2021 09 15 12:00 pm

LOCATION/ADDRESS: 959 El Camino Real

ENGINEERS: Schumaker

SITE SKETCH: Show microphone location, nearby residences/buildings, potential reflective surfaces, project roadways, local roadways, driveways, ground type, trees. Indicate reference distances between objects, arrows showing wind direction, North, and camera locations/directions. Describe the line-of-sight and topography/elevation changes relative to noise sources.



WEATHER DATA: (temperature, wind speed/direction, sky conditions, relative humidity)

81.3 °F 0.8 mph Blue and Sunny

EQUIPMENT DATA: (sound level meter, microphone, preamp, calibrator, factory cal. date)

LXT

ESTIMATED CONSTRUCTION DATE OF RESIDENCES: (Pre-1978, or new construction)

POSTED SPEED: 35 mph

COMMENTS:

TRAFFIC COUNTS:

Roadway/Direction	Autos	Medium	Heavy	Speed	Start Time	Duration

NOISE MEASUREMENT LOG SHEET (20)

Jones & Stokes

PROJECT NAME: 959 El Camino Real
PROJECT #:
SITE NUMBER: ST-1
DATE/TIME: 2021 09 15 12:00
LOCATION/ADDRESS: 959 El Camino Real
ENGINEERS: Schumaker

#	Minute Starting	Measured Leq (dBA)	O or X	Autos	Medium Trucks	Heavy Trucks	Other Noise Sources/Comments (include SLM equipment, Calibration Data)		
1	12:00								
2	12:01						Large Pickup Truck drives by		
3	12:02						wave of traffic on El Camino Real car starts nearby		
4	12:03						Truck pulls into driveway		
5	12:04						low RPM motorcycle passby on El camino		
6	12:05								
7	12:06								
8	12:07						wave of traffic mixed with Bart Train		
9	12:08								
10	12:09						2 cars pull into drive way, plane overhead car starts ~60 ft away		
11	12:10						Truck pulling equipment trailer (Rattle sounds)		
12	12:11						plane overhead Truck drives over curb onto El camino		
13	12:12								
14	12:13							Leq	67.0 dBA
15	12:14						motor cycle passby car dragging It's body on concrete	Lmax	80.4
16	15							Lmin	50.1
17							el camino is busy with traffic	L10	70.4
18							LXT_Data. 023	L33	67.0
19								L50	65.3
20								L90	57.7

Overall Leq (Include "O" minutes, Exclude "X" minutes) = ☐ **dBA**

Subset Leq (Exclude "O" and "X" minutes) = ☐ **dBA**

"O" = other characteristic sources that contributed to the Leq

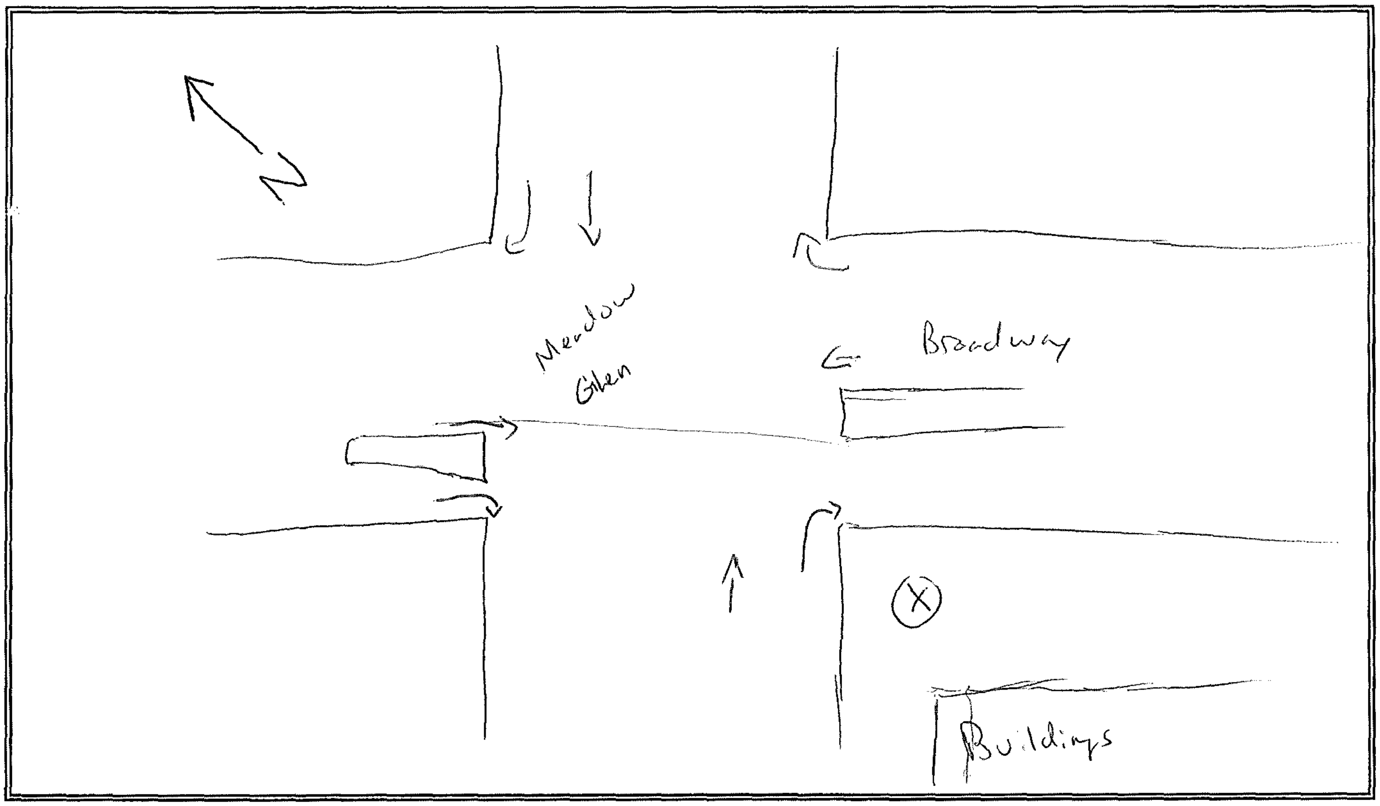
"X" = exclude from Leq calculation; a non-typical source contaminated the measurement

NOISE MEASUREMENT SITE INFORMATION SHEET

Jones & Stokes

PROJECT NAME: 959 ElCamino Real
PROJECT #:
SITE NUMBER: ST-2
DATE/TIME: 2021 09 15 11:32
LOCATION/ADDRESS: 979 Broadway, Suite 116
ENGINEERS: Schumaker

SITE SKETCH: Show microphone location, nearby residences/buildings, potential reflective surfaces, project roadways, local roadways, driveways, ground type, trees. Indicate reference distances between objects, arrows showing wind direction, North, and camera locations/directions. Describe the line-of-sight and topography/elevation changes relative to noise sources.



WEATHER DATA: (temperature, wind speed/direction, sky conditions, relative humidity)
66.7°F (SLM in shade)
2.3 mph
Blue and clear

EQUIPMENT DATA: (sound level meter, microphone, preamp, calibrator, factory cal. date)
LXT

ESTIMATED CONSTRUCTION DATE OF RESIDENCES: (Pre-1978, or [✓ new construction])

POSTED SPEED:

COMMENTS:

TRAFFIC COUNTS:

Roadway/Direction	Autos	Medium	Heavy	Speed	Start Time	Duration

NOISE MEASUREMENT LOG SHEET (20)

Jones & Stokes

PROJECT NAME: 459 El Camino Real
PROJECT #:
SITE NUMBER: ST 2
DATE/TIME: 2021 09 15 11:32
LOCATION/ADDRESS:
ENGINEERS: Schumaker

#	Minute Starting	Measured Leq (dBA)	O or X	Autos	Medium Trucks	Heavy Trucks	Other Noise Sources/Comments (include SLM equipment, Calibration Data)		
1	11:32								
2	11:33								
3	11:34						Moped speeds by Crows		
4	11:35								
5	11:36						plane take off		
6	11:37								
7	11:38								
8	11:39						Ladies talking as they walk by ~25 ft away Big Semi truck through intersection.		
9	11:40								
10	11:41						plane take off Truck with equipment trailer rattles by		
11	11:42						plane overhead		
12	11:43								
13	11:44						Car horn from distance Lady walking by, not talking		
14	11:45							Leq	61.9
15	11:46						Squeaky brecks car passes by playing loud music	Lmax	81.1
16								Lmin	50.6
17							constant traffic on Elcamino Real	L10	63.2
18							Stop and go traffic at Meadow Glen/Broadway	L33	60.3
19							(4-way Stop)	L50	58.7
20							LXT_Data.022	L90	54.6

Overall Leq (Include "O" minutes, Exclude "X" minutes) = dBA

Subset Leq (Exclude "O" and "X" minutes) = dBA

"O" = other characteristic sources that contributed to the Leq

"X" = exclude from Leq calculation; a non-typical source contaminated the measurement

Noise Appendix

Field Pictures

Noise Monitoring Site LT-1
Location: 850 El Camino Real

Looking northwest along El Camino Real, ~200 feet northwest of Mateo Avenue.

Looking southeast on El Camino Real.

Facing northeast, in front of 850 El Camino Real

Looking southwest across El Camino Real.

Noise Monitoring Site LT-2
Location: North Corner of 1001 Broadway

Looking northwest along broadway

Looking southeast towards Meadow Glen, ~125 feet from the Broadway/Meadow Glen intersection.

Looking south, 1001 Broadway in the background.

Looking south while standing on Broadway.

Noise Monitoring Site LT-3
Location: East Corner of 1010 Magnolia Ave.

On Meadown Glen, looking southwest towards Magnolia Ave.

Looking northeast along Meadow Glen.

Facing northwest, 1010 Magnolia Avenue in the background.

~120 feet northeast of Magnolia Avenue.

Noise Monitoring Site ST-1
Location: Northeast corner of 959 El Camino Real

Facing northeast towards El Camino Real.

Facing northwest, 959 El Camino Real in the background.

Facing southeast.

Looking southwest, SLM ~30 feet from southbound El Camino Real.

Noise Monitoring Site ST-2

Location: Southeast corner of Broadway and Meadow Glen (979 Broadway)

Looking northeast towards Broadway, ~25 feet from Broadway.

Looking southeast, 979 Broadway in the background.

Facing southwest, SLM ~15 feet southeast of Meadow Glen

Looking northwest at the Broadway/Meadow Glen intersection.

Appendix D

Air Quality Technical Report

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AIR QUALITY TECHNICAL REPORT
959 EL CAMINO

PREPARED FOR:

City of Millbrae
Planning Division
621 Magnolia Avenue
Millbrae, California 94030
Contact: Nestor Guevara, Associate Planner
(650) 259-2335

PREPARED BY:

ICF
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San Francisco, California 94105
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April 11, 2022

ICF. 2022. *Air Quality Technical Report,959 El Camino Real Project*. April. (ICF 104073.0.002) Prepared for the City of Millbrae, CA.

Contents

Tables and Figures

Acronyms and Abbreviations

“Hot Spots” Act	Air Toxics “Hot Spots” Information and Assessment Act of 1987
°F	Fahrenheit
$\mu g/m^3$	micrograms per cubic meter
ACM	asbestos-containing material
AQAPs	Air quality attainment plans
AREAPOLY	area source
BAAQMD	Bay Area Air Quality Management District
BMPs	best management practices
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CAFE	Corporate Average Fuel Economy Standards
CalEEMod	California Emissions Estimator Model
CARB	California Air Resources Board
Carl Moyer Program	Carl Moyer Memorial Air Quality Standards Attainment Program
CCAA	California Clean Air Act
CEQA	California Environmental Quality Act
CEQA Guidelines	California Environmental Quality Act Air Quality Guidelines
CMP	Congestion Management Program
CO	carbon monoxide
DPM	diesel particulate matter
EO	Executive Order
EPA	Environmental Protect Agency
FR	*Federal Register*
Friant Ranch Project	Community Plan Update and Friant Ranch Specific Plan
GHG	greenhouse gas
HRA	human health risk assessment
LINEAREA	line/area source
mpg	miles per gallon
NAAQS	National Ambient Air Quality Standards
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NHTSA	National Highway Traffic Safety Administrative
NO	nitric oxide
NO_2	nitrogen dioxide
NO_X	nitrogen oxide

OEHHA	California Office of Environmental Health Hazard Assessment
ppm	parts per million
proposed project, or Project	959 El Camino Real Mixed-Use Development Project
PV	photovoltaic
ROG	reactive organic gas
SAFE	Safer Affordable Fuel-Efficient
SCAQMD	South Coast Air Quality Management District
SFBAAB	San Francisco Bay Area Air Basin
SIP	state implementation plan
Site	Project site
SJVAPCD	San Joaquin Valley Air Pollution Control District
SO_2	sulfur dioxide
TACs	toxic air contaminants
Tanner Act	Toxic Air Contaminant Identification and Control Act
VMT	vehicle miles traveled
VOC	volatile organic compound

Chapter 1
Introduction

1.1 Document Summary

ICF prepared this Air Quality Technical Report at the request of the City of Millbrae. The report documents the air quality analysis of construction and operational activities for the 959 El Camino Real Project (proposed project, or Project). The report describes project-level and cumulative impacts, as well as any applicable project applicant commitments that would avoid and minimize impacts. The report also describes existing conditions at the Project site (Site) and the regulatory framework for this analysis. Relevant technical documentation used in this analysis includes air quality modeling files and calculations (Appendix A).

1.2 Project Description

The proposed project is a mixed-use development located at 959 El Camino Real in the City of Millbrae, California (Site) (Assessor's Parcel Number No. 021-364-080). The Site is bounded by El Camino Real, Meadow Glen Avenue, Broadway, and the Millbrae Square Shopping Center's surface parking lot. The Project Sponsor, High Street Residential, has applied for the proposal under Senate Bill (SB) 330 and also seeks a density bonus and concession/incentive/waivers pursuant to State Density Bonus Law (Government Code Sections 65915 et. seq.) (SDBL). The existing 31,741-square foot vacant, single-story retail building and surface parking lot (formerly Office Depot) on the Site would be demolished to facilitate the construction of a six-story building with two levels of below-grade parking. The Project would include 278 dwelling units with a mix of studios, one-bedroom, two-bedrooms, and three-bedrooms. Figure 1 shows the Project location.

The Project would provide a total of 25,673 square feet (sf) of private and common open spaces. Common open spaces would include 17,729 sf of ground-floor covered and uncovered open spaces.[1] In addition, the Project would provide 7,944 sf of private open space through covered and uncovered private residential balconies. The Project also includes 17,210 sf of retail space. The Project provides a total of 349 vehicle parking spaces and 68 bicycle parking spaces.

The Site is located in the City of Millbrae's (City) Commercial "C" Zoning District, which has a height limit of 40 feet, 100 percent lot coverage, and no Floor Area Ratio (FAR) limit. The Project would provide 9 percent very low-income units (13% of the base allowable units would be allocated to Very Low-Income not exceeding 50% of Area Median Income), and thereby qualifies for a 20 percent density increase and one incentive/concession.

Project construction would consist of one main phase with six key stages of construction activities, beginning January 2023 and ending in April 2025. Project construction would use various types of construction equipment.

---

[1] Ground floor covered and uncovered open spaces include entryways, courtyards, and seating areas along both the residential and retail uses.

Figure 1. Project Location

\\PDCCITRDSGIS1\Projects 1\City of Milbrae\042521 959 El Camino Real\Figures\Project Location 20211001.mxd; User: 50860, Date: 10/4/2021

Operations would include a range of sustainability features. Those relevant to the air quality analysis include installation of Energy Star appliances, no natural gas consumption in dwelling units (i.e., electric water and space heating, stovetops, ovens, and dryers), installation of a solar photovoltaic (PV) system, and alternative and shared transportation accommodation and promotion.

Chapter 2
Environmental Setting

For purposes of the air quality analysis, the environmental setting for the Project is the San Francisco Bay Area Air Basin (SFBAAB).

Ambient air quality is affected by climatological conditions, topography, and the types and amounts of pollutants emitted. The sections that follow summarize how air pollution moves through the air basin and how it is chemically changed in the presence of other chemicals and particles. This section also summarizes regional and local climate conditions, existing air quality conditions, and the sensitive receptors that may be affected by Project-generated emissions.

2.1 Pollutants of Concern

The primary criteria pollutants of concern that could be generated by the Project are ozone precursors (reactive organic gas [ROG] and nitrogen oxide [NO_X]), carbon monoxide (CO), and particulate matter (PM). The principal characteristics and possible health and environmental effects from Project-generated exposure to primary criteria pollutants are discussed below.

2.1.1 Criteria Pollutants

The federal and state governments have established ambient air quality standards for six criteria pollutants. Ozone is considered a regional pollutant because its precursors affect air quality on a regional scale. Pollutants such as CO, nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead are considered local pollutants that tend to accumulate in the air locally. PM is both a regional and local pollutant. The primary criteria pollutants generated by the Project are ozone precursors (i.e., NO_X and ROGs), CO, and PM.[2,3,4]

All criteria pollutants can have human health effects at certain concentrations. The ambient air quality standards for these pollutants are set to protect public health and the environment with an adequate margin of safety (Clean Air Act [CAA] Section 109). Epidemiological, controlled human exposure, and toxicology studies evaluate potential health and environmental effects of criteria pollutants and form the scientific basis for new and revised ambient air quality standards.

The principal characteristics and possible health and environmental effects from exposure to the primary criteria pollutants generated by the Project are discussed below.

---

[2] As discussed above, there are also ambient air quality standards for SO_2, lead, sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particulates. However, these pollutants are typically associated with industrial sources, which are not included as part of the Project. Accordingly, they are not evaluated further.

[3] Most emissions of NO_x are in the form of nitric oxide (NO). Conversion to NO_2 occurs in the atmosphere as pollutants disperse downwind. Accordingly, NO_2 is not considered a local pollutant of concern for the Project and is not evaluated further.

[4] Reşitoğlu, Ibrahim A. 2018. *NO_x Pollutants from Diesel Vehicles and Trends in Control Technologies.* Published November 5. DOI: 10.5772/intechopen.81112. Available: https://www.intechopen.com/books/diesel-and-gasoline-engines/no-sub-x-sub-pollutants-from-diesel-vehicles-and-trends-in-the-control-technologies. Accessed: February 2, 2022.

2.1.1.1 Ozone

Ozone, or smog, is photochemical oxidant that is formed when ROGs and NO_X (both byproducts of the internal combustion engine) react with sunlight. ROGs are compounds made up primarily of hydrogen and carbon atoms. Internal combustion associated with motor vehicle use is the major source of hydrocarbons. Other sources of ROGs are emissions associated with the use of paints and solvents, the application of asphalt paving, and the use of household consumer products such as aerosols. The two major forms of NO_X are nitric oxide (NO) and NO_2. NO is a colorless, odorless gas that forms from atmospheric nitrogen and oxygen when combustion takes place under high temperature and/or high pressure. NO_2 is a reddish-brown, irritating gas formed by the combination of NO and oxygen. In addition to serving as an integral participant in ozone formation, NO_X also acts as an acute respiratory irritant and increases susceptibility to respiratory pathogens.

Ozone poses a higher risk to those who already suffer from respiratory diseases (e.g., asthma), children, older adults, and people who are active outdoors. Exposure to ozone at certain concentrations can make breathing more difficult, cause shortness of breath and coughing, inflame and damage the airways, aggravate lung diseases, increase the frequency of asthma attacks, and cause chronic obstructive pulmonary disease. Studies show associations between short-term ozone exposure and non-accidental mortality, including deaths from respiratory issues. Studies also suggest long-term exposure to ozone may increase the risk of respiratory-related deaths.[5] The concentration of ozone at which health effects are observed depends on an individual's sensitivity, level of exertion (i.e., breathing rate), and duration of exposure. Studies show large individual differences in the intensity of symptomatic responses, with one study finding no symptoms to the least responsive individual after a 2-hour exposure to 400 parts per billion of ozone and a 50 percent decrease in forced airway volume in the most responsive individual. Although the results vary, evidence suggests that sensitive populations (e.g., asthmatics) may be affected on days when the 8-hour maximum ozone concentration reaches 80 parts per billion.[6] The average background level of ozone in the Bay Area is approximately 45 parts per billion.[7]

In addition to human health effects, ozone has been tied to crop damage, typically in the form of stunted growth, leaf discoloration, cell damage, and premature death. Ozone can also act as a corrosive and oxidant, resulting in property damage such as the degradation of rubber products and other materials.

2.1.1.2 Carbon Monoxide

Carbon monoxide is a colorless, odorless toxic gas produced by incomplete combustion of carbon substances, such as gasoline or diesel fuel. In the air quality study area, high CO levels are of greatest concern during the winter, when periods of light winds combine with the formation of ground-level temperature inversions from evening through early morning. These conditions trap pollutants near the ground, reducing the dispersion of vehicle emissions. Moreover, motor vehicles exhibit

---

[5] U.S. Environmental Protection Agency. 2020. *Ground-level Ozone Basics.* Last updated: July 13. Available: https://www.epa.gov/ground-level-ozone-pollution/ground-level-ozone-basics#wwh. Accessed: February 2, 2022.

[6] U.S. Environmental Protection Agency. 2016. *Health Effects of Ozone in the General Population.* Last updated: September 2. Available: https://www.epa.gov/ozone-pollution-and-your-patients-health/health-effects-ozone-general-population. Accessed: February 2, 2022.

[7] Bay Area Air Quality Management District. 2017. *Final 2017 Clean Air Plan, Spare the Air, Cool the Climate.* Adopted: April 19. Available: https://www.baaqmd.gov/~/media/files/planning-and-research/plans/2017-clean-air-plan/attachment-a_-proposed-final-cap-vol-1-pdf.pdf?la=en. Accessed: February 2, 2022.

increased CO emission rates at low air temperatures. The primary adverse health effect associated with CO is interference with normal oxygen transfer to the blood, which may result in tissue oxygen deprivation. Exposure to CO at high concentrations can also cause fatigue, headaches, confusion, dizziness, and chest pain. There are no ecological or environmental effects of CO at or near existing background CO levels.[8]

2.1.1.3 Particulate Matter

PM consists of finely divided solids or liquids such as soot, dust, aerosols, fumes, and mists. Two forms of particulates are now generally considered: inhalable course particles, or PM10, and inhalable fine particles, or PM2.5. Particulate discharge into the atmosphere results primarily from industrial, agricultural, construction, and transportation activities. However, wind on arid landscapes also contributes substantially to local particulate loading.

Particulate pollution can be transported over long distances and may adversely affect humans, especially people who are naturally sensitive or susceptible to breathing problems. Numerous studies have linked PM exposure to premature death in people with preexisting heart or lung disease, nonfatal heart attacks, irregular heartbeat, aggravated asthma, decreased lung function, and increased respiratory symptoms. Studies show that long-term exposure to PM2.5 was associated with increased risk of mortality, ranging from a 6 to 13 percent increased risk per 10 micrograms per cubic meter ($\mu g/m^3$) of PM2.5.[9] Every 1 $\mu g/m^3$ reduction in PM2.5 results in a 1 percent reduction in the mortality rate for individuals over 30 years old.[10] Studies also show an increase in overall mortality of approximately 0.5 percent for every 10 mg/m^3 increase in PM10 measured the day before death.[11] PM10 levels have been greatly reduced since 1990. Peak concentrations have declined by 60 percent, and annual average values have declined by 50 percent.[12] Depending on its composition, both PM10 and PM2.5 can also affect water quality and acidity, deplete soil nutrients, damage sensitive forests and crops, affect ecosystem diversity, and contribute to acid rain.[13]

2.1.2 Toxic Air Contaminants

Although ambient air quality standards have been established for criteria pollutants, no ambient standards exist for toxic air contaminants (TACs). Many pollutants are identified as TACs because of their potential to increase the risk of developing cancer or because of their acute or chronic health risks. For TACs that are known or suspected carcinogens, the California Air Resources Board (CARB) has consistently found that there are no levels or thresholds below which exposure is risk free. Individual TACs vary greatly in the risks they present. At a given level of exposure, one TAC may

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[8] California Air Resources Board. 2020. *Carbon Monoxide & Health.* Available: https://ww2.arb.ca.gov/resources/carbon-monoxide-and-health. Accessed: February 2, 2022.

[9] California Air Resources Board. 2010. *Estimate of Premature Deaths Associated with Fine Particle Pollution (PM2.5) in California Using a U.S. Environmental Protection Agency Methodology*. August 31.

[10] Ibid.

[11] U.S. Environmental Protection Agency. 2005. *Final Report: The National Morbidity, Mortality, and Air Pollution Study – Morbidity and Mortality from Air Pollution in the United States*. Available: https://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract_id/2399/report/F. Accessed: February 2, 2022.

[12] Ibid.

[13] U.S. Environmental Protection Agency. 2020. *Health and Environmental Effects of Particulate Matter (PM).* Last updated: April. Available: https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm. Accessed: February 2, 2022.

pose a hazard that is many times greater than another. TACs are identified and their toxicity is studied by the California Office of Environmental Health Hazard Assessment (OEHHA). The primary TACs of concern associated with the Project are asbestos and diesel particulate matter (DPM).

2.1.2.1 Asbestos

Asbestos is the name given to several naturally occurring fibrous silicate minerals. Before the adverse health effects of asbestos were identified, asbestos was widely used as insulation and fireproofing in buildings, and it can still be found in some older buildings. It is also found in its natural state in rock or soil. The inhalation of asbestos fibers into the lungs can result in a variety of adverse health effects, including inflammation of the lungs, respiratory ailments (e.g., asbestosis, which is scarring of lung tissue that results in constricted breathing), and cancer (e.g., lung cancer and mesothelioma, which is cancer of the linings of the lungs and abdomen).

2.1.2.2 Diesel Particulate Matter

DPM is generated by diesel-fueled equipment and vehicles. Within the Bay Area, the Bay Area Air Quality Management District (BAAQMD) has found that of all controlled TACs, emissions of DPM are responsible for about 82 percent of the total ambient cancer risk.[14] Short-term exposure to DPM can cause acute irritation (e.g., eye, throat, and bronchial), neurophysiological symptoms (e.g., lightheadedness and nausea), and respiratory symptoms (e.g., cough and phlegm). The U.S. Environmental Protect Agency (EPA) has determined that diesel exhaust is "likely to be carcinogenic to humans by inhalation."[15]

2.1.3 Odors

Offensive odors can be unpleasant and lead to citizen complaints to local governments and air districts. According to CARB's *Air Quality and Land Use Handbook,*[16] land uses associated with odor complaints typically include sewage treatment plants, landfills, recycling facilities, manufacturing facilities, and agricultural activities. CARB provides recommended screening distances for siting new receptors near existing odor sources.

2.2 Climate and Meteorology

The following section is based on BAAQMD's summary of the regional air quality monitor planning area, which encompasses the Site.[17]

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[14] Bay Area Air Quality Management District. 2017. *Final 2017 Clean Air Plan.* Adopted April 19. Available: https://www.baaqmd.gov/~/media/files/planning-and-research/plans/2017-clean-air-plan/attachment-a_-proposed-final-cap-vol-1-pdf.pdf?la=en. Accessed: February 2, 2022.

[15] U.S. Environmental Protection Agency. 2003. *Diesel Engine Exhaust; CASRN N.A.* February 28. Available: https://cfpub.epa.gov/ncea/iris/iris_documents/documents/subst/0642_summary.pdf#nameddest=woe. Accessed: February 2, 2022.

[16] California Air Resources Board. 2005. *Air Quality and Land Use Handbook: A Community Health Perspective.* April. Available: https://ww3.arb.ca.gov/ch/handbook.pdf. Accessed: February 2, 2022.

[17] Bay Area Air Quality Management District. 1998. *Particulate Matter Monitoring Network Description for the Bay Area Air Quality Management District Planning Area*. Available: https://www.arb.ca.gov/aqd/pm25/district/ba.doc. Accessed: February 2, 2022.

While the primary factors that determine air quality are the locations of air pollutant sources and the amount of pollutants emitted from those sources, meteorological conditions and topography are also important factors. Atmospheric conditions, such as wind speed, wind direction, and air temperature gradients interact with the physical features of the landscape to determine the movement and dispersal of air pollutants. Unique geographic features throughout the state define 15 air basins with distinctive regional climates.

The peninsula region of the Bay Area extends from the area northwest of San Jose to the Golden Gate. The Santa Cruz Mountains, part of the Pacific Coast Ranges, extend up the center of the peninsula, with elevations exceeding 2,000 feet at the south end, and gradually decreasing to 500 feet elevation in South San Francisco, where the mountain range terminates. On the west side of the mountains lie small coastal towns, such as Half Moon Bay and Pacifica, that due to coastal ocean upwelling and northwest winds, experience a high incidence of cool, foggy weather in the summer. On the east side of the mountain range lie the larger cities. Cities in the southeastern peninsula experience warmer temperatures and few foggy days because the marine layer, with an average depth of 1,700 feet, is blocked by the 2,000-foot ridge to the west. At the north end of the peninsula lies San Francisco. Because most of the topography of San Francisco is below 200 feet, the marine layer is able to flow across most of the city, making its climate cool and windy.

The blocking effect of the Santa Cruz Mountains can be seen in the summertime maximum temperatures. For example, at Half Moon Bay and San Francisco, the average maximum daily summertime temperatures are in the mid-60s, while on the eastern side near the City of Belmont, the maximum temperatures are in the low 80s for the same period. Daily maximum temperatures throughout the peninsula during the winter months are in the high 50s. Large temperature gradients are not seen in the minimum temperatures. Average minimum temperatures at Half Moon Bay are about 43 degrees Fahrenheit (°F) in winter, and 50–52°F in summer. The east peninsula, near the City of Belmont, reports winter minimum temperatures of 40°F, and summer minimum temperatures of 52–54°F.

Annual average wind speeds range from 5–10 mph throughout the peninsula. The tendency is for the higher wind speeds to be found along the western coast. However, winds on the east side of the peninsula can also be high in certain areas because low-lying areas in the mountain range, at San Bruno Gap and Crystal Springs Gap, commonly allow the marine layer to pass across the peninsula.

On the peninsula, the Bruno Gap and Crystal Springs Gap are two important gaps in the Santa Cruz Mountains. The San Bruno Gap, the larger of the two, extends from Fort Funston on the ocean side to the San Francisco International Airport on the bay side. Because the gap is oriented in the same northwest to southeast direction as the prevailing winds, and because the elevations along the gap are under 200 feet, marine air is easily able to penetrate into the bay.

Crystal Springs Gap extends along Highway 92 between Half Moon Bay and San Carlos. The low point is 900 feet, with elevations of 1,500 feet north and south of the gap. As the sea breeze strengthens on summer afternoons, the gap permits maritime air to pass across the mountains and its cooling effect is commonly seen from San Mateo to Redwood City.

The prevailing winds are westerly along the peninsula's west coast. Individual sites can show significant differences, however. For example, Fort Funston in western San Francisco County shows a southwest wind pattern, while Pillar Point in San Mateo County to the south shows a northwest wind pattern. Sites on the east side of the mountains also show a westerly pattern, although their wind patterns show influence by local topographic features. That is, a few hundred feet rise in elevation will induce flow around that feature instead of over it during stable atmospheric conditions. This can change the wind pattern by as much as 90 degrees over short distances. On mornings without a strong pressure gradient, areas on the east side of the peninsula often experience eastern flow in the surface layer, induced by upslope flow on the east-facing slopes and by the bay breeze. The bay breeze is rarely seen after noon because the stronger sea breeze dominates the flow pattern.

Rainfall amounts on the east side of the peninsula are somewhat lower than on the west side, with San Francisco and Redwood City reporting an average of 19.5 inches per year. On the west side, Half Moon Bay reports 25 inches per year. Areas in the Santa Cruz Mountains are significantly higher, especially west of the ridge line, due to orographic-lifting induced condensation, close proximity to a moisture source, and fog drip.

Air pollution potential is highest along the southeastern portion of the peninsula because this area is most protected from the high winds and fog of the marine layer, the emission density is relatively high, and pollutant transport from upwind sites is possible. In San Francisco, to the north, pollutant emissions are high, but winds are generally fast enough to carry the pollutants away before they can accumulate.

2.3 Existing Air Quality Conditions

2.3.1 Ambient Criteria Pollutant Concentrations

A number of ambient air quality monitoring stations are located in SFBAAB to monitor progress toward air quality standards attainment of National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS). There are no monitoring stations in the city of Millbrae, but there is one 11.1 miles north in San Francisco at 10 Arkansas Street. Recent air quality monitoring results from the San Francisco-Arkansas Street station are summarized in Table 2-1. The data represent air quality monitoring for the last 3 years for which a complete dataset is available (2018–2020). As indicated in Table 2-1, the San Francisco-Arkansas Street monitoring station has experienced infrequent violations of state and federal air quality standards during this time period.

Table 2-1. Ambient Air Quality Data at the San Francisco-Arkansas Street Monitoring Station (2017–2019)

Pollutant Standards	2018	2019	2020
Ozone (O_3)			
Maximum 1-hour concentration (ppm)	0.065	0.091	0.088
Maximum 8-hour concentration (ppm)	0.049	0.073	0.055
Number of days standard exceeded [a]			
CAAQS 1-hour standard (> 0.09 ppm)	0	0	0
CAAQS 8-hour standard (> 0.070 ppm)	0	**1**	0
NAAQS 8-hour standard (> 0.070 ppm)	0	**1**	0
Carbon Monoxide (CO)			
Maximum 8-hour concentration (ppm)	1.6	1.0	1.6
Maximum 1-hour concentration (ppm)	1.9	1.2	1.8
Number of days standard exceeded [a]			

Pollutant Standards	**2018**	**2019**	**2020**
NAAQS 8-hour standard (≥ 9 ppm)	0	0	0
CAAQS 8-hour standard (≥ 9.0 ppm)	0	0	0
NAAQS 1-hour standard (≥ 35 ppm)	0	0	0
CAAQS 1-hour standard (≥ 20 ppm)	0	0	0
Nitrogen Dioxide (NO_2)			
State maximum 1-hour concentration (ppb)	68	61	47
State second-highest 1-hour concentration (ppb)	65	54	47
Annual average concentration (ppb)	11	9	8
Number of days standard exceeded [a]			
CAAQS 1-hour standard (180 ppb)	0	0	0
Particulate Matter (PM10)			
National [b] maximum 24-hour concentration (μg/m^3)	40.9	42.1	102.3
National [b] second-highest 24-hour concentration (μg/m^3)	35.7	34.2	58.0
State [c] maximum 24-hour concentration (μg/m^3)	43.0	42.0	105.0
State [c] second-highest 24-hour concentration (μg/m^3)	37.0	35.0	59.0
National annual average concentration (μg/m^3)	10.0	7.5	12.0
State annual average concentration (μg/m^3)[d]	*	14.8	23.3
Measured number of days standard exceeded [a,e]			
NAAQS 24-hour standard (> 150 μg/m^3)	0	0	0
CAAQS 24-hour standard (> 50 μg/m^3)	0	0	**23**
Fine Particulate Matter (PM2.5)			
National [f] maximum 24-hour concentration (μg/m^3)	177.4	25.4	147.3
National [f] second-highest 24-hour concentration (μg/m^3)	145.4	22.0	123.1
State [g] maximum 24-hour concentration (μg/m^3)	177.4	25.4	147.3
State [g] second-highest 24-hour concentration (μg/m^3)	145.4	22.0	123.1
National annual average concentration (μg/m^3)	11.6	7.6	10.5
State annual average concentration (μg/m^3)	11.7	7.7	10.5
Measured number of days standard exceeded [a]			
NAAQS 24-hour standard (> 35 μg/m^3)	**15**	0	**8**

Sources:

California Air Resources Board. 2020. *iADAM: Air Quality Data Statistics – Top 4 Summary* (2017–2019, San Francisco County, Arkansas Street). Available: https://www.arb.ca.gov/adam/topfour/topfourdisplay.php. Accessed: December 15, 2021.

U.S. Environmental Protection Agency. 2018. *Outdoor Air Quality Data. Monitor Values Reports* (Carbon Monoxide, 2016–2018, San Francisco County, Arkansas Street). Last updated July 31. Available: https://www.epa.gov/outdoor-air-quality-data/monitor-values-report. Accessed: December 15, 2021.

ppb = parts per billion; ppm = parts per million; NAAQS = National Ambient Air Quality Standards; CAAQS = California Ambient Air Quality Standards; μg/m^3 = micrograms per cubic meter.
* = insufficient data available to determine the value.

[a] Exceedances are **bolded**. An exceedance is not necessarily related to a violation of the standard because an exceedance may be the result of a highly irregular or infrequent event, which is then excluded from the designation process.

[b] National statistics are based on standard conditions data. In addition, national statistics are based on samplers using federal reference or equivalent methods.

[c] State statistics are based on approved local samplers and local conditions data.

[d] State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.

[e] Measurements usually are collected every six days.

[f] National statistics are based on samplers using federal reference or equivalent methods.

[g] State statistics are based on local approved samplers.

2.3.2 Regional Attainment Status

Local monitoring data are used to designate areas as nonattainment, maintenance, attainment, or unclassified areas for the ambient air quality standards. The four designations are defined below. Table 2-2 summarizes the attainment status of San Mateo County.

- **Nonattainment**: Assigned to areas where monitored pollutant concentrations consistently violate the standard in question.
- **Maintenance**: Assigned to areas where monitored pollutant concentrations exceeded the standard in question in the past but are no longer in violation of that standard.
- **Attainment**: Assigned to areas where pollutant concentrations meet the standard in question over a designated period of time.
- **Unclassified**: Assigned to areas where data are insufficient to determine whether a pollutant is violating the standard in question.

Table 2-2. Federal and State Ambient Air Quality Attainment Status for San Mateo County

Criteria Pollutant	Federal Designation	State Designation
Ozone (8-hour standard)	**Marginal [a] Nonattainment**	**Nonattainment**
Carbon monoxide (CO)	Attainment	Attainment
Particulate matter (PM10)	Attainment	**Nonattainment**
Fine particulate matter (PM2.5)	**Moderate [b] Nonattainment**	**Nonattainment**
Nitrogen dioxide (NO_2)	Attainment	Attainment
Sulfur dioxide (SO_2)	Attainment	Attainment
Lead	Attainment	Attainment
Sulfates	(no federal standard)	Attainment
Hydrogen sulfide	(no federal standard)	Unclassified
Visibility-reducing particles	(no federal standard)	Unclassified

Sources:

U.S. Environmental Protection Agency. 2021. *Current Nonattainment Counties for All Criteria Pollutants.* (Green Book). Last updated: October 31. Available: https://www3.epa.gov/airquality/greenbook/ancl.html#CA. Accessed: February 2, 2022.

California Air Resources Board. 2021. *Area Designations Maps, State and National*. Available: http://www.arb.ca.gov/desig/adm/adm.htm. Accessed: February 2, 2022.

CO = carbon monoxide; NO_2 = nitrogen dioxide; PM10 = particulate matter with a diameter of less than or equal to 10 microns; PM2.5 = particulate matter with a diameter of less than or equal to 2.5 microns; SO_2 = sulfur dioxide.

Pollutants that are designated nonattainment are **bolded**.

[a] Marginal nonattainment areas have a design value of 0.076 up to but not including 0.086 parts per million (ppm).

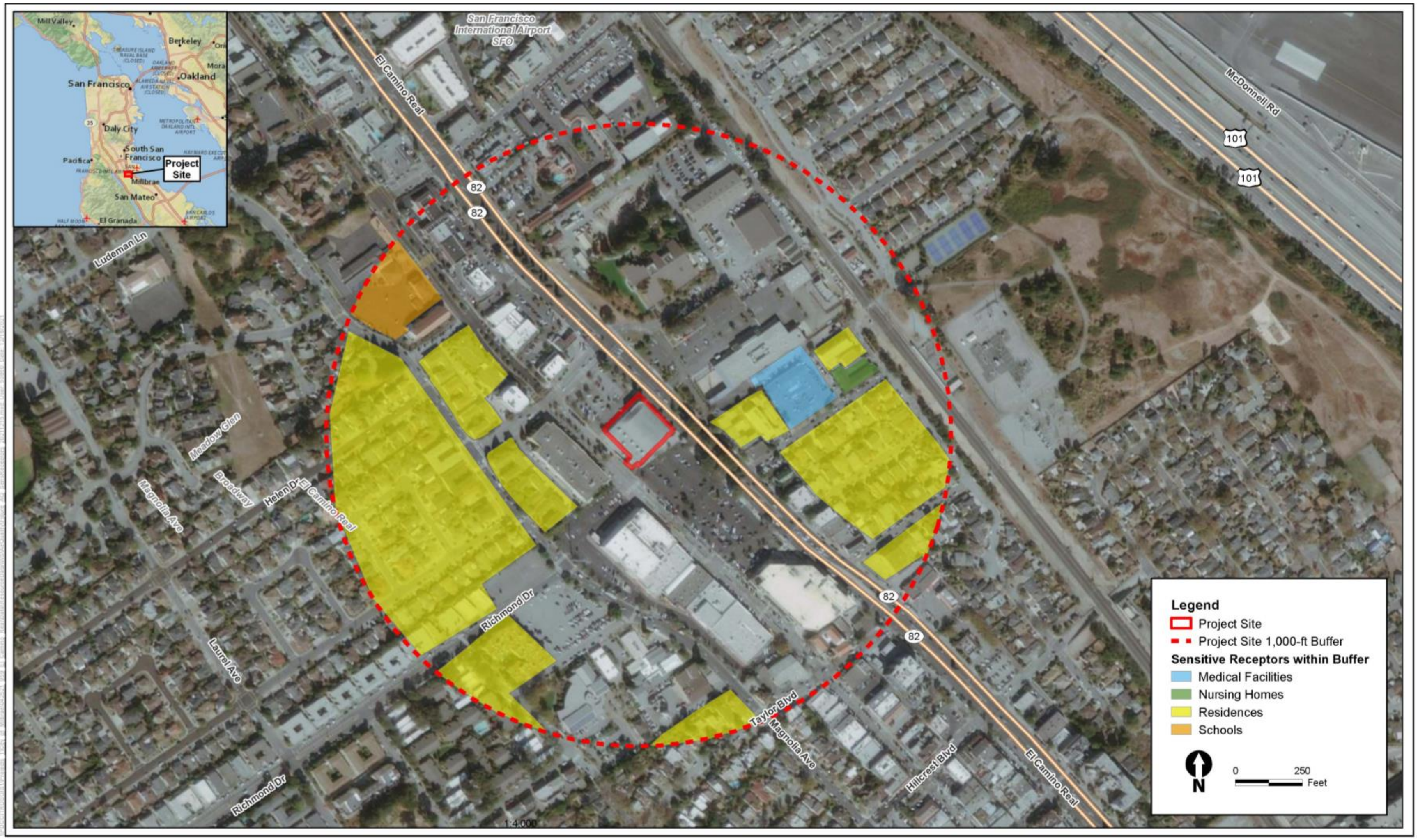
[b] Moderate maintenance areas have a design value of less than or equal to 12.7 ppm.

2.3.3 Sensitive Receptors

The NAAQS and CAAQS apply at publicly accessible areas, regardless of whether those areas are populated. For the purposes of air quality analysis, sensitive land uses are defined as locations where human populations, especially children, seniors, and sick persons, are located and where there is reasonable expectation of continuous human exposure according to the averaging period for the air quality standards (e.g., 24-hour, 8-hour, and 1-hour). Typical sensitive receptors include residences, hospitals, and schools. Diverse land uses and numerous sensitive receptors are distributed throughout the Project area, including residential uses, schools, open spaces, healthcare facilities, daycare centers, senior living complexes, and community centers.

Currently, the Site consists of commercial uses and does not contain any sensitive receptors. Places of employment are not considered sensitive land uses because health-sensitive individuals (e.g., children and seniors) are not present. However, there are sensitive receptors, including residential uses, within 1,000 feet of the Site. The closest sensitive receptors are multi-family housing buildings, the closest of which is approximately 125 feet northeast of the Site (850 El Camino Real). Additional sensitive receptors include other residential uses 240 feet to the southwest, a health care facility 340 feet to the northeast, a senior living facility 630 feet to the northeast, and an elementary school 690 feet to the northwest. Figure 2 illustrates all sensitive receptors within 1,000 feet of the Site.

Figure 2. Sensitive Receptors



Chapter 3

Regulatory Setting

This section provides a summary of the regulatory setting at the federal, state, and regional levels that are applicable to the Project.

The federal Clean Air Act (CAA) and its subsequent amendments form the basis for the nation's air pollution control effort. EPA is responsible for implementing most aspects of the CAA. A key element of the CAA is the NAAQS for criteria pollutants. The CAA delegates enforcement of the NAAQS to the states. In California, CARB is responsible for enforcing air pollution regulations and ensuring the NAAQS and CAAQS are met. CARB, in turn, delegates regulatory authority for stationary sources and other air quality management responsibilities to local air agencies. BAAQMD is the local air agency for the Project area. The following sections provide more detailed information on federal, state, and regional air quality regulations that apply to the Project.

3.1 Federal

3.1.1 Clean Air Act and National Ambient Air Quality Standards

The CAA was first enacted in 1963 and has been amended in 1965, 1967, 1970, 1977, and 1990. The CAA establishes federal air quality standards, known as NAAQS, for six criteria pollutants and specifies future dates for achieving compliance. The CAA also mandates that the states submit and implement a state implementation plan (SIP) for local areas not meeting those standards. The plans must include pollution control measures that demonstrate how the standards will be met.

The 1990 CAA amendments identify specific emission-reduction goals for areas not meeting the NAAQS. These amendments require both a demonstration of reasonable further progress toward attainment and incorporation of additional sanctions for failure to attain or meet interim milestones. Table 3-1 shows the NAAQS currently in effect for each criteria pollutant, as well as the CAAQS (discussed further below).

3.1.2 Non-Road Diesel Rule

EPA has established a series of increasingly strict emission standards for new off-road diesel equipment, on-road diesel trucks, and locomotives. New equipment, including heavy-duty trucks and off-road construction, is required to comply with these emission standards.

Table 3-1. Federal and State Ambient Air Quality Standards

Criteria Pollutant	Average Time	California Standards	National Standards [a]	
			Primary	Secondary
Ozone	1-hour	0.09 ppm	None [b]	None [b]
	8–hour	0.070 ppm	0.070 ppm	0.070 ppm
CO	8-hour	9.0 ppm	9 ppm	None
	1-hour	20 ppm	35 ppm	None
PM_{10}	24-hour	50 μg/m³	150 μg/m³	150 μg/m³
	Annual mean	20 μg/m³	None	None
$PM_{2.5}$	24-hour	None	35 μg/m³	35 μg/m³
	Annual mean	12 μg/m³	12.0 μg/m³	15 μg/m³
NO_2	Annual mean	0.030 ppm	0.053 ppm	0.053 ppm
	1-hour	0.18 ppm	0.100 ppm	None
SO_2[c]	Annual mean	None	0.030 ppm	None
	24-hour	0.04 ppm	0.14 ppm	None
	3-hour	None	None	0.5 ppm
	1-hour	0.25 ppm	0.075 ppm	None
Lead	30-day average	1.5 μg/m³	None	None
	Calendar quarter	None	1.5 μg/m³	1.5 μg/m³
	3-month average	None	0.15 μg/m³	0.15 μg/m³
Sulfates	24-hour	25 μg/m³	None	None
Visibility-reducing particles	8-hour	-[d]	None	None
Hydrogen Sulfide	1-hour	0.03 ppm	None	None
Vinyl Chloride	24-hour	0.01 ppm	None	None

Source: California Air Resources Board. 2016. *Ambient Air Quality Standards.* May 4. Available: https://ww2.arb.ca.gov/sites/default/files/2020-07/aaqs2.pdf. Accessed: November 23, 2021.

Notes:

ppm = parts per million; μg/m3 = micrograms per cubic meter; mg/m3 = milligrams per cubic meter.

[a] National standards are divided into primary and secondary standards. Primary standards are intended to protect public health, whereas secondary standards are intended to protect public welfare and the environment.

[b] The federal 1-hour standard of 12 parts per hundred million was in effect from 1979 through June 15, 2005. The revoked standard is referenced because it was employed for such a long period and is a benchmark for SIPs.

[c] The annual and 24-hour NAAQS for SO_2 only apply for 1 year after designation of the new 1-hour standard to those areas that were previously in nonattainment for 24-hour and annual NAAQS.

[d] CAAQS for visibility-reducing particles is defined by an extinction coefficient of 0.23 per kilometer, which is visibility of 10 miles or more due to particles when relative humidity is less than 70 percent.

3.1.3 Corporate Average Fuel Economy Standards

The Corporate Average Fuel Economy Standards (CAFE) were first enacted in 1975 to improve the average fuel economy of cars and light duty trucks. The National Highway Traffic Safety Administrative (NHTSA) sets the CAFE standards, which are regularly updated to require additional improvements in fuel economy. The standards were last updated in October 2012 to apply to new passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2017 through 2025, and are equivalent to 54.5 miles per gallon. However, On August 2, 2018, NHTSA and EPA proposed to amend the fuel efficiency standards for passenger cars and light trucks and establish new standards covering model years 2021 through 2026 by maintaining the current model year 2020 standards through 2026 per the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule. On September 19, 2019, EPA and NHTSA issued a final action on the One National Program Rule, which is considered Part 1 of the SAFE Vehicles Rule and a precursor to the proposed fuel efficiency standards. The One National Program Rule enables EPA and NHTSA to provide nationwide uniform fuel economy and greenhouse gas (GHG) vehicle standards, specifically by (1) clarifying that federal law preempts state and local tailpipe GHG standards, (2) affirming NHTSA's statutory authority to set nationally applicable fuel economy standards, and (3) withdrawing California's CAA preemption waiver to set state-specific standards.

EPA and NHTSA published their decisions to withdraw California's waiver and finalize regulatory text related to the preemption on September 27, 2019, per Title 84 of the *Federal Register* (FR) Section 51310. The agencies also announced that they will later publish the second part of the SAFE Vehicles Rule (i.e., the standards). California, 22 other States, the District of Columbia, and two cities filed suit against the proposed One National Program Rule on September 20, 2019.[18] The lawsuit requests a "permanent injunction prohibiting Defendants from implementing or relying on the Preemption Regulation," but does not stay its implementation during legal deliberations. Part 1 of the SAFE Vehicles Rule went into effect on November 26, 2019, and Part 2 went into effect on March 30, 2020. The revised rule changes the national fuel economy standards for light-duty vehicles from 46.7 miles per gallon (mpg) to 40.4 mpg in future years. California, 22 other states, and the District of Columbia filed a petition for review of the final rule on May 27, 2020.[19]

On January 20, 2021, President Biden issued an Executive Order (EO) 13990, directing NHTSA and EPA to review the SAFE Vehicles Rule, Part One, and propose a new rule for suspending, revising, or rescinding it by April 2021. The executive order also requires NHTSA and EPA to propose a new rule for suspending, revising, or rescinding Part Two by July 2021. In February 2021, the Department of Justice also asked courts to put the state litigation on hold while the current administration reconsidered the policy decisions of the prior administration.

In response to EO 13990, in April 2021, NHSTA released the CAFE Preemption Propose Rule, which if finalized, would repeal the SAFE Vehicles Rule Part One, and would reinstate California's right to set more stringent fuel efficiency standards

In response to the actions required for Part Two of EO 13990, on August 10, 2021, EPA and NHTSA proposed new CAFE standards to amend CAFE standards set in 2020 for passenger cars and light trucks manufactured. NHTSA released the Corporate Average Fuel Economy Standards for Model Years 2024-2026 Passenger Cars and Light Trucks Rule (86 FR 49602), which proposed standards set in 2020 should be revised so that they increase at a rate of 8 percent year over year for each model year from 2024 through 2026, for both passenger cars and light trucks. Public comment for the Corporate Average Fuel Economy Standards for Model Years 2024-2026 Passenger Cars and Light Trucks Rule concluded on October 26, 2021.[20] EPA released the Revised 2023 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions Standards Rule (86 FR 43726), proposing to

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[18] *California et al. v. United States Department of Transportation et al.*, 1:19-cv-02826, U.S. District Court for the District of Columbia.

[19] Ibid.

[20] National Highway Traffic Safety Administration. 2021. *Corporate Average Fuel Economy*. Available: https://www.nhtsa.gov/laws-regulations/corporate-average-fuel-economy#heavy-duty-vehicles. Accessed: November 24, 2021.

revise the GHG standards to be more stringent than the SAFE rule standards in each model year from 2023 through 2026, and to incentivize the production and sale to zero and near zero emission vehicles.[21]

In addition, on August 5th, 2021, President Biden signed EO 14037, which set a target to make half of all new vehicles sold in 2030 zero-emissions vehicles, including battery, electric, plug-in hybrid electric, or fuel cell electric vehicles. On December 8th, 2021, President Biden signed EO 14057, which strengthened the targets to 100 percent zero-emission vehicle acquisitions by 2035 and 100 percent zero-emission light-duty vehicles by 2027.

3.2 State

3.2.1 California Clean Air Act and California Ambient Air Quality Standards

In 1988, the California legislature adopted the California Clean Air Act (CCAA), which established a statewide air pollution control program. The CCAA requires all air districts in the state to endeavor to meet the CAAQS by the earliest practical date. Unlike the CAA, the CCAA does not set precise attainment deadlines. Instead, the CCAA establishes increasingly stringent requirements for areas that will require more time to achieve the standards. CAAQS are generally more stringent than NAAQS and incorporate additional standards for sulfates, hydrogen sulfide, visibility-reducing particles, and vinyl chloride. The CAAQS and NAAQS are shown in Table 3-1.

CARB and local air districts bear responsibility for meeting the CAAQS, which are to be achieved through district-level air quality management plans incorporated into a SIP. In California, EPA has delegated authority to prepare SIPs to CARB, which, in turn, has delegated that authority to individual air districts. CARB traditionally has established state air quality standards, maintaining oversight authority in air quality planning, developing programs for reducing emissions from motor vehicles, developing air emission inventories, collecting air quality and meteorological data, and approving SIPs.

The CCAA substantially adds to the authority and responsibilities of air districts. The CCAA designates air districts as lead air quality planning agencies, requires air districts to prepare air quality plans, and grants air districts authority to implement transportation control measures. The CCAA also emphasizes the control of "indirect and area-wide sources" of air pollutant emissions. The CCAA gives local air pollution control districts explicit authority to regulate indirect sources of air pollution.

3.2.2 Statewide Truck and Bus Regulation

Originally adopted in 2005, the on-road truck and bus regulation requires heavy trucks to be retrofitted with PM filters. The regulation applies to privately and federally owned diesel-fueled trucks with a gross vehicle weight rating greater than 14,000 pounds. Compliance with the

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[21] U.S. Environmental Protection Agency. 2021. *Regulations for Greenhouse Gas Emissions from Passenger Cars and Trucks*. Available: https://www.epa.gov/regulations-emissions-vehicles-and-engines/regulations-greenhouse-gas-emissions-passenger-cars-and. Accessed: November 24, 2021.

regulation can be reached through one of two paths: (1) vehicle retrofits according to engine year or (2) phase-in schedule. Compliance paths ensure that by January 2023, nearly all trucks and buses will have 2010 model year engines or newer.

3.2.3 State Tailpipe Emission Standards

Like EPA at the federal level, CARB has established a series of increasingly strict emission standards for new off-road diesel equipment and on-road diesel trucks operating in California. New equipment used to construct the Project would be required to comply with the standards.

In April 2021, Executive Order N-79-20 was signed, requiring the elimination of new internal combustion passenger vehicles by 2035 in California.

3.2.4 Carl Moyer Program

The Carl Moyer Memorial Air Quality Standards Attainment Program (Carl Moyer Program) is a voluntary program that offers grants to owners of heavy-duty vehicles and equipment. The program is a partnership between CARB and the local air districts throughout the state to reduce air pollution emissions from heavy-duty engines. Locally, the air districts administer the Carl Moyer Program.

3.2.5 Toxic Air Contaminant Regulation

California regulates TACs primarily through the Toxic Air Contaminant Identification and Control Act (Tanner Act) and the Air Toxics “Hot Spots” Information and Assessment Act of 1987 (“Hot Spots” Act). In the early 1980s, CARB established a statewide comprehensive air toxics program to reduce exposure to air toxics. The Tanner Act created California’s program to reduce exposure to air toxics. The “Hot Spots” Act supplements the Tanner Act by requiring a statewide air toxics inventory, notification of people exposed to a significant health risk, and facility plans to reduce these risks.

CARB has identified DPM as a TAC and has approved a comprehensive *Diesel Risk Reduction Plan* to reduce emissions from both new and existing diesel-fueled engines and vehicles.[22] The goal of the plan is to reduce DPM emissions and the associated health risks. . The plan identifies 14 measures that CARB will implement over the next several years. The project would be required to comply with any applicable diesel control measures from the *Diesel Risk Reduction Plan*.

3.3 Regional

3.3.1 Bay Area Air Quality Management District

At the local level, responsibilities of air quality districts include overseeing stationary-source emissions, approving permits, maintaining emissions inventories, maintaining air quality stations, overseeing agricultural burning permits, and reviewing air quality–related sections of environmental documents required by the California Environmental Quality Act (CEQA). The air

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[22] California Air Resources Board. 2000. *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engine and Vehicles.* October. Available: https://ww3.arb.ca.gov/diesel/documents/rrpfinal.pdf. Accessed: November 23, 2021.

quality districts are also responsible for establishing and enforcing local air quality rules and regulations that address the requirements of federal and state air quality laws and for ensuring that NAAQS and CAAQS are met.

The Project falls under the jurisdiction of the BAAQMD. The BAAQMD has local air quality jurisdiction over projects in the SFBAAB, including in San Mateo County. BAAQMD developed advisory emission thresholds to assist CEQA lead agencies in determining the level of significance of a project's emissions, which are outlined in its *California Environmental Quality Act Air Quality Guidelines* (CEQA Guidelines).[23] BAAQMD has also adopted air quality plans to improve air quality, protect public health, and protect the climate, including the *2017 Clean Air Plan: Spare the Air, Cool the Climate.*[24]

The *2017 Clean Air Plan* was adopted by the BAAQMD on April 19, 2017. The *2017 Clean Air Plan* updates the prior 2010 Bay Area ozone plan and outlines feasible measures to reduce ozone; provides a control strategy to reduce particulate matter, air toxics, and GHGs in a single, integrated plan; and establishes emission control measures to be adopted or implemented. The *2017 Clean Air Plan* contains the following primary goals; consistency with these goals is evaluated in this section.

- Protect Air Quality and Health at the Regional and Local Scale: Attain all State and national air quality standards and eliminate disparities among Bay Area communities in cancer health risk from TACs.
- Protect the Climate: Reduce Bay Area GHG emissions to 40 percent below 1990 levels by 2030 and 80 percent below 1990 levels by 2050; the *2017 Clean Air Plan* is the most current applicable air quality plan for the air basin and consistency with this plan is the basis for determining whether the project would conflict with or obstruct implementation of an air quality plan.

In addition to air quality plans, BAAQMD also adopts rules and regulations to improve existing and future air quality. The project may be subject to the following district rules.

- Regulation 2, Rule 2 (New Source Review)—This regulation contains requirements for Best Available Control Technology and emission offsets.
- Regulation 2, Rule 5 (New Source Review of Toxic Air Contaminates)—This regulation outlines guidance for evaluating TAC emissions and their potential health risks.
- Regulation 6, Rule 1 (PM)—This regulation restricts emissions of PM darker than a 1 on the Ringlemann Chart to less than 3 minutes in any 1 hour.
- Regulation 7 (Odorous Substances)—This regulation establishes general odor limitations on odorous substances and specific emission limitations on certain odorous compounds.
- Regulation 8, Rule 3 (Architectural Coatings)—This regulation limits the quantity of ROG in architectural coatings.

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[23] Bay Area Air Quality Management District. 2017. *California Environmental Quality Act. Air Quality Guidelines.* May. Available: https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en. Accessed: February 2, 2022.

[24] Bay Area Air Quality Management District. 2017. *Final 2017 Clean Air Plan.* Adopted April 19. Available: https://www.baaqmd.gov/~/media/files/planning-and-research/plans/2017-clean-air-plan/attachment-a_-proposed-final-cap-vol-1-pdf.pdf?la=en. Accessed: February 2, 2022.

- Regulation 9, Rule 6 (NOx Emission from Natural Gas–Fired Boilers and Water Heaters)—This regulation limits emissions of NO_X generated by natural gas–fired boilers.
- Regulation 9, Rule 8 (Stationary Internal Combustion Engines)—This regulation limits emissions of NO_X and CO from stationary internal combustion engines of more than 50 horsepower.
- Regulation 11, Rule (Hazardous Pollutants – Asbestos Demolition, Renovation, and Manufacturing)—This regulation, which incorporates EPA's asbestos National Emissions Standards for Hazardous Air Pollutants (NESHAP) regulations, controls emissions of asbestos to the atmosphere during demolition, renovation, and transport activities.

Chapter 4
Impacts

This section describes the impact analysis related to air quality for the Project. It describes the methods and thresholds used to determine whether an impact would be significant. Project applicant commitments that would minimize or avoid potentially significant impacts are described for each impact discussion, where applicable.

4.1 Methods

Air quality impacts associated with construction and operation of the project were assessed and quantified (where applicable) using standard and accepted software tools, techniques, and emission factors. Methods are summarized below. A full list of assumptions can be found in Appendix A.

4.1.1 Construction Emissions

Criteria pollutant emissions generated by construction activities were quantified using the California Emissions Estimator Model (CalEEMod), version 2020.4.0. Assumptions related to construction activity and scheduling (i.e., construction phase start and end dates) were based on project-specific information provided by the Project applicant and model defaults where project-specific information was not available.

Construction is expected to consist of seven main phases: demolition, site preparation, grading, utility construction, building construction, paving, and architectural coating. Each phase has discrete start and end dates. Construction would start January 2023 and be completed by April 2025. A maximum of two phases would occur simultaneously. Based on input from the Project applicant, the analysis assumes that construction would occur 5 days a week, Monday through Friday. The primary construction assumptions for the Project are summarized below. Additional data used in the construction analysis are detailed in Appendix A.

- **Heavy-Duty Construction Equipment.** The Project applicant provided information regarding the number of pieces of equipment, equipment horsepower, fuel type, and hours per day for each phase of construction. The applicant has committed to ensuring all off-road diesel-powered equipment used during construction will be equipped with EPA Tier 4 Final engines. Equipment load factors are based on CalEEMod defaults.
- **Construction Workers' Vehicle Trips**. The number of one-way daily worker trips per phase (ranging from 6 to 50) were based on the project applicant information, and the trip length (11 miles one way) and fleet mix (e.g., light-duty autos and light-duty trucks) were based on CalEEMod defaults. Emissions were calculated using the vehicle emission factors from EMFAC2017 provided in CalEEMod.
- **Construction Vendor Truck Trips.** The number of one-way daily vendor trips per phase (ranging from 0 to 5) were based on the Project applicant information, and the trip length (7.3 miles one way) and fleet mix (e.g., heavy-heavy duty trucks, medium-heavy duty trucks) were based on CalEEMod defaults. Emissions were calculated using the vehicle emission factors from EMFAC2017 provided in CalEEMod.

- **Construction Haul Truck Trips.** The number of one-way daily haul trucks during demolition (ranging from 2 to 106) were based on Project applicant information, and the trip length (20 miles one way) and fleet mix (e.g., heavy-heavy duty trucks) were based on CalEEMod defaults.
- **Paving.** Paving activities would result in the emission of ROGs. Approximately 3.1 acres of the Project area would be paved during the paving phase.
- **Architectural Coating.** Architectural coating activities would result in the emission of ROGs. The activities would take place during the architectural coating phase. The Project applicant has committed to using low volatile organic compound (VOC) coatings.
- **Earthmoving.** Earthmoving activities would result in the emission of PM dust. Earthmoving activities include grading of 3.72 acres and export of 32,575 cubic yards of material during site preparation and grading. The Project applicant would implement BAAQMD's construction dust best management practices (BMPs) (listed in Table 8-2 of its CEQA Guidelines), which includes watering of exposed surfaces two times per day and limiting vehicle speeds to 15 miles per hour.[25]
- **Demolition.** Removal of the existing structure would result in the emission of PM dust. Approximately 31,741 square feet of existing structure would be demolished and exported off-site during the demolition phase.

4.1.2 Operational Emissions

Criteria pollutant emissions generated by operation activities were quantified using CalEEMod. Assumptions related to operational activity were based on project-specific information provided by the Project applicant and model defaults where project-specific information was not available. The data used in the operations analysis are provided in Appendix A of this report. The operational assumptions for the Project are summarized below.

- **Mobile Sources.** Vehicle trips would include daily resident trips plus employee commuting associated with the non-residential land uses at the Site. Fehr & Peers estimated the daily vehicle miles traveled (VMT) of the Project to be 9,529.[26] The VMT estimate considers the expected VMT reductions associated with the Project's smart growth as a mixed-use, transportation-oriented infill development. The CalEEMod default fleet mix of vehicle categories was used to calculate mobile source emissions. Emissions were calculated using the vehicle emission factors from EMFAC2017 provided in CalEEMod. Consistent with the capabilities of CalEEMod, this analysis does not quantify the emissions benefit from vehicle fuel switching that would be induced by electric vehicle chargers in parking spaces.
- **Area Sources.** Area sources include consumer products and architectural coatings. The Project applicant has committed to using low VOC coatings and all-electric landscape equipment (e.g., lawnmowers, leaf blowers, and chainsaws). No hearths (i.e., woodstoves and fireplaces) would be installed.
- **Energy Sources.** CalEEMod does not calculate criteria pollutant emissions associated with electricity consumption. Therefore, energy-source criteria pollutant emissions in CalEEMod

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[25] Bay Area Air Quality Management District. 2017. *California Environmental Quality Act. Air Quality Guidelines.* May. Available: https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en. Accessed: February 2, 2022.

[26] Fehr & Peers. 2022. *959 El Camino Real Transportation Data Needs.* Provided to ICF January 18.

include only the emissions from natural gas combustion on site. The Project applicant has committed to providing all-electric residential units, which would not consume natural gas. The non-residential land uses would be pre-wired for electric uses, but tenants would have to opt into an all-electric option and some land uses (e.g., restaurants) would use gas for cooking, so it was conservatively assumed that all of the non-residential land uses would consume natural gas in addition to electricity.

- **Water and Wastewater Sources.** CalEEMod calculates the GHG emissions associated with electricity needed to convey, treat, and distribute water. CalEEMod also calculates the fugitive GHG emissions associated the wastewater treatment process. Criteria pollutants are not emitted as a result of the water and wastewater processes, so these sources are not applicable to this analysis.
- **Solid Waste Sources.** CalEEMod calculates the fugitive GHG emissions associated with the landfilled waste decomposition process. Criteria pollutants are not emitted as a result of this process, so this source is not applicable to this analysis.
- **Off-Road Equipment Sources**. No off-road equipment (e.g., cranes, pumps) would be used during operations, and therefore this source is not applicable to this analysis.
- **Stationary Sources.** No stationary sources (e.g., generators, commercial boilers) would be used during operations, and therefore this source is not applicable to this analysis.
- **Vegetation.** CalEEMod calculates the sequestered carbon associated with changes in land use vegetation. Criteria pollutants are not emitted or stored as a result of this process, so this source is not applicable to this analysis.

4.1.3 Carbon Monoxide Emissions

As discussed in Section 4.1.2.1, *Carbon Monoxide*, BAAQMD has screening criteria that provide a conservative indication of whether Project-generated traffic would cause a potential CO hot spot. Because the Project would meet these screening criteria, as discussed below under Impact AQ-3, a quantitative analysis of site-specific dispersion modeling of Project-related CO concentrations would not be necessary.

4.1.4 Health Risk Assessment Modeling

Diesel-fueled off-road equipment and trucks used during construction would emit DPM that could expose nearby sensitive receptors to increased cancer and non-cancer risks. A human health risk assessment (HRA) for construction was performed using EPA's most recent dispersion model, AERMOD, version 191901; chronic risk assessment values presented by OEHHA; and other assumptions for model inputs from BAAQMD's *Air Toxics NSR Program Health Risk Assessment Guidelines* and *Health Risk Assessment Modeling Protocol*.[27,28] Note that the HRA takes into account

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[27] Bay Area Air Quality Management District. 2016. *Air Toxics NSR Program Health Risk Assessment Guidelines.* December. Available: https://www.baaqmd.gov/~/media/files/planning-and-research/permit-modeling/hra_guidelines_12_7_2016_clean-pdf.pdf?la=en. Accessed: February 2, 2022.

[28] Bay Area Air Quality Management District. 2020. *Health Risk Assessment Modeling Protocol*. August. Available: https://www.baaqmd.gov/~/media/files/ab617-community-health/facility-risk-reduction/documents/baaqmd_hra_modeling_protocol-pdf.pdf?la=en. Accessed: February 2, 2022.

OEHHA's most recent guidance and calculation methods from the *Air Toxics Hot Spots Program, Risk Assessment Guidelines, Guidance Manual for Preparation of Risk Assessments*.[29]

Because operations would not involve PM emissions-intensive sources (i.e., haul trucks; generators; process boilers; on-site, off-road equipment), an operational HRA was not conducted.

The construction HRA consists of three parts: an emissions inventory, air dispersion modeling, and risk calculations. A description of each of these parts follows.

4.1.4.1 Emissions Inventory

The emissions inventory includes DPM and PM2.5 emissions from construction. DPM emissions would be generated by off-road equipment and on-road travel by heavy-duty trucks. The amount of DPM emissions was assumed to be equal to the construction mass emissions quantities for PM2.5 exhaust from diesel vehicles and equipment. The construction PM2.5 inventory consists of PM2.5 exhaust and fugitive dust emissions from off-road equipment, on-site soil movement, and on-road travel by heavy-duty trucks and workers' vehicles. Off-site construction vehicle emissions were apportioned to roadways and based on the percentage of total trip distance traveled within 1,000 feet of the Site.

4.1.4.2 Air Dispersion Modeling

The HRA used EPA's AERMOD model, version 21112, to model annual average DPM and PM2.5 concentrations at nearby receptors. Modeling inputs, including emissions rates (in grams of pollutant emitted per second) and source characteristics (e.g., release height, stack diameter, plume width), were based on guidance provided by OEHHA and BAAQMD. Meteorological data were obtained from CARB for the San Francisco International Airport location, which is the nearest monitoring station and less than half a mile east of the Site.

The modeling of emissions from construction activities was based on the number of construction hours and days from 2023 through 2025 (8 hours per day, 5 days per week, excluding Saturdays and Sundays).

Emissions from on-site construction equipment were characterized as an area source (AREAPOLY) with a release height of 0.9 meter for fugitive dust emissions and 4.1 meters for all other emissions. The area source was drawn as the footprint of the Site where construction activity would occur.

Haul and vendor truck emissions were characterized as line/area sources (LINEAREA) drawn onto the extent of the designated haul routes that occurred within 1,000 feet of the Site. The haul and vendor truck release heights were modeled as 0.9 meter for fugitive dust emissions and 3.4 meters for all other emissions. The haul truck route from the Site was assumed to start from the parking lot on the northwest side of the Site and exit right onto El Camino Real, which extends past 1,000 feet of the Site. The route to the Site within 1,000 feet was assumed to start on El Camino Real, turn left onto Silva Avenue, turn right onto Broadway, and then turn right into the parking lot on the northwest side of the building. This route is in the vicinity of sensitive receptor land uses (i.e., residences) along El Camino Real.

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[29] Office of Environmental Health Hazard Assessment. 2015. *Air Toxics Hot Spots Program, Risk Assessment Guidelines, Guidance Manual for Preparation of Risk Assessments.* February. Available: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf. Accessed: February 2, 2022.

Plume rise is the height that pollutants rise above a release height. For exhaust, plume rise occurs because of the temperature of the exhaust gas. Exhaust gas temperatures can be high, which causes the plume to rise. For dust, plume rise accounts for the mechanical entrainment of dust in the wheels of equipment and trucks. To account for plume rise associated with mechanically generated construction emissions sources during the AERMOD run, the initial vertical dimension of fugitive dust emissions for both the area and line/area source were modeled at 0.79 meters. All other emissions were modeled at 3.81 meters for the area source and 3.16 meters for the line/area sources.

The urban dispersion option was selected based on the Site's characteristics and because surrounding areas are developed with buildings and paved surfaces that can influence how pollutants are dispersed in the area.

Sensitive receptors that were modeled include multi-family residential complexes, other residential uses, a health care facility, a senior living facility, and an elementary school. Figure 2 illustrates all sensitive receptors within 1,000 feet of the Site that were modeled. A 25- by 25-meter receptor grid was used to place receptors. All receptors were assumed to have a height of 1.5 meters to represent the average human breathing zone.

A complete list of dispersion modeling inputs is provided in Appendix A.

4.1.4.3 Risk Calculations

The risk calculations incorporate OEHHA's age-specific factors, which account for increased sensitivity to carcinogens during early-in-life exposure. The approach for estimating cancer risk from long-term inhalation, with exposure to carcinogens, requires calculating a range of potential doses and multiplying by cancer potency factors in units corresponding to the inverse dose to obtain a range of cancer risks. For cancer risk, the risk for each age group is calculated using the appropriate daily breathing rates, age sensitivity factors, and exposure durations. The cancer risks calculated for individual age groups are summed to estimate the cancer risk for each receptor. Chronic cancer and hazard risks were calculated using OEHHA's 2015 HRA guidance.[30] According to BAAQMD guidance, residential cancer risks assume a 30-year exposure at 24 hours per day for 350 days per year.[31] The residential cancer risk from construction assumed a 2.3-year exposure duration, consistent with the Project's construction schedule. The risk calculations and additional assumptions are provided in Appendix A.

4.2 Thresholds of Significance

Based on Appendix G of the CEQA Guidelines, the Project would have a significant air quality impact if it would result in any of the conditions listed below.

- Conflict with or obstruct implementation of the applicable air quality plan.

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[30] Office of Environmental Health Hazard Assessment. 2015. *Air Toxics Hot Spots Program, Risk Assessment Guidelines, Guidance Manual for Preparation of Risk Assessments.* February. Available: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf. Accessed: February 2, 2022.

[31] Bay Area Air Quality Management District. 2016. *Air Toxics NSR Program Health Risk Assessment Guidelines.* December. Available: https://www.baaqmd.gov/~/media/files/planning-and-research/permit-modeling/hra_guidelines_12_7_2016_clean-pdf.pdf?la=en. Accessed: February 2, 2022.

- Result in a cumulatively considerable net increase in any criteria pollutant for which the project region is classified as a nonattainment area under an applicable federal or state ambient air quality standard.
- Expose sensitive receptors to substantial pollutant concentrations.
- Result in other emissions (such as those leading to odors) that would adversely affect a substantial number of people.

As discussed above, all pollutants that would be generated by the Project are associated with some form of health risk (e.g., asthma, lower respiratory problems). Criteria pollutants can be classified as either regional or localized pollutants. Regional pollutants can be transported over long distances and affect ambient air quality far from the emissions source. Localized pollutants affect ambient air quality near the emissions source. As discussed above, the primary pollutants of concern generated by the Project are ozone precursors (ROG and NO_X), CO, PM, and TACs (including DPM and asbestos).

The following sections discuss thresholds and analysis considerations for regional and local project-generated criteria pollutants with respect to their human health implications. Thresholds and guidance for evaluating potential odors associated with the Project area are also presented.

4.2.1 Regional Project-Generated Criteria Pollutant Emissions (Ozone Precursors and Regional Particulate Matter)

This analysis evaluates the impacts of regional emissions generated by the Project (Impacts AQ-1 through AQ-2b) using the project-level guidance recommended by BAAQMD in its CEQA Guidelines.[32]

For Impact AQ-1, this analysis considers whether the Project would conflict with the most recent air quality plan.[33] The impact analysis evaluates whether the Project supports the primary goals of the 2017 Clean Air Plan, including applicable control measures from the plan, and whether it would disrupt or hinder implementation of any 2017 Clean Air Plan control measures. BAAQMD *recommends* that the determination of consistency with the Clean Air Plan goals be based on whether the Project is consistent with BAAQMD's project-level thresholds. These thresholds are also the basis for determining significance under Impact AQ-2a and Impact AQ-2b (discussed below).

For Impact AQ-2a and Impact AQ-2b, calculated regional criteria pollutant emissions are compared to BAAQMD's project-level thresholds. BAAQMD's project-level thresholds are summarized in Table 4-1.[34] According to BAAQMD, projects with emissions in excess of the thresholds would be expected to have a significant cumulative impact on regional air quality because an exceedance of the thresholds is anticipated to contribute to NAAQS and CAAQS violations.

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[32] Bay Area Air Quality Management District. 2017. *California Environmental Quality Act. Air Quality Guidelines.* May. Available: https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en. Accessed: February 2, 2022.

[33] Bay Area Air Quality Management District. 2017. *California Environmental Quality Act. Air Quality Guidelines.* May. Available: https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en. Accessed: February 2, 2022.

[34] Ibid.

Table 4-1. BAAQMD Project-Level Regional Criteria Pollutant Emission Thresholds

Analysis	Thresholds (Daily Average Emissions)
Regional criteria pollutants (construction)	• Reactive organic gases: 54 pounds/day • Nitrogen oxides: 54 pounds/day • Particulate matter: 82 pounds/day (exhaust only); compliance with best management practices (fugitive dust) • Fine particulate matter: 54 pounds/day (exhaust only); compliance with best management practices (fugitive dust)
Regional criteria pollutants (operations)	• Reactive organic gases: 54 pounds/day • Nitrogen oxides: 54 pounds/day • Particulate matter: 82 pounds/day (exhaust only) • Fine particulate matter: 54 pounds/day (exhaust only)

Source: Bay Area Air Quality Management District. 2017b. *California Environmental Quality Act. Air Quality Guidelines.* May. Available: https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en. Accessed: February 2, 2022.

As discussed previously, air districts develop region-specific CEQA thresholds of significance in consideration of existing air quality concentrations and attainment designations under the NAAQS and CAAQS. The NAAQS and CAAQS are informed by a wide range of scientific evidence that demonstrates that there are known, safe concentrations of criteria pollutants. Accordingly, the Project would expose receptors to substantial regional pollution if any of the thresholds summarized in Table 4-1 are exceeded.

4.2.2 Localized Project-Generated Criteria Pollutant Emissions (Carbon Monoxide and Particulate Matter) and Air Toxics

Localized pollutants generated by a project can be deposited near the emissions source, potentially affecting the nearby population. Although these pollutants dissipate with distance, emissions from individual projects can result in direct and material health impacts on adjacent sensitive receptors. The localized pollutants of concern that would be generated by the Project are CO, PM, and DPM. The applicable thresholds for each pollutant, grouped under Impact AQ-3, are described below.

4.2.2.1 Carbon Monoxide

Heavy traffic congestion can contribute to high levels of CO. Individuals exposed to such hot spots may have a greater likelihood of developing adverse health effects. BAAQMD has adopted screening criteria that provide a conservative indication of whether project-generated traffic would cause a potential CO hot spot. If the screening criteria are not met, a quantitative analysis, through site-specific dispersion modeling of project-related CO concentrations, would not be necessary. Based on the screening criteria, the project would not cause localized violations of the CAAQS for CO. BAAQMD's CO screening criteria are summarized below.[35]

- The project traffic would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour.
- The project traffic would not increase traffic volumes at affected intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., a tunnel, parking garage, bridge underpass, natural or urban street canyon, below-grade roadway).
- The project would be consistent with an applicable congestion management program established by the county congestion management agency for designated roads or highways, the regional transportation plan, and local congestion management agency plans.

BAAQMD does not consider construction-generated CO to be a significant pollutant of concern because construction activities typically do not generate substantial quantities of this particular pollutant.[36]

4.2.2.2 Particulate Matter

BAAQMD adopted an incremental PM2.5 concentration-based significance threshold in which a "substantial" contribution at the project level for an individual source is defined as total (i.e., exhaust and fugitive) PM2.5 concentrations exceeding 0.3 $\mu g/m^3$. In addition, BAAQMD considers projects to have a cumulatively considerable PM2.5 impact if sensitive receptors are exposed to PM2.5 concentrations from local sources within 1,000 feet, including existing sources, project-related sources, and reasonably foreseeable future sources, that exceed 0.8 $\mu g/m^3$.[37]

BAAQMD has not established PM10 thresholds of significance. BAAQMD's PM2.5 thresholds apply to both new receptors and new sources. However, BAAQMD considers impacts related to fugitive PM10 from earthmoving activities to be less than significant with application of BAAQMD's basic construction best management practices for dust control.

4.2.2.3 Diesel Particle Matter

DPM has been identified as a TAC. It is particularly concerning because long-term exposure can lead to cancer, birth defects, and damage to the brain and nervous system. BAAQMD has adopted incremental cancer and hazard thresholds to evaluate receptor exposure to single sources of DPM emissions. The "substantial" DPM threshold defined by BAAQMD is exposure of a sensitive receptor to an individual emissions source, resulting in an excess cancer risk level of more than 10 in 1 million or a non-cancer (i.e., chronic or acute) hazard index greater than 1.0.[38] BAAQMD also considers projects to have a cumulatively considerable DPM impact if they contribute to DPM

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[35] Bay Area Air Quality Management District. 2017. *California Environmental Quality Act Air Quality Guidelines.* May. Available: https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en. Accessed: February 2, 2022.

[36] Bay Area Air Quality Management District. 2017. *California Environmental Quality Act. Air Quality Guidelines.* May. Available: https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en. Accessed: February 2, 2022.

[37] Ibid.

[38] Ibid.

emissions that, when combined with cumulative sources within 1,000 feet of sensitive receptors, result in excess cancer risk levels of more than 100 in 1 million or an hazard index greater than 10.0. BAAQMD considers projects to have a significant cumulative impact if they introduce new receptors at a location where the combined exposure to all cumulative sources within 1,000 feet is in excess of cumulative thresholds.[39]

4.2.2.4 Asbestos

BAAQMD considers a project to have a significant impact if it does not comply with the applicable regulatory requirements outlined in BAAQMD's Regulation 11, Rule 2.

4.2.3 Odors

For Impact AQ-4, BAAQMD and CARB have identified several types of land uses as being commonly associated with odors,[40,41] such as landfills, wastewater treatment facilities, and animal processing centers. BAAQMD's *CEQA Air Quality Guidelines* recommend that project analyses identify the location of existing and planned odor sources and include policies to reduce potential odor impacts in the project area.

4.3 Project Impacts

Impact AQ-1: The Project would not conflict with or obstruct implementation of the applicable air quality plan (Less than Significant)

The CAA requires a SIP or an air quality control plan to be prepared for areas with air quality that violates the NAAQS. The SIP sets forth the strategies and pollution control measures that states will use to attain the NAAQS. The CCAA requires attainment plans to demonstrate a 5 percent per year reduction in nonattainment air pollutants or their precursors, as averaged every consecutive 3-year period, unless an approved alternative measure of progress is developed. Air quality attainment plans (AQAPs) outline emissions limits and control measures to achieve and maintain these standards by the earliest practical date. The current AQAP for the SFBAAB is the 2017 Clean Air Plan.[42]

According to BAAQMD's CEQA Guidelines, the determination of 2017 Clean Air Plan consistency should consider the following for project-level analyses:[43]

- Does the project support the primary goals of the 2017 Clean Air Plan?

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[39] Bay Area Air Quality Management District. 2017. *California Environmental Quality Act. Air Quality Guidelines.* May. Available: https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en. Accessed: February 2, 2022.

[40] Ibid.

[41] California Air Resources Board. 2005. *Air Quality and Land Use Handbook: A Community Health Perspective.* April. Available: https://ww3.arb.ca.gov/ch/handbook.pdf. Accessed: November 23, 2021.

[42] Ibid.

[43] Ibid.

- Does the project include applicable control measures from the 2017 Clean Air Plan?
- Does the project disrupt or hinder implementation of any 2017 Clean Air Plan control measure?

BAAQMD recommends that the determination of consistency with the Clean Air Plan goals be based on whether the project is consistent with BAAQMD's project-level thresholds. These thresholds are also the basis for determining significance under Impact AQ-2a and Impact AQ-2b (discussed below). To avoid double-counting impacts (i.e., using a redundant significance determination criterion in both Impact AQ-1 and Impacts AQ-2a and AQ-2b), the City as the lead agency has chosen to determine the significance of Impact AQ-1 by evaluating whether the amount of growth associated with the Project is consistent with the 2017 Clean Air Plan and also whether the Project is consistent with the 2017 Clean Air Plan's relevant policies and control measures, rather than strictly basing the assessment on project emissions in relation to BAAQMD's project-level thresholds.

Each of these three questions is addressed below for the Project.

Support of 2017 Clean Air Plan Goals

The primary goals of the 2017 Clean Air Plan are to (1) attain the CAAQS and NAAQS, (2) eliminate disparities among Bay Area communities in the cancer health risk from TACs, and (3) reduce Bay Area GHG emissions to 40 percent below 1990 levels by 2030 and 80 percent below 1990 levels by 2050. As discussed below, the Project includes numerous Project applicant commitments to design features that will support regional attainment of the CAAQS and NAAQS and, therefore, would not prevent attainment of the state and national air quality standards. For example, the design and location of the Project would decrease regional VMT per service population and corresponding mobile emissions per service population because the Site would be an infill site (i.e., not contributing to sprawl),transit-oriented (i.e., near multiple rail and bus transit stations), and in proximity to a mix of uses (i.e., a diversity of land use types). All of these Project features promote alternative transportation options not only for the Project but for existing and future development in the surrounding area (e.g., residents and business would have access to nearby retail options with construction of the amenities building). Alternative transportation options are less emissions-intensive compared to single occupied vehicles. The Project applicant has also committed to providing all-electric residential dwelling units with all-electric wiring for non-residential land uses and retainment of the emissions-free electricity provider Peninsula Clean Energy as a secondary option to Pacific Gas & Electric. Development would include energy efficient appliances, street lighting, and other end uses. Installation of a solar PV system would displace electricity use from fossil fuel sources. Lastly, area source emissions from maintenance equipment would be reduced by the Project applicant's commitment to use electric landscaping equipment in place of gasoline-fueled equipment. These commitments to sustainable design features would not only decrease the project's contribution to regional criteria pollutant emissions per service population but would also reduce emissions of GHGs per service population as well. Therefore, the Project would support the primary goals of the 2017 Clean Air Plan.

Support Applicable Control Measures and their Implementation

To meet the primary goals, the 2017 Clean Air Plan recommends specific control measures and actions. These control measures are grouped into various categories and include stationary source measures, mobile source measures, and transportation control measures. The 2017 Clean Air Plan recognizes that community design dictates individual travel mode and that a key long-term control strategy to reduce emissions of criteria pollutants, air toxics, and GHGs from motor vehicles is to channel future Bay Area growth into vibrant urban communities where goods and services are close at hand and people have a range of viable transportation options. To this end, the 2017 Clean Air Plan includes control measures that are aimed at reducing air pollution in the SFBAAB.

The air quality measures most applicable to the Project are related to transportation, energy, and green buildings, as follows.

- TR1: Clean Air Teleworking Initiative – Develop teleworking best practices for employers and develop additional strategies to promote telecommuting. Promote teleworking on "Spare the Air" days.
- TR2: Trip Reduction Programs – Implement the regional Commuter Benefits Program (Rule 14-1), which requires employers with 50 or more Bay Area employees to provide commuter benefits. Encourage trip reduction policies and programs in local plans (e.g., general and specific plans) while providing grants to support trip reduction efforts. Encourage local governments to require mitigation of vehicle travel as part of new development approval, adopt transit benefit ordinances to reduce transit costs for employees, and develop innovative ways to encourage rideshare, transit, cycling, and walking for work trips. Fund various employer-based trip reduction programs.
- TR8: Ridesharing, Last-Mile Connection – Promote carpooling and vanpooling by providing funding to continue regional and local ridesharing programs and support the expansion of carsharing programs. Provide incentive funding for pilot projects to evaluate the feasibility and cost-effectiveness of innovative ridesharing and other last-mile solution trip reduction strategies. Encourage employers to promote ridesharing and carsharing to their employees.
- TR9: Bicycle and Pedestrian Access and Facilities – Encourage planning for bicycle and pedestrian facilities in local plans (e.g., general and specific plans) and fund bicycle lanes, routes, paths, and parking facilities.
- TR13: Parking Policies – Encourage parking policies and programs in local plans (e.g., reduce minimum parking requirements), limit the supply of off-street parking in transit-oriented areas, unbundle the price of parking spaces, and support implementation of demand-based pricing (such as "SF Park") in high-traffic areas.
- TR14: Cars and Light Trucks – Commit regional clean air funds toward qualifying vehicle purchases and infrastructure development. Partner with private, local, state, and federal programs to promote the purchase and lease of battery-electric and plug-in hybrid-electric vehicles.
- TR15: Public Outreach and Education – Implement the Spare the Air Every Day Campaign, including Spare the Air alerts, employer programs, community resource teams, a plug-in electric vehicle outreach campaign, and the Spare the Air Youth Program.
- TR23: Lawn and Garden Equipment – Seek additional funding to expand the Commercial Lawn and Garden Equipment Replacement Program into all nine Bay Area counties. Explore options to expand the program to cover shredders, stump grinders, and commercial turf equipment.
- EN2: Decrease Electricity Demand – Work with local governments to adopt additional energy efficiency policies and programs. Support local government energy efficiency programs through best practices, model ordinances, and technical support. Work with partners to develop messaging to decrease electricity demand during peak times.

- BL1: Green Buildings – Collaborate with partners such as KyotoUSA to identify energy-related improvements and opportunities for on-site renewable energy systems in school districts; investigate funding strategies to implement upgrades. Identify barriers to effective local implementation of the CALGreen (Title 24) statewide building energy code; develop solutions to improve implementation/enforcement. Work with the Association of Bay Area Governments' BayREN program to make additional funding available for energy-related projects in the buildings sector. Engage with additional partners to target reducing emissions from specific types of buildings.
- BL2: Decarbonize Buildings – Explore potential air district rulemaking options regarding the sale of fossil fuel–based space and water heating systems for both residential and commercial use. Explore incentives for property owners to replace their furnaces, water heaters, or natural gas–powered appliances with zero-carbon alternatives. Update air district guidance documents to recommend that commercial and multi-family developments install ground-source heat pumps and solar hot water heaters.

The Project would include design features that would support emissions reductions in the transportation sector. For instance, the Project's compliance with the City's Climate Action Plan checklist requirements related to alternative transportation, active transportation, commuting, and vehicle sharing reflect promotion of transit and pedestrian connectivity (e.g., bikeshare and scooter share, traffic calming) and support of transit priority measures (Measure TR2, TR8, and TR9). Other improvements, such as electric vehicle charging stations and bicycle parking, would support alternative modes of transportation within the Project area (Measures TR8, TR9, and TR14). The Project would implement programs aimed at trip reduction, such as on-site carshare, scooter share, and electric bicycle share (Measures TR1, TR13, and TR15). In addition, the Project would implement a number of sustainability features, such as building all-electric residential dwelling units and retainment of Peninsula Clean Energy to provide the option of zero-emission electricity (Measures BL1, BL2, and EN2). The Project would be designed to meet the standards of the CALGreen building code (Measures BL2 and EN2). Therefore, the Project would generally support the applicable control measures and their implementation, as identified in the 2017 Clean Air Plan.

Disrupt or Hinder Implementation of 2017 Clean Air Plan Control Measures

As discussed above, the Project applicant's commitments to sustainable design features for the Project would address issues related to transportation, energy, and green building controls. It would not disrupt, delay, or otherwise hinder implementation of any applicable control measure from the 2017 Clean Air Plan. Rather, the Project would support and facilitate implementation of control measures. Therefore, the Project would not fundamentally conflict with the 2017 Clean Air Plan and this impact would be ***less than significant***.

Impact AQ-2a: Construction of the Project would not result in a cumulatively considerable net increase in criteria pollutants for which the Project region is classified as a nonattainment area under an applicable federal (ozone) or state (ozone and PM) ambient air quality standard (Less than Significant)

Construction associated with the Project would result in the temporary generation of ozone precursors (ROG, NO_X), CO, and PM emissions that could result in short-term impacts on ambient air quality in the vicinity of the Site. Emissions would originate from construction equipment exhaust, employee and haul truck vehicle exhaust, land clearing, architectural coatings, and asphalt paving. Additionally, demolition and earthmoving activities would generate fugitive dust. Construction-related emissions would vary substantially, depending on the level of activity, length of the construction period, specific construction operations, types of equipment, number of personnel, wind and precipitation conditions, and soil moisture content.

Construction-related emissions for the Project have been calculated using the methods described in Section 4.1, *Methods*. As discussed above, BAAQMD's CEQA Guidelines consider fugitive dust impacts to be potentially significant without application of BMPs. To avoid this, the Project applicant would implement BAAQMD's construction dust BMPs (listed in Table 8-2 of its CEQA Guidelines), which includes watering of exposed surfaces two times per day and limiting vehicle speeds to 15 miles per hour. The Project applicant has also committed to using low VOC coatings and ensuring all off-road diesel-powered equipment used during construction will be equipped with EPA Tier 4 Final engines. The reduction in emissions as a result of these dust BMPs and project applicant commitments is accounted for in the project emission calculations summarized in Table 4-2. Emissions are reported by year in which construction would occur, and each year is compared individually to the applicable BAAQMD threshold.

Table 4-2. Maximum Daily Criteria Pollutant Emissions during Construction (pounds/day)

				PM10		PM2.5	
Construction Year	**ROG**	**NO_x**	**CO**	**Dust**	**Exhaust**	**Dust**	**Exhaust**
2023	1	19	24	9	< 1	5	< 1
2024	18	6	34	1	< 1	< 1	< 1
2025	18	< 1	2	< 1	< 1	< 1	< 1
BAAQMD Threshold	54	54	None	BMPs	82	BMPs	54
Exceed Threshold?	No	No	N/A	—	No	—	No

Source: See Appendix A for construction modeling outputs.
ROG = reactive organic gases; NO_X = nitrogen oxide; CO = carbon monoxide; PM10 = particulate matter no more than 10 microns in diameter; PM2.5 = particulate matter no more than 2.5 microns in diameter; BAAQMD = Bay Area Air Quality Management District; BMPs = best management practices.

As shown in Table 4-2, construction of the Project would not generate emissions in excess of BAAQMD's significance threshold and, therefore, would not be expected to contribute a significant level of air pollution such that air quality within the SFBAAB would be degraded. The impact from construction-generated criteria pollutant emissions would be ***less than significant***.

Health Impacts of Regional Criteria Pollutants (Construction)

The California Supreme Court, in *Sierra Club v. County of Fresno* (6 Cal. 5th 502), reviewed the long-term regional air quality analysis contained in the EIR for the proposed Friant Ranch Specific Plan (Friant Ranch Project). The Friant Ranch Project is a 942-acre master plan development in unincorporated Fresno County, which is part of the San Joaquin Valley Air Basin, an area that is currently in nonattainment status under the NAAQS and CAAQS for ozone and PM2.5. The California Supreme Court found that the Friant Ranch Project EIR's air quality analysis was inadequate because, although it disclosed that air quality impacts would be significant and unavoidable, it failed to provide enough detail "for the public to translate the bare [criteria pollutant emissions] numbers provided into adverse health impacts or to understand why such a translation is not possible at this time." The court's decision provides that environmental documents must attempt to connect a project's significant regional air quality impacts to specific health effects or explain why it is not technically feasible to perform such an analysis.

Adverse health effects induced by regional criteria pollutant emissions (e.g., ozone precursors and PM) generated by the project would be highly dependent on a multitude of interconnected variables (e.g., cumulative concentrations, local meteorology and atmospheric conditions, the number and character of exposed individuals [e.g., age, gender]). For these reasons, ozone precursors (i.e., ROG and NO_X) contribute to the formation of groundborne ozone on a regional scale. Emissions of ROG and NO_X generated in one area may not equate to a specific ozone concentration in that same area. Similarly, some types of particulate pollution may be transported over long distances or formed through atmospheric reactions. As such, the magnitude and locations of specific health effects from exposure to increased ozone or regional PM concentrations are the product of emissions generated by numerous sources throughout a region, as opposed to a single individual project. Moreover, exposure to regional air pollution does not guarantee that an individual will experience an adverse health effect—as discussed above, there are large individual differences in the intensity of symptomatic responses to air pollutants. These differences are influenced, in part, by the underlying health condition of an individual, which cannot be known or extrapolated across regional populations.

Models and tools have been developed to correlate regional criteria pollutant emissions to potential community health impacts. Although there are models capable of quantifying ozone and secondary PM formation and associated health effects, these tools were developed to support regional planning and policy analysis and have limited sensitivity to relatively small changes in criteria pollutant concentrations induced by individual projects. Therefore, translating project-generated criteria pollutants to the locations where specific health effects could occur or the resultant number of additional days of nonattainment cannot be achieved with any degree of accuracy for relatively small projects (relative to the size of the regional air basin).

The technical limitations of existing models for correlating project-level regional emissions to specific health consequences are recognized by air quality management districts throughout the state, including the San Joaquin Valley Air Pollution Control District (SJVAPCD) and South Coast Air Quality Management District (SCAQMD), which provided amici curiae briefs for the Friant Ranch Project legal proceedings. In its brief, the SJVAPCD acknowledged that, although Health Risk Assessments for localized air toxics, such as DPM, are commonly prepared, "it is not feasible to conduct a similar analysis for criteria air pollutants because currently available computer modeling tools are not equipped for this task."[44, 45]

As discussed above, BAAQMD's regional thresholds, as presented in Table 4-1, consider existing air quality concentrations and attainment or nonattainment designations under the NAAQS and CAAQS. The NAAQS and CAAQS are informed by a wide range of scientific evidence that demonstrates that there are known, safe concentrations of criteria pollutants below these thresholds. While recognizing that air quality is a cumulative problem, BAAQMD considers projects that generate criteria pollutant and ozone precursor emissions below these thresholds to be minor in nature; therefore, they would not adversely affect air quality to the extent that the health-protective NAAQS or CAAQS would be exceeded. Regional emissions generated by a project could increase photochemical reactions and the formation of tropospheric ozone and secondary PM, which, at

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[44] SJVAPCD further noted that emissions solely from the Friant Ranch Project, which equate to less than one-tenth of 1 percent of the total NO_x and VOC in the San Joaquin Valley, "are not likely to yield valid information" and that any such information would not be "accurate when applied at the local level."

[45] San Joaquin Valley Air Pollution Control District. 2015. *Final Staff Report*. Update to District's Risk Management Policy to Address OEHHAA's Revised Risk Assessment Guidance Document. May 28.

certain concentrations, could lead to an increased incidence of specific health consequences. Although these health effects are associated with ozone and particulate pollution, the effects are a result of cumulative and regional emissions. Therefore, the Project's incremental contribution cannot be traced to specific health outcomes on a regional scale, and a quantitative correlation of project-generated regional criteria pollutant emissions to specific human health impacts is not included in this analysis.

Cumulative Impacts on Regional and Local Air Quality (Construction)

As discussed above, BAAQMD has identified project-level thresholds to evaluate criteria pollutant impacts (Table 4-1). In developing these thresholds, BAAQMD considers levels at which project emissions are cumulatively considerable. As noted in BAAQMD's guidelines,

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

The project-level analysis serves as the cumulative-level analysis and no additional analysis is required beyond what is already provided above for Impact AQ-2a.

Impact AQ-2b: Operation of the Project would not result in a cumulatively considerable net increase in criteria pollutants for which the Project region is classified as a nonattainment area under an applicable federal (ozone) or state (ozone and PM) ambient air quality standard (Less than Significant)

Operation of the Project has the potential to result in air quality impacts from area, energy, and mobile sources. Area sources would include off-gassing during the reapplication of architectural coatings and consumer products (e.g., solvents, cleaning supplies, cosmetics, toiletries).[46] Energy sources would include on-site natural gas combustion for space and water heating for the non-residential land uses. Mobile sources would include vehicle trips generated by the Project. Each of these sources was accounted for when calculating the Project's long-term operational emissions. The Project applicant has committed to low VOC coatings, electric landscaping equipment, all-electric residential dwelling units, and energy efficient appliances. The reduction in emissions as a result of these Project applicant commitments is accounted for in the Project emission calculations. Consistent with the capabilities of CalEEMod, the analysis does not quantify the emissions benefit to energy and mobile sources from certain sustainability design features (e.g., electric vehicle chargers in parking spaces).

Table 4-3 summarizes daily area, energy, mobile source emissions generated by the Project in the first operational year (2025).

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[46] The Project applicant has committed to using electric landscaping equipment, which do not result in criteria pollutant emissions. This area source is therefore not applicable to the analysis.

Table 4-3. Average Daily Criteria Pollutant Emissions during Operation (pounds/day)

Source	ROG	NO_X	CO	PM10	PM2.5
Area Sources	6	< 1	17	< 1	< 1
Energy Sources	< 1	< 1	< 1	< 1	< 1
Mobile Sources	13	7	80	7	2
Total [a]	**20**	**7**	**98**	**7**	**2**
BAAQMD Threshold	54	54	None	82	54
Exceed Threshold?	No	No	N/A	No	No

Source: See Appendix A for operations modeling outputs.
ROG = reactive organic gases; NO_X = nitrogen oxide; CO = carbon monoxide; PM10 = particulate matter no more than 10 microns in diameter; PM2.5 = particulate matter no more than 2.5 microns in diameter; BAAQMD = Bay Area Air Quality Management District; BMPs = best management practices.
[a] Values may not add up because of rounding.

As shown in Table 4-3, operation of the Project would not generate emissions in excess of BAAQMD's significance threshold and, therefore, would not be expected to contribute a significant level of air pollution such that air quality within the SFBAAB would be degraded. The impact from operation-generated criteria pollutant emissions would be ***less than significant***.

Health Impacts of Regional Criteria Pollutants (Operation)

See discussion in Impact AQ-2a above, which applies equally to operations.

Cumulative Impacts on Regional and Local Air Quality (Operation)

As discussed above, BAAQMD has identified project-level thresholds to evaluate criteria pollutant impacts (Table 4-1). In developing these thresholds, BAAQMD considers levels at which project emissions are cumulatively considerable. As noted in BAAQMD's guidelines,

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

The project-level analysis serves as the cumulative-level analysis and no additional analysis is required beyond what is already provided above for Impact AQ-2b.

Impact AQ-3: The Project would not expose sensitive receptors to substantial pollutant concentrations (Less than Significant)

The primary pollutants of concern to human health generated by the Project are criteria pollutants and TACs. These pollutants and their potential impacts on receptors are analyzed below.

Localized Criteria Pollutants

Localized criteria pollutants generated by the Project (e.g., fugitive dust, PM, CO) could be deposited near the emissions source and affect the population near that emissions source. Although these pollutants dissipate with distance, emissions from individual projects can result in direct and material health impacts on adjacent sensitive receptors. As discussed above, the NAAQS and CAAQS are health protective standards that have been set at levels that are considered safe with respect to protecting public health, including the health of sensitive populations, such as asthmatics, children, and the elderly.

Construction

During grading and excavation activities associated with construction, localized fugitive dust would be generated. The amount of dust generated by a project is highly variable and dependent on the size of the disturbed area at any given time, the amount of activity, soil conditions, and meteorological conditions. BAAQMD's CEQA Guidelines considers dust impacts to be less than significant if BAAQMD's construction BMPs are employed to reduce such emissions. Because the Project applicant has committed to implementing BAAQMD's Basic Construction BMPs, construction-related fugitive dust emissions would be ***less than significant*** and would not expose receptors to substantial pollutant concentrations or risks.

Operation

Continuous engine exhaust may elevate localized CO concentrations, resulting in hot spots. Receptors exposed to these CO hot spots may have a greater likelihood of developing adverse health effects. CO hot spots are typically observed at heavily congested intersections where a substantial number of gasoline-powered vehicles idle for prolonged durations throughout the day. The BAAQMD's screening criteria for CO hot spots is 44,000 vehicles per hour at affected intersections and 24,000 vehicles per hour at affected intersections where vertical or horizontal mixing is limited (i.e., a tunnel).

In order to use the BAAQMD's quantitative screening criteria to evaluate CO hot spots, a project must be consistent with an applicable Congestion Management Program (CMP). In the Project area, one analyzed intersection, El Camino Real/Broadway, is considered a CMP intersection from the San Mateo County Congestion Management Program.[47] According to the Traffic Impact Analysis prepared for the project,[48] this intersection currently operates at an acceptable level of service and would continue to do so with implementation of the Project. Consequently, the project would be consistent with the applicable CMP, and BAAQMD quantitative screening values can be used to evaluate the project's potential to create CO hot spots.

Peak hour traffic volume data at the three analyzed intersections in the Project area indicate that the BAAQMD screening threshold would not be exceeded. The intersection with the maximum number of vehicles per hour with the Project (5,009 vehicles at El Camino Real/Meadow Glen Avenue) would be well below the screening levels. As a result, the additional vehicle trips associated with the Project would not result in CO concentrations that would contribute to any new localized violations of the 1-hour or 8-hour ambient state or federal air quality standards. Accordingly, sensitive receptors would not be exposed to substantial concentrations of CO. Therefore, this impact would be ***less than significant***.

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[47] City/County Association of Governments of San Mateo County. 2020. *San Mateo County Congestion Management Program 2019.*Available: https://ccag.ca.gov/wp-content/uploads/2020/04/2019-CMP-Final-040920.pdf. Accessed: February 2, 2022.

[48] Fehr and Peers. 2022. *959 El Camino Real Mixed-Use Development Draft Transportation Impact Analysis Report.* January. Prepared for ICF and the City of Millbrae.

Toxic Air Contaminants

The primary TACs of concern associated with the Project are asbestos and DPM.

Construction

Asbestos

Structure demolition could disperse particulates that contain asbestos-containing material (ACM) adjacent to the locations of sensitive receptors. ACMs were commonly used as fireproofing and insulating agents prior to the 1970s. The U.S. Consumer Product Safety Commission banned the use of most ACMs in 1977 because of their link to mesothelioma. However, the building to be demolished may have been constructed prior to 1977 and, therefore, may have used ACM that could expose receptors to asbestos, which may become airborne with other particulates during demolition.

All demolition activities would be subject to EPA's asbestos NESHAP if asbestos is present at the existing facilities. The asbestos NESHAP regulations protect the public by minimizing the release of asbestos fibers during activities involving the processing, handling, and disposal of ACM. The asbestos NESHAP regulations for demolition and renovation are outlined in BAAQMD Regulation 11, Rule 2. In addition to demolition and renovation measures, BAAQMD Regulation 11, Rule 2 also includes measures to address ACM during haul truck transport. More specifically, it includes provisions such as treating ACM with water prior to transport and placing it in leak-tight containers for haul truck transport to disposal sites. The Project will be required by conditions of approval to comply with all applicable BAAQMD regulations. Consequently, regulatory mechanisms exist that would ensure that impacts from ACM, if present during demolition activities within the Project area, would be ***less than significant***.

Diesel Particulate Matter and Localized PM2.5

DPM is a carcinogen emitted by diesel internal combustion engines. Construction activities would generate DPM (PM2.5 exhaust from diesel-powered vehicles and equipment)[49] and PM2.5 (exhaust and fugitive dust) that could expose adjacent receptors to significant health risks beginning in 2023. The receptors affected by the highest concentrations of DPM exhaust and PM2.5 are the closest sensitive receptors to the site (the multi-family housing buildings located 125 feet northeast of the Site).

Table 4-4 presents the maximum construction-related health risk for the maximally exposed individual receptor within 1,000 feet of Project construction activities. As shown in Table 4-4, the project would not exceed BAAQMD's thresholds for cancer risk, non-cancer risk, or annual PM2.5 concentration. Therefore, this impact would be ***less than significant***.

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[49] Per BAAQMD guidance, PM2.5 exhaust is used as a surrogate for DPM.

Table 4-4. Cancer and Chronic Hazard Risks and PM.5 Concentrations during Construction [a]

Receptor	Cancer Risk (cases per million)	Non-Cancer Hazard Index	Annual PM2.5 Concentration (µg/m^3)
Maximally Exposed Individual Receptor [b]	0.9	< 0.1	0.2
Significance Threshold	10.0	1.0	0.3
Exceed Threshold?	No	No	No

Source: See Appendix A for modeling outputs and calculations.

µg/m^3 = micrograms per cubic meter; PM2.5 = particulate matter no more than 2.5 microns in diameter

[a] The results account for the project applicant's compliance with BAAQMD's fugitive dust BMPs and commitment to using Tier 4 engines for all diesel-fueled off-road equipment (see Impact AQ-2a).

[b] This receptor is located 125 feet northeast of the Site at 850 El Camino Real.

Operation

As discussed above, because operations would not involve PM emissions-intensive sources (i.e., haul trucks; generators; process boilers; on-site, off-road equipment), an operational HRA to analyze health risks from operational activities was not required.

Cumulative Community Risk

According to BAAQMD's guidelines, combined risk levels should be determined from all nearby DPM sources within 1,000 feet of a project site, and these combined risk levels should be compared to BAAQMD's cumulative health risk thresholds.

The Project construction activities would generate DPM and PM2.5. Existing nearby DPM and PM2.5 sources within 1,000 feet of the Site, along with the Project, could contribute to a cumulative health risk for existing and future sensitive receptors adjacent to and within the Site. The combined risks from construction and ambient sources are summarized in Table 4-5.

Table 4-5. Cumulative Health Risks from the Project

Source	Cancer Risk (case per million)	Non-Cancer Hazard Index	Annual PM2.5 Concentration (µg/m^3)
Contribution from Existing Sources [a]			
Stationary Sources	63	< 0.1	< 0.1
Roadway Sources	13	0.0	0.3
Rail Sources	5	0.0	< 0.1
Contribution from Project Construction			
Maximally Exposed Individual Receptor	1	< 0.1	< 0.1
Cumulative Total			
Existing + Project Construction	81	0.2	0.5
BAAQMD Thresholds	100	10.0	0.8
Exceeds Threshold?	No	No	No

Source: See appendix A for modeling outputs and calculations.

Mg/m^3 = micrograms per cubic meter

[a] Contributions from existing sources represent the health risks within 1,000 feet of the maximum exposed receptor, which is a residence located 125 feet northeast of the Site at 850 El Camino Real.

As shown in Table 4-5, the combined PM2.5 concentration from Project construction and ambient sources would not exceed the BAAQMD cumulative thresholds**.** Therefore, this the Project's contribution is considered ***less than cumulatively considerable***.

Impact AQ-4: The project would not result in other emissions (such as those leading to odors) that would adversely affect a substantial number of people. (Less than Significant)

BAAQMD and CARB have identified the types of land uses below as being commonly associated with odors. Although this list is not exhaustive, it is intended to help lead agencies recognize the types of facilities where more analysis may be warranted.

- Sewage treatment plants
- Coffee roasters
- Asphalt plants
- Metal smelters
- Landfills
- Recycling facilities
- Waste transfer stations
- Petroleum refineries
- Biomass operations
- Auto body shops
- Coating operations
- Fiberglass manufacturers
- Foundries
- Rendering plants
- Livestock operations

The Project would be constructed and operated within 1,000 feet of existing sensitive receptors (see Figure 2). However, the list of land uses proposed as part of the Project does not include any of the odor-generating land uses identified above.

Potential odor emitters during construction activities include diesel exhaust, asphalt paving, and the use of architectural coatings and solvents. Construction-related activities would be temporary and would not be likely to result in nuisance odors that would violate BAAQMD Regulation 7. Odors during operation could emanate from the reapplication of architectural coatings. These odors would be limited to the immediate vicinity of the Site and occur infrequently. Although such brief paint-related odors may be considered adverse, they would not affect a substantial number of people. Given mandatory compliance with BAAQMD rules, no proposed construction or operational activities would create a significant level of objectionable odors. Therefore, odor impacts for the Project would be ***less than significant***.

Appendix A
Air Quality Modeling Results

Project CalEEMod Construction and Operations Output

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

959 ECR - Proposed Project

San Mateo County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Strip Mall	17.86	1000sqft	0.41	17,864.00	0
General Office Building	1.04	1000sqft	0.02	1,039.00	0
Enclosed Parking with Elevator	344.00	Space	3.10	142,207.00	0
Health Club	14.21	1000sqft	0.33	14,210.00	0
Apartments Mid Rise	278.00	Dwelling Unit	7.32	229,957.00	795

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	70
Climate Zone	5			**Operational Year**	2025
Utility Company	Pacific Gas and Electric Company				
CO2 Intensity (lb/MWhr)	203.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - per applicant data response

Construction Phase - per applicant data response

Off-road Equipment - per applicant data response

Off-road Equipment -

Off-road Equipment -

Off-road Equipment - per applicant data response

Grading - per applicant data response

Demolition - per applicant data response

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959 ECR - Proposed Project - San Mateo County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Trips and VMT - per applicant data response

Architectural Coating - Low-VOC paints http://www.specifygreen.com/evrperf/VOCRequirements.html

Vehicle Trips - 9,529 VMT/day projectwide per applicant data response

Woodstoves - per applicant data response

Area Coating - Use low VOC coatings

Construction Off-road Equipment Mitigation - electric crane

Area Mitigation - electric landscape equipment, low VOC coatings

Energy Use - No NG for residential units

Energy Mitigation - Energy Star Appliances. On-site solar expected but kWh unknown so conservatively assumed as zero

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	150.00	50.00
tblArchitecturalCoating	EF_Nonresidential_Interior	100.00	50.00
tblArchitecturalCoating	EF_Parking	150.00	100.00
tblArchitecturalCoating	EF_Residential_Exterior	150.00	50.00
tblArchitecturalCoating	EF_Residential_Interior	100.00	50.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	150	50
tblAreaCoating	Area_EF_Nonresidential_Interior	100	50
tblAreaCoating	Area_EF_Parking	150	100
tblAreaCoating	Area_EF_Residential_Exterior	150	50
tblAreaCoating	Area_EF_Residential_Interior	100	50
tblAreaMitigation	UseLowVOCPaintNonresidentialExteriorValue	150	50
tblAreaMitigation	UseLowVOCPaintNonresidentialInteriorValue	100	50
tblAreaMitigation	UseLowVOCPaintParkingCheck	False	True
tblAreaMitigation	UseLowVOCPaintParkingValue	150	100
tblAreaMitigation	UseLowVOCPaintResidentialExteriorValue	150	50
tblAreaMitigation	UseLowVOCPaintResidentialInteriorValue	100	50
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	FuelType	Diesel	Electrical
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00

959 ECR - Proposed Project - San Mateo County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	5.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	11.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	20.00	91.00
tblConstructionPhase	NumDays	300.00	426.00

959 ECR - Proposed Project - San Mateo County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblConstructionPhase	NumDays	30.00	40.00
tblConstructionPhase	NumDays	20.00	10.00
tblConstructionPhase	NumDays	300.00	15.00
tblConstructionPhase	PhaseEndDate	7/12/2024	4/22/2025
tblConstructionPhase	PhaseEndDate	5/17/2024	12/16/2024
tblConstructionPhase	PhaseEndDate	3/24/2023	4/7/2023
tblConstructionPhase	PhaseEndDate	6/14/2024	12/6/2024
tblConstructionPhase	PhaseStartDate	6/15/2024	12/17/2024
tblConstructionPhase	PhaseStartDate	3/25/2023	5/1/2023
tblConstructionPhase	PhaseStartDate	5/18/2024	11/24/2024
tblEnergyUse	NT24NG	2,615.00	0.00
tblEnergyUse	T24NG	5,828.01	0.00
tblFireplaces	NumberGas	41.70	0.00
tblFireplaces	NumberNoFireplace	11.12	0.00
tblFireplaces	NumberWood	47.26	0.00
tblGrading	AcresOfGrading	40.00	1.86
tblGrading	AcresOfGrading	15.00	1.86
tblGrading	MaterialExported	0.00	29,750.00
tblGrading	MaterialExported	0.00	2,825.00
tblLandUse	LandUseSquareFeet	137,600.00	142,207.00
tblLandUse	LandUseSquareFeet	278,000.00	229,957.00
tblOffRoadEquipment	LoadFactor	0.37	0.37
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.42	0.42
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	OffRoadEquipmentType		Skid Steer Loaders
tblOffRoadEquipment	OffRoadEquipmentType	Welders	Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Other Construction Equipment
tblOffRoadEquipment	OffRoadEquipmentType		Rollers
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00

959 ECR - Proposed Project - San Mateo County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblTripsAndVMT	HaulingTripNumber	79.00	40.00
tblTripsAndVMT	HaulingTripNumber	353.00	404.00
tblTripsAndVMT	HaulingTripNumber	3,719.00	4,250.00
tblTripsAndVMT	HaulingTripNumber	0.00	2,125.00
tblTripsAndVMT	HaulingTripNumber	0.00	100.00
tblTripsAndVMT	HaulingTripNumber	0.00	30.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	58.00	5.00
tblTripsAndVMT	VendorTripNumber	0.00	1.00
tblTripsAndVMT	VendorTripNumber	58.00	2.00
tblTripsAndVMT	WorkerTripNumber	15.00	6.00
tblTripsAndVMT	WorkerTripNumber	18.00	7.00
tblTripsAndVMT	WorkerTripNumber	15.00	7.00
tblTripsAndVMT	WorkerTripNumber	272.00	50.00
tblTripsAndVMT	WorkerTripNumber	15.00	7.00
tblTripsAndVMT	WorkerTripNumber	54.00	23.00
tblTripsAndVMT	WorkerTripNumber	272.00	10.00
tblVehicleTrips	DV_TP	11.00	0.00
tblVehicleTrips	HO_TL	5.70	1.00
tblVehicleTrips	HS_TL	4.80	1.00
tblVehicleTrips	HW_TL	10.80	1.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	86.00	100.00
tblVehicleTrips	ST_TR	4.91	34.28
tblVehicleTrips	ST_TR	2.21	0.00

tblVehicleTrips	ST_TR	20.87	0.00
tblVehicleTrips	ST_TR	42.04	0.00
tblVehicleTrips	SU_TR	4.09	34.28
tblVehicleTrips	SU_TR	0.70	0.00
tblVehicleTrips	SU_TR	26.73	0.00
tblVehicleTrips	SU_TR	20.43	0.00
tblVehicleTrips	WD_TR	5.44	34.28
tblVehicleTrips	WD_TR	9.74	0.00
tblVehicleTrips	WD_TR	32.93	0.00
tblVehicleTrips	WD_TR	44.32	0.00
tblWoodstoves	NumberCatalytic	5.56	0.00
tblWoodstoves	NumberNoncatalytic	5.56	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

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	lb/day										lb/day					
2023	2.7702	35.0328	20.5042	0.0988	19.0700	1.3084	20.3784	10.1685	1.2052	11.3738	0.0000	10,945.1783	10,945.1783	1.7331	1.2941	11,374.1417
2024	18.1670	25.6446	32.7525	0.0637	0.7631	1.1006	1.8637	0.2054	1.0258	1.2312	0.0000	6,339.3495	6,339.3495	1.4505	0.2046	6,436.5811
2025	18.1548	1.2210	2.2372	4.5400e-003	0.1957	0.0525	0.2482	0.0521	0.0525	0.1045	0.0000	442.2994	442.2994	0.0202	6.7900e-003	444.8270
Maximum	**18.1670**	**35.0328**	**32.7525**	**0.0988**	**19.0700**	**1.3084**	**20.3784**	**10.1685**	**1.2052**	**11.3738**	**0.0000**	**10,945.1783**	**10,945.1783**	**1.7331**	**1.2941**	**11,374.1417**

959 ECR - Proposed Project - San Mateo County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Mitigated 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	lb/day										lb/day					
2023	0.6239	18.6706	23.5382	0.0988	9.0075	0.1586	9.1119	4.6923	0.1538	4.7949	0	10,945.18	10,945.18	1.7331	1.2941	11,374.14
2024	18.0159	5.8576	34.4415	0.0587	0.7631	0.0887	0.8518	0.2054	0.0878	0.2932	0	5,850.39	5,850.39	1.2924	0.2046	5,943.67
2025	18.0137	0.2042	2.2605	4.54E-03	0.1957	5.00E-03	0.2007	0.0521	4.93E-03	0.057	0	442.2994	442.2994	0.0202	6.79E-03	444.827
Maximum	**18.0159**	**18.6706**	**34.4415**	**0.0988**	**9.0075**	**0.1586**	**9.1119**	**4.6923**	**0.1538**	**4.7949**	**0**	**10,945.18**	**10,945.18**	**1.7331**	**1.2941**	**11,374.14**

	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**	**N20**	**CO2e**
Percent Reduction	**6.24**	**60.04**	**-8.55**	**3.02**	**50.24**	**89.75**	**54.81**	**52.52**	**89.20**	**59.52**	**0.00**	**2.76**	**2.76**	**4.94**	**0.00**	**2.70**

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	lb/day										lb/day					
Area	6.8187	0.2643	22.9520	1.2100e-003		0.1273	0.1273		0.1273	0.1273	0.0000	41.3801	41.3801	0.0398	0.0000	42.3741
Energy	0.0133	0.1210	0.1016	7.3000e-004		9.2000e-003	9.2000e-003		9.2000e-003	9.2000e-003		145.2043	145.2043	2.7800e-003	2.6600e-003	146.0672
Mobile	11.5491	7.0709	80.1590	0.0710	7.2905	0.0700	7.3605	1.9407	0.0647	2.0055		7,217.5391	7,217.5391	1.4012	0.7095	7,463.9890

Total	**18.3811**	**7.4562**	**103.2127**	**0.0730**	**7.2905**	**0.2064**	**7.4970**	**1.9407**	**0.2012**	**2.1419**	**0.0000**	**7,404.1235**	**7,404.1235**	**1.4438**	**0.7121**	**7,652.4304**

Mitigated 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	lb/day										lb/day					
Area	6.49	0.2097	17.4361	7.90E-04		0.0949	0.0949		0.0949	0.0949	0	28.9426	28.9426	0.0208	0	29.4626
Energy	0.01	0.121	0.1016	7.30E-04		9.20E-03	9.20E-03		9.20E-03	9.20E-03		145.2043	145.2043	2.78E-03	2.66E-03	146.0672
Mobile	11.55	7.0709	80.159	0.071	7.2905	0.07	7.3605	1.9407	0.0647	2.0055		7,217.54	7,217.54	1.4012	0.7095	7,463.99
Total	**18.06**	**7.4016**	**97.6968**	**0.0725**	**7.2905**	**0.174**	**7.4645**	**1.9407**	**0.1688**	**2.1095**	**0**	**7,391.69**	**7,391.69**	**1.4248**	**0.7121**	**7,639.52**

	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**	**N20**	**CO2e**
Percent Reduction	**1.77**	**0.73**	**5.34**	**0.58**	**0.00**	**15.70**	**0.43**	**0.00**	**16.11**	**1.51**	**0.00**	**0.17**	**0.17**	**1.31**	**0.00**	**0.17**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2023	1/27/2023	5	20	
2	Site Preparation	Site Preparation	1/28/2023	2/10/2023	5	10	
3	Grading	Grading	2/11/2023	4/7/2023	5	40	
4	Paving	Paving	11/24/2024	12/6/2024	5	10	

959 ECR - Proposed Project - San Mateo County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5	Architectural Coating	Architectural Coating	12/17/2024	4/22/2025	5	91	
6	Water Line Construction	Building Construction	4/9/2023	4/28/2023	5	15	
7	Building Construction	Building Construction	5/1/2023	12/16/2024	5	426	

Acres of Grading (Site Preparation Phase): 1.86

Acres of Grading (Grading Phase): 1.86

Acres of Paving: 3.1

Residential Indoor: 465,663; Residential Outdoor: 155,221; Non-Residential Indoor: 49,670; Non-Residential Outdoor: 16,557; Striped Parking Area: 8,532

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Building Construction	Cranes	1	7.00	231	0.29
Demolition	Excavators	3	8.00	158	0.38
Grading	Excavators	1	8.00	158	0.38
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Grading	Graders	1	8.00	187	0.41
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Water Line Construction	Skid Steer Loaders	1	8.00	65	0.37
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45

Water Line Construction	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Water Line Construction	Excavators	1	8.00	158	0.38
Water Line Construction	Other Construction Equipment	1	8.00	172	0.42
Water Line Construction	Rollers	1	8.00	80	0.38

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	6.00	2.00	40.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	7.00	2.00	404.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	7.00	2.00	4,250.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	50.00	5.00	2,125.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	7.00	0.00	100.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	23.00	1.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Water Line Construction	5	10.00	2.00	30.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Alternative Fuel for Construction Equipment

Use Cleaner Engines for Construction Equipment

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 2023

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	lb/day										lb/day					

Fugitive Dust					0.8560	0.0000	0.8560	0.1296	0.0000	0.1296			0.0000			0.0000
Off-Road	2.2691	21.4844	19.6434	0.0388		0.9975	0.9975		0.9280	0.9280		3,746.9840	3,746.9840	1.0494		3,773.2183
Total	**2.2691**	**21.4844**	**19.6434**	**0.0388**	**0.8560**	**0.9975**	**1.8535**	**0.1296**	**0.9280**	**1.0576**		**3,746.9840**	**3,746.9840**	**1.0494**		**3,773.2183**

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	lb/day										lb/day					
Hauling	4.5600e-003	0.3198	0.1032	1.2900e-003	0.0348	2.0600e-003	0.0369	9.5300e-003	1.9700e-003	0.0115		150.2236	150.2236	0.0151	0.0242	157.8136
Vendor	2.1200e-003	0.0959	0.0343	4.2000e-004	0.0135	4.9000e-004	0.0140	3.8900e-003	4.7000e-004	4.3500e-003		46.8520	46.8520	2.8800e-003	6.9100e-003	48.9832
Worker	0.0142	9.1600e-003	0.1209	3.8000e-004	0.0493	2.3000e-004	0.0495	0.0131	2.1000e-004	0.0133		38.5772	38.5772	1.0400e-003	1.0300e-003	38.9093
Total	**0.0209**	**0.4248**	**0.2584**	**2.0900e-003**	**0.0976**	**2.7800e-003**	**0.1004**	**0.0265**	**2.6500e-003**	**0.0291**		**235.6528**	**235.6528**	**0.0190**	**0.0322**	**245.7061**

Mitigated 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	lb/day										lb/day					
Fugitive Dust					0.3852	0.0000	0.3852	0.0583	0.0000	0.0583			0.0000			0.0000

Off-Road	0.4623	2.0032	23.2798	0.0388		0.0616	0.0616		0.0616	0.0616	0.0000	3,746.9840	3,746.9840	1.0494		3,773.2183
Total	**0.4623**	**2.0032**	**23.2798**	**0.0388**	**0.3852**	**0.0616**	**0.4468**	**0.0583**	**0.0616**	**0.1200**	**0.0000**	**3,746.9840**	**3,746.9840**	**1.0494**		**3,773.2183**

Mitigated 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	lb/day										lb/day					
Hauling	4.5600e-003	0.3198	0.1032	1.2900e-003	0.0348	2.0600e-003	0.0369	9.5300e-003	1.9700e-003	0.0115		150.2236	150.2236	0.0151	0.0242	157.8136
Vendor	2.1200e-003	0.0959	0.0343	4.2000e-004	0.0135	4.9000e-004	0.0140	3.8900e-003	4.7000e-004	4.3500e-003		46.8520	46.8520	2.8800e-003	6.9100e-003	48.9832
Worker	0.0142	9.1600e-003	0.1209	3.8000e-004	0.0493	2.3000e-004	0.0495	0.0131	2.1000e-004	0.0133		38.5772	38.5772	1.0400e-003	1.0300e-003	38.9093
Total	**0.0209**	**0.4248**	**0.2584**	**2.0900e-003**	**0.0976**	**2.7800e-003**	**0.1004**	**0.0265**	**2.6500e-003**	**0.0291**		**235.6528**	**235.6528**	**0.0190**	**0.0322**	**245.7061**

3.3 Site Preparation - 2023

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	lb/day										lb/day					
Fugitive Dust					18.2955	0.0000	18.2955	9.9568	0.0000	9.9568			0.0000			0.0000
Off-Road	2.6595	27.5242	18.2443	0.0381		1.2660	1.2660		1.1647	1.1647		3,687.3081	3,687.3081	1.1926		3,717.1219

959 ECR - Proposed Project - San Mateo County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Total	**2.6595**	**27.5242**	**18.2443**	**0.0381**	**18.2955**	**1.2660**	**19.5615**	**9.9568**	**1.1647**	**11.1216**		**3,687.3081**	**3,687.3081**	**1.1926**		**3,717.1219**

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	lb/day										lb/day					
Hauling	0.0920	6.4604	2.0846	0.0260	0.7035	0.0416	0.7451	0.1926	0.0398	0.2324		3,034.5167	3,034.5167	0.3042	0.4890	3,187.8342
Vendor	2.1200e-003	0.0959	0.0343	4.2000e-004	0.0135	4.9000e-004	0.0140	3.8900e-003	4.7000e-004	4.3500e-003		46.8520	46.8520	2.8800e-003	6.9100e-003	48.9832
Worker	0.0166	0.0107	0.1410	4.5000e-004	0.0575	2.7000e-004	0.0578	0.0153	2.4000e-004	0.0155		45.0067	45.0067	1.2200e-003	1.2000e-003	45.3942
Total	**0.1107**	**6.5669**	**2.2599**	**0.0268**	**0.7746**	**0.0424**	**0.8169**	**0.2117**	**0.0405**	**0.2522**		**3,126.3754**	**3,126.3754**	**0.3083**	**0.4971**	**3,282.2116**

Mitigated 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	lb/day										lb/day					
Fugitive Dust					8.2330	0.0000	8.2330	4.4806	0.0000	4.4806			0.0000			0.0000
Off-Road	0.4656	2.0175	20.8690	0.0381		0.0621	0.0621		0.0621	0.0621	0.0000	3,687.3081	3,687.3081	1.1926		3,717.1219
Total	**0.4656**	**2.0175**	**20.8690**	**0.0381**	**8.2330**	**0.0621**	**8.2950**	**4.4806**	**0.0621**	**4.5427**	**0.0000**	**3,687.3081**	**3,687.3081**	**1.1926**		**3,717.1219**

Mitigated 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	lb/day										lb/day					
Hauling	0.0920	6.4604	2.0846	0.0260	0.7035	0.0416	0.7451	0.1926	0.0398	0.2324		3,034.5167	3,034.5167	0.3042	0.4890	3,187.8342
Vendor	2.1200e-003	0.0959	0.0343	4.2000e-004	0.0135	4.9000e-004	0.0140	3.8900e-003	4.7000e-004	4.3500e-003		46.8520	46.8520	2.8800e-003	6.9100e-003	48.9832
Worker	0.0166	0.0107	0.1410	4.5000e-004	0.0575	2.7000e-004	0.0578	0.0153	2.4000e-004	0.0155		45.0067	45.0067	1.2200e-003	1.2000e-003	45.3942
Total	**0.1107**	**6.5669**	**2.2599**	**0.0268**	**0.7746**	**0.0424**	**0.8169**	**0.2117**	**0.0405**	**0.2522**		**3,126.3754**	**3,126.3754**	**0.3083**	**0.4971**	**3,282.2116**

3.4 Grading - 2023

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	lb/day										lb/day					
Fugitive Dust					6.1555	0.0000	6.1555	3.3283	0.0000	3.3283			0.0000			0.0000
Off-Road	1.7109	17.9359	14.7507	0.0297		0.7749	0.7749		0.7129	0.7129		2,872.6910	2,872.6910	0.9291		2,895.9182
Total	**1.7109**	**17.9359**	**14.7507**	**0.0297**	**6.1555**	**0.7749**	**6.9304**	**3.3283**	**0.7129**	**4.0412**		**2,872.6910**	**2,872.6910**	**0.9291**		**2,895.9182**

959 ECR - Proposed Project - San Mateo County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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	lb/day										lb/day					
Hauling	0.2420	16.9904	5.4824	0.0683	1.8503	0.1094	1.9597	0.5065	0.1047	0.6111		7,980.6286	7,980.6286	0.7999	1.2860	8,383.8462
Vendor	2.1200e-003	0.0959	0.0343	4.2000e-004	0.0135	4.9000e-004	0.0140	3.8900e-003	4.7000e-004	4.3500e-003		46.8520	46.8520	2.8800e-003	6.9100e-003	48.9832
Worker	0.0166	0.0107	0.1410	4.5000e-004	0.0575	2.7000e-004	0.0578	0.0153	2.4000e-004	0.0155		45.0067	45.0067	1.2200e-003	1.2000e-003	45.3942
Total	**0.2607**	**17.0970**	**5.6577**	**0.0692**	**1.9213**	**0.1102**	**2.0314**	**0.5256**	**0.1054**	**0.6310**		**8,072.4874**	**8,072.4874**	**0.8040**	**1.2941**	**8,478.2235**

Mitigated 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	lb/day										lb/day					
Fugitive Dust					2.7700	0.0000	2.7700	1.4977	0.0000	1.4977			0.0000			0.0000
Off-Road	0.3632	1.5737	17.7527	0.0297		0.0484	0.0484		0.0484	0.0484	0.0000	2,872.6910	2,872.6910	0.9291		2,895.9182
Total	**0.3632**	**1.5737**	**17.7527**	**0.0297**	**2.7700**	**0.0484**	**2.8184**	**1.4977**	**0.0484**	**1.5462**	**0.0000**	**2,872.6910**	**2,872.6910**	**0.9291**		**2,895.9182**

Mitigated 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	lb/day										lb/day					
Hauling	0.2420	16.9904	5.4824	0.0683	1.8503	0.1094	1.9597	0.5065	0.1047	0.6111		7,980.6286	7,980.6286	0.7999	1.2860	8,383.8462
Vendor	2.1200e-003	0.0959	0.0343	4.2000e-004	0.0135	4.9000e-004	0.0140	3.8900e-003	4.7000e-004	4.3500e-003		46.8520	46.8520	2.8800e-003	6.9100e-003	48.9832
Worker	0.0166	0.0107	0.1410	4.5000e-004	0.0575	2.7000e-004	0.0578	0.0153	2.4000e-004	0.0155		45.0067	45.0067	1.2200e-003	1.2000e-003	45.3942
Total	**0.2607**	**17.0970**	**5.6577**	**0.0692**	**1.9213**	**0.1102**	**2.0314**	**0.5256**	**0.1054**	**0.6310**		**8,072.4874**	**8,072.4874**	**0.8040**	**1.2941**	**8,478.2235**

3.5 Paving - 2024

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	lb/day										lb/day					
Off-Road	0.9882	9.5246	14.6258	0.0228		0.4685	0.4685		0.4310	0.4310		2,207.5472	2,207.5472	0.7140		2,225.3963
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9882**	**9.5246**	**14.6258**	**0.0228**		**0.4685**	**0.4685**		**0.4310**	**0.4310**		**2,207.5472**	**2,207.5472**	**0.7140**		**2,225.3963**

Unmitigated Construction Off-Site

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	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	lb/day										lb/day					
Hauling	0.0225	1.5752	0.5300	6.2900e-003	0.1742	0.0103	0.1845	0.0477	9.8900e-003	0.0576		738.2297	738.2297	0.0773	0.1191	775.6491
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0158	9.5900e-003	0.1327	4.3000e-004	0.0575	2.5000e-004	0.0578	0.0153	2.3000e-004	0.0155		43.5436	43.5436	1.1100e-003	1.1200e-003	43.9048
Total	**0.0383**	**1.5848**	**0.6626**	**6.7200e-003**	**0.2317**	**0.0106**	**0.2423**	**0.0629**	**0.0101**	**0.0731**		**781.7733**	**781.7733**	**0.0784**	**0.1202**	**819.5539**

Mitigated 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	lb/day										lb/day					
Off-Road	0.2805	1.2154	17.2957	0.0228		0.0374	0.0374		0.0374	0.0374	0.0000	2,207.5472	2,207.5472	0.7140		2,225.3963
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.2805**	**1.2154**	**17.2957**	**0.0228**		**0.0374**	**0.0374**		**0.0374**	**0.0374**	**0.0000**	**2,207.5472**	**2,207.5472**	**0.7140**		**2,225.3963**

Mitigated 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

959 ECR - Proposed Project - San Mateo County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Category	lb/day										lb/day					
Hauling	0.0225	1.5752	0.5300	6.2900e-003	0.1742	0.0103	0.1845	0.0477	9.8900e-003	0.0576		738.2297	738.2297	0.0773	0.1191	775.6491
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0158	9.5900e-003	0.1327	4.3000e-004	0.0575	2.5000e-004	0.0578	0.0153	2.3000e-004	0.0155		43.5436	43.5436	1.1100e-003	1.1200e-003	43.9048
Total	**0.0383**	**1.5848**	**0.6626**	**6.7200e-003**	**0.2317**	**0.0106**	**0.2423**	**0.0629**	**0.0101**	**0.0731**		**781.7733**	**781.7733**	**0.0784**	**0.1202**	**819.5539**

3.6 Architectural Coating - 2024

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	lb/day										lb/day					
Archit. Coating	17.9333					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1808	1.2188	1.8101	2.9700e-003		0.0609	0.0609		0.0609	0.0609		281.4481	281.4481	0.0159		281.8443
Total	**18.1140**	**1.2188**	**1.8101**	**2.9700e-003**		**0.0609**	**0.0609**		**0.0609**	**0.0609**		**281.4481**	**281.4481**	**0.0159**		**281.8443**

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	lb/day										lb/day					

959 ECR - Proposed Project - San Mateo County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.0200e-003	0.0475	0.0171	2.1000e-004	6.7600e-003	2.4000e-004	7.0000e-003	1.9500e-003	2.3000e-004	2.1800e-003		23.0112	23.0112	1.4700e-003	3.4000e-003	24.0607
Worker	0.0520	0.0315	0.4359	1.4200e-003	0.1889	8.3000e-004	0.1898	0.0501	7.7000e-004	0.0509		143.0718	143.0718	3.6400e-003	3.6800e-003	144.2585
Total	**0.0530**	**0.0790**	**0.4530**	**1.6300e-003**	**0.1957**	**1.0700e-003**	**0.1968**	**0.0521**	**1.0000e-003**	**0.0531**		**166.0830**	**166.0830**	**5.1100e-003**	**7.0800e-003**	**168.3192**

Mitigated 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	lb/day										lb/day					
Archit. Coating	17.9333					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.0297	0.1288	1.8324	2.9700e-003		3.9600e-003	3.9600e-003		3.9600e-003	3.9600e-003	0.0000	281.4481	281.4481	0.0159		281.8443
Total	**17.9630**	**0.1288**	**1.8324**	**2.9700e-003**		**3.9600e-003**	**3.9600e-003**		**3.9600e-003**	**3.9600e-003**	**0.0000**	**281.4481**	**281.4481**	**0.0159**		**281.8443**

Mitigated 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	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

Vendor	1.0200e-003	0.0475	0.0171	2.1000e-004	6.7600e-003	2.4000e-004	7.0000e-003	1.9500e-003	2.3000e-004	2.1800e-003		23.0112	23.0112	1.4700e-003	3.4000e-003	24.0607
Worker	0.0520	0.0315	0.4359	1.4200e-003	0.1889	8.3000e-004	0.1898	0.0501	7.7000e-004	0.0509		143.0718	143.0718	3.6400e-003	3.6800e-003	144.2585
Total	**0.0530**	**0.0790**	**0.4530**	**1.6300e-003**	**0.1957**	**1.0700e-003**	**0.1968**	**0.0521**	**1.0000e-003**	**0.0531**		**166.0830**	**166.0830**	**5.1100e-003**	**7.0800e-003**	**168.3192**

3.6 Architectural Coating - 2025

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	lb/day										lb/day					
Archit. Coating	17.9333					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1709	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515		281.4481	281.4481	0.0154		281.8319
Total	**18.1041**	**1.1455**	**1.8091**	**2.9700e-003**		**0.0515**	**0.0515**		**0.0515**	**0.0515**		**281.4481**	**281.4481**	**0.0154**		**281.8319**

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	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	9.9000e-004	0.0469	0.0171	2.0000e-004	6.7600e-003	2.4000e-004	7.0000e-003	1.9500e-003	2.3000e-004	2.1800e-003		22.5601	22.5601	1.5000e-003	3.3300e-003	23.5914

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Worker	0.0497	0.0285	0.4110	1.3700e-003	0.1889	7.9000e-004	0.1897	0.0501	7.3000e-004	0.0509		138.2912	138.2912	3.3100e-003	3.4600e-003	139.4038
Total	**0.0507**	**0.0755**	**0.4281**	**1.5700e-003**	**0.1957**	**1.0300e-003**	**0.1967**	**0.0521**	**9.6000e-004**	**0.0530**		**160.8514**	**160.8514**	**4.8100e-003**	**6.7900e-003**	**162.9951**

Mitigated 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	lb/day										lb/day					
Archit. Coating	17.9333					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.0297	0.1288	1.8324	2.9700e-003		3.9600e-003	3.9600e-003		3.9600e-003	3.9600e-003	0.0000	281.4481	281.4481	0.0154		281.8319
Total	**17.9630**	**0.1288**	**1.8324**	**2.9700e-003**		**3.9600e-003**	**3.9600e-003**		**3.9600e-003**	**3.9600e-003**	**0.0000**	**281.4481**	**281.4481**	**0.0154**		**281.8319**

Mitigated 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	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	9.9000e-004	0.0469	0.0171	2.0000e-004	6.7600e-003	2.4000e-004	7.0000e-003	1.9500e-003	2.3000e-004	2.1800e-003		22.5601	22.5601	1.5000e-003	3.3300e-003	23.5914
Worker	0.0497	0.0285	0.4110	1.3700e-003	0.1889	7.9000e-004	0.1897	0.0501	7.3000e-004	0.0509		138.2912	138.2912	3.3100e-003	3.4600e-003	139.4038

Total	**0.0507**	**0.0755**	**0.4281**	**1.5700e-003**	**0.1957**	**1.0300e-003**	**0.1967**	**0.0521**	**9.6000e-004**	**0.0530**		**160.8514**	**160.8514**	**4.8100e-003**	**6.7900e-003**	**162.9951**

3.7 Water Line Construction - 2023

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	lb/day										lb/day					
Off-Road	0.9022	8.9431	12.6728	0.0191		0.4456	0.4456		0.4100	0.4100		1,846.4633	1,846.4633	0.5972		1,861.3929
Total	**0.9022**	**8.9431**	**12.6728**	**0.0191**		**0.4456**	**0.4456**		**0.4100**	**0.4100**		**1,846.4633**	**1,846.4633**	**0.5972**		**1,861.3929**

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	lb/day										lb/day					
Hauling	4.5600e-003	0.3198	0.1032	1.2900e-003	0.0348	2.0600e-003	0.0369	9.5300e-003	1.9700e-003	0.0115		150.2236	150.2236	0.0151	0.0242	157.8136
Vendor	2.1200e-003	0.0959	0.0343	4.2000e-004	0.0135	4.9000e-004	0.0140	3.8900e-003	4.7000e-004	4.3500e-003		46.8520	46.8520	2.8800e-003	6.9100e-003	48.9832
Worker	0.0237	0.0153	0.2014	6.4000e-004	0.0822	3.8000e-004	0.0825	0.0218	3.5000e-004	0.0221		64.2953	64.2953	1.7400e-003	1.7100e-003	64.8488
Total	**0.0304**	**0.4310**	**0.3389**	**2.3500e-003**	**0.1305**	**2.9300e-003**	**0.1334**	**0.0352**	**2.7900e-003**	**0.0380**		**261.3710**	**261.3710**	**0.0197**	**0.0328**	**271.6456**

Mitigated 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	lb/day										lb/day					
Off-Road	0.2599	2.0641	14.4640	0.0191		0.0313	0.0313		0.0313	0.0313	0.0000	1,846.4633	1,846.4633	0.5972		1,861.3929
Total	**0.2599**	**2.0641**	**14.4640**	**0.0191**		**0.0313**	**0.0313**		**0.0313**	**0.0313**	**0.0000**	**1,846.4633**	**1,846.4633**	**0.5972**		**1,861.3929**

Mitigated 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	lb/day										lb/day					
Hauling	4.5600e-003	0.3198	0.1032	1.2900e-003	0.0348	2.0600e-003	0.0369	9.5300e-003	1.9700e-003	0.0115		150.2236	150.2236	0.0151	0.0242	157.8136
Vendor	2.1200e-003	0.0959	0.0343	4.2000e-004	0.0135	4.9000e-004	0.0140	3.8900e-003	4.7000e-004	4.3500e-003		46.8520	46.8520	2.8800e-003	6.9100e-003	48.9832
Worker	0.0237	0.0153	0.2014	6.4000e-004	0.0822	3.8000e-004	0.0825	0.0218	3.5000e-004	0.0221		64.2953	64.2953	1.7400e-003	1.7100e-003	64.8488
Total	**0.0304**	**0.4310**	**0.3389**	**2.3500e-003**	**0.1305**	**2.9300e-003**	**0.1334**	**0.0352**	**2.7900e-003**	**0.0380**		**261.3710**	**261.3710**	**0.0197**	**0.0328**	**271.6456**

3.8 Building Construction - 2023

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	lb/day										lb/day					
Off-Road	1.5728	14.3849	16.2440	0.0269		0.6997	0.6997		0.6584	0.6584		2,555.2099	2,555.2099	0.6079		2,570.4061
Total	**1.5728**	**14.3849**	**16.2440**	**0.0269**		**0.6997**	**0.6997**		**0.6584**	**0.6584**		**2,555.2099**	**2,555.2099**	**0.6079**		**2,570.4061**

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	lb/day										lb/day					
Hauling	0.0114	0.7977	0.2574	3.2100e-003	0.0869	5.1400e-003	0.0920	0.0238	4.9100e-003	0.0287		374.6774	374.6774	0.0376	0.0604	393.6078
Vendor	5.3100e-003	0.2396	0.0858	1.0500e-003	0.0338	1.2200e-003	0.0350	9.7200e-003	1.1600e-003	0.0109		117.1301	117.1301	7.1900e-003	0.0173	122.4580
Worker	0.1187	0.0764	1.0071	3.1800e-003	0.4107	1.9000e-003	0.4126	0.1090	1.7500e-003	0.1107		321.4767	321.4767	8.7100e-003	8.5600e-003	324.2440
Total	**0.1353**	**1.1137**	**1.3503**	**7.4400e-003**	**0.5314**	**8.2600e-003**	**0.5397**	**0.1425**	**7.8200e-003**	**0.1503**		**813.2842**	**813.2842**	**0.0535**	**0.0862**	**840.3098**

Mitigated 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

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Category	lb/day										lb/day					
Off-Road	0.2658	1.9659	15.1859	0.0219		0.0325	0.0325		0.0325	0.0325	0.0000	2,066.2431	2,066.2431	0.4497		2,077.4857
Total	**0.2658**	**1.9659**	**15.1859**	**0.0219**		**0.0325**	**0.0325**		**0.0325**	**0.0325**	**0.0000**	**2,066.2431**	**2,066.2431**	**0.4497**		**2,077.4857**

Mitigated 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	lb/day										lb/day					
Hauling	0.0114	0.7977	0.2574	3.2100e-003	0.0869	5.1400e-003	0.0920	0.0238	4.9100e-003	0.0287		374.6774	374.6774	0.0376	0.0604	393.6078
Vendor	5.3100e-003	0.2396	0.0858	1.0500e-003	0.0338	1.2200e-003	0.0350	9.7200e-003	1.1600e-003	0.0109		117.1301	117.1301	7.1900e-003	0.0173	122.4580
Worker	0.1187	0.0764	1.0071	3.1800e-003	0.4107	1.9000e-003	0.4126	0.1090	1.7500e-003	0.1107		321.4767	321.4767	8.7100e-003	8.5600e-003	324.2440
Total	**0.1353**	**1.1137**	**1.3503**	**7.4400e-003**	**0.5314**	**8.2600e-003**	**0.5397**	**0.1425**	**7.8200e-003**	**0.1503**		**813.2842**	**813.2842**	**0.0535**	**0.0862**	**840.3098**

3.8 Building Construction - 2024

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	lb/day										lb/day					
Off-Road	1.4716	13.4438	16.1668	0.0270		0.6133	0.6133		0.5769	0.5769		2,555.6989	2,555.6989	0.6044		2,570.8077

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Total	**1.4716**	**13.4438**	**16.1668**	**0.0270**		**0.6133**	**0.6133**		**0.5769**	**0.5769**		**2,555.6989**	**2,555.6989**	**0.6044**		**2,570.8077**

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	lb/day										lb/day					
Hauling	0.0112	0.7857	0.2644	3.1400e-003	0.0869	5.1600e-003	0.0921	0.0238	4.9400e-003	0.0287		368.2484	368.2484	0.0386	0.0594	386.9142
Vendor	5.1200e-003	0.2373	0.0855	1.0300e-003	0.0338	1.2200e-003	0.0350	9.7300e-003	1.1700e-003	0.0109		115.0560	115.0560	7.3600e-003	0.0170	120.3037
Worker	0.1129	0.0685	0.9475	3.0800e-003	0.4107	1.8100e-003	0.4126	0.1090	1.6600e-003	0.1106		311.0257	311.0257	7.9100e-003	7.9900e-003	313.6054
Total	**0.1293**	**1.0915**	**1.2973**	**7.2500e-003**	**0.5314**	**8.1900e-003**	**0.5396**	**0.1425**	**7.7700e-003**	**0.1502**		**794.3301**	**794.3301**	**0.0538**	**0.0844**	**820.8233**

Mitigated 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	lb/day										lb/day					
Off-Road	0.2658	1.9659	15.1859	0.0219		0.0325	0.0325		0.0325	0.0325	0.0000	2,066.7425	2,066.7425	0.4462		2,077.8978
Total	**0.2658**	**1.9659**	**15.1859**	**0.0219**		**0.0325**	**0.0325**		**0.0325**	**0.0325**	**0.0000**	**2,066.7425**	**2,066.7425**	**0.4462**		**2,077.8978**

Mitigated 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	lb/day										lb/day					
Hauling	0.0112	0.7857	0.2644	3.1400e-003	0.0869	5.1600e-003	0.0921	0.0238	4.9400e-003	0.0287		368.2484	368.2484	0.0386	0.0594	386.9142
Vendor	5.1200e-003	0.2373	0.0855	1.0300e-003	0.0338	1.2200e-003	0.0350	9.7300e-003	1.1700e-003	0.0109		115.0560	115.0560	7.3600e-003	0.0170	120.3037
Worker	0.1129	0.0685	0.9475	3.0800e-003	0.4107	1.8100e-003	0.4126	0.1090	1.6600e-003	0.1106		311.0257	311.0257	7.9100e-003	7.9900e-003	313.6054
Total	**0.1293**	**1.0915**	**1.2973**	**7.2500e-003**	**0.5314**	**8.1900e-003**	**0.5396**	**0.1425**	**7.7700e-003**	**0.1502**		**794.3301**	**794.3301**	**0.0538**	**0.0844**	**820.8233**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	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	lb/day										lb/day					
Mitigated	11.5491	7.0709	80.1590	0.0710	7.2905	0.0700	7.3605	1.9407	0.0647	2.0055		7,217.5391	7,217.5391	1.4012	0.7095	7,463.9890
Unmitigated	11.5491	7.0709	80.1590	0.0710	7.2905	0.0700	7.3605	1.9407	0.0647	2.0055		7,217.5391	7,217.5391	1.4012	0.7095	7,463.9890

4.2 Trip Summary Information

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	9,529.00	9,529.00	9529.00	3,468,556	3,468,556
Enclosed Parking with Elevator	0.00	0.00	0.00		
General Office Building	0.00	0.00	0.00		
Health Club	0.00	0.00	0.00		
Strip Mall	0.00	0.00	0.00		
Total	9,529.00	9,529.00	9,529.00	3,468,556	3,468,556

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
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	Primary	Diverted	Pass-by
Apartments Mid Rise	1.00	1.00	1.00	31.00	15.00	54.00	100	0	0
Enclosed Parking with Elevator	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
General Office Building	9.50	7.30	7.30	33.00	48.00	19.00	77	19	4
Health Club	9.50	7.30	7.30	16.90	64.10	19.00	52	39	9
Strip Mall	9.50	7.30	7.30	16.60	64.40	19.00	45	40	15

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Mid Rise	0.465403	0.073585	0.235906	0.146720	0.025583	0.006412	0.010355	0.002060	0.001446	0.000572	0.028871	0.000432	0.002657
Enclosed Parking with Elevator	0.465403	0.073585	0.235906	0.146720	0.025583	0.006412	0.010355	0.002060	0.001446	0.000572	0.028871	0.000432	0.002657
General Office Building	0.465403	0.073585	0.235906	0.146720	0.025583	0.006412	0.010355	0.002060	0.001446	0.000572	0.028871	0.000432	0.002657
Health Club	0.465403	0.073585	0.235906	0.146720	0.025583	0.006412	0.010355	0.002060	0.001446	0.000572	0.028871	0.000432	0.002657
Strip Mall	0.465403	0.073585	0.235906	0.146720	0.025583	0.006412	0.010355	0.002060	0.001446	0.000572	0.028871	0.000432	0.002657

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Kilowatt Hours of Renewable Electricity Generated

Install Energy Efficient Appliances

	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	lb/day										lb/day					
NaturalGas Mitigated	0.0133	0.1210	0.1016	7.3000e-004		9.2000e-003	9.2000e-003		9.2000e-003	9.2000e-003		145.2043	145.2043	2.7800e-003	2.6600e-003	146.0672
NaturalGas Unmitigated	0.0133	0.1210	0.1016	7.3000e-004		9.2000e-003	9.2000e-003		9.2000e-003	9.2000e-003		145.2043	145.2043	2.7800e-003	2.6600e-003	146.0672

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	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
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Mid Rise	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
General Office Building	54.5119	5.9000e-004	5.3400e-003	4.4900e-003	3.0000e-005		4.1000e-004	4.1000e-004		4.1000e-004	4.1000e-004		6.4132	6.4132	1.2000e-004	1.2000e-004	6.4513
Health Club	956.547	0.0103	0.0938	0.0788	5.6000e-004		7.1300e-003	7.1300e-003		7.1300e-003	7.1300e-003		112.5350	112.5350	2.1600e-003	2.0600e-003	113.2037
Strip Mall	223.178	2.4100e-003	0.0219	0.0184	1.3000e-004		1.6600e-003	1.6600e-003		1.6600e-003	1.6600e-003		26.2562	26.2562	5.0000e-004	4.8000e-004	26.4122
Total		**0.0133**	**0.1210**	**0.1016**	**7.2000e-004**		**9.2000e-003**	**9.2000e-003**		**9.2000e-003**	**9.2000e-003**		**145.2043**	**145.2043**	**2.7800e-003**	**2.6600e-003**	**146.0672**

959 ECR - Proposed Project - San Mateo County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Mitigated

	NaturalGas Use	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
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Mid Rise	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
General Office Building	0.0545119	5.9000e-004	5.3400e-003	4.4900e-003	3.0000e-005		4.1000e-004	4.1000e-004		4.1000e-004	4.1000e-004		6.4132	6.4132	1.2000e-004	1.2000e-004	6.4513
Health Club	0.956547	0.0103	0.0938	0.0788	5.6000e-004		7.1300e-003	7.1300e-003		7.1300e-003	7.1300e-003		112.5350	112.5350	2.1600e-003	2.0600e-003	113.2037
Strip Mall	0.223178	2.4100e-003	0.0219	0.0184	1.3000e-004		1.6600e-003	1.6600e-003		1.6600e-003	1.6600e-003		26.2562	26.2562	5.0000e-004	4.8000e-004	26.4122
Total		**0.0133**	**0.1210**	**0.1016**	**7.2000e-004**		**9.2000e-003**	**9.2000e-003**		**9.2000e-003**	**9.2000e-003**		**145.2043**	**145.2043**	**2.7800e-003**	**2.6600e-003**	**146.0672**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Electric Lawnmower

Use Electric Leafblower

Use Electric Chainsaw

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

959 ECR - Proposed Project - San Mateo County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	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	lb/day										lb/day					
Mitigated	6.4938	0.2097	17.4361	7.9000e-004		0.0949	0.0949		0.0949	0.0949	0.0000	28.9426	28.9426	0.0208	0.0000	29.4626
Unmitigated	6.8187	0.2643	22.9520	1.2100e-003		0.1273	0.1273		0.1273	0.1273	0.0000	41.3801	41.3801	0.0398	0.0000	42.3741

6.2 Area by SubCategory

Unmitigated

	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
SubCategory	lb/day										lb/day					
Architectural Coating	0.4471					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	5.6801					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.6915	0.2643	22.9520	1.2100e-003		0.1273	0.1273		0.1273	0.1273		41.3801	41.3801	0.0398		42.3741
Total	**6.8187**	**0.2643**	**22.9520**	**1.2100e-003**		**0.1273**	**0.1273**		**0.1273**	**0.1273**	**0.0000**	**41.3801**	**41.3801**	**0.0398**	**0.0000**	**42.3741**

Mitigated

959 ECR - Proposed Project - San Mateo County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	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
SubCategory	lb/day										lb/day					
Architectural Coating	0.4471					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	5.6801					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.3666	0.2097	17.4361	7.9000e-004		0.0949	0.0949		0.0949	0.0949		28.9426	28.9426	0.0208		29.4626
Total	**6.4938**	**0.2097**	**17.4361**	**7.9000e-004**		**0.0949**	**0.0949**		**0.0949**	**0.0949**	**0.0000**	**28.9426**	**28.9426**	**0.0208**	**0.0000**	**29.4626**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

959 ECR - Proposed Project - San Mateo County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Health Risk Assessment Calculations

Type	Location Lookup	Cancer Risk by Bin	Chronic HI (max annual)
Residential	553386.1, 4162151.21	0.9	0.0011
Residential	553191.6, 4162084.29	0.7	0.0009
Residential	553386.1, 4162184.67	0.7	0.0009
Residential	553425, 4162151.21	0.5	0.0006
Residential	553152.7, 4162117.75	0.4	0.0005
Residential	553425, 4162184.67	0.4	0.0005
Residential	553152.7, 4162084.29	0.4	0.0005
Residential	553152.7, 4162050.83	0.3	0.0004
Residential	553463.9, 4162151.21	0.3	0.0004
Residential	553425, 4162218.13	0.3	0.0004
Residential	553463.9, 4162184.67	0.3	0.0003
Residential	553113.8, 4162117.75	0.2	0.0003
Residential	553113.8, 4162084.29	0.2	0.0003
Residential	553502.8, 4162117.75	0.2	0.0003
Residential	553502.8, 4162084.29	0.2	0.0003
Residential	553502.8, 4162151.21	0.2	0.0003
Residential	553463.9, 4162218.13	0.2	0.0003
Residential	553113.8, 4162050.83	0.2	0.0003
Residential	553113.8, 4162184.67	0.2	0.0003
Residential	553502.8, 4162184.67	0.2	0.0002
Residential	553113.8, 4162017.37	0.2	0.0002
Residential	553113.8, 4162218.13	0.2	0.0002
Residential	553541.7, 4162117.75	0.2	0.0002
Residential	553541.7, 4162084.29	0.2	0.0002
Residential	553541.7, 4162151.21	0.2	0.0002
Residential	553502.8, 4162218.13	0.2	0.0002
Residential	553463.9, 4162251.59	0.2	0.0002
Residential	553541.7, 4162050.83	0.2	0.0002
Residential	553074.9, 4162117.75	0.1	0.0002
Residential	553541.7, 4162017.37	0.1	0.0002
Residential	553074.9, 4162151.21	0.1	0.0002
Residential	553074.9, 4162084.29	0.1	0.0002
Residential	553541.7, 4162184.67	0.1	0.0002
Residential	553074.9, 4162050.83	0.1	0.0002
Residential	553152.7, 4161916.99	0.1	0.0002
Residential	553113.8, 4161950.45	0.1	0.0002
Residential	553074.9, 4162184.67	0.1	0.0002
Residential	553074.9, 4162017.37	0.1	0.0002
Residential	553580.6, 4162084.29	0.1	0.0002
Residential	553580.6, 4162117.75	0.1	0.0002
Residential	553580.6, 4162050.83	0.1	0.0002
Residential	553580.6, 4162151.21	0.1	0.0001
Residential	553502.8, 4162251.59	0.1	0.0001

Residential	553541.7, 4162218.13	0.1	0.0001
Residential	553074.9, 4162218.13	0.1	0.0001
Residential	553074.9, 4161983.91	0.1	0.0001
Residential	553580.6, 4162017.37	0.1	0.0001
Residential	553113.8, 4161916.99	0.1	0.0001
Residential	553580.6, 4162184.67	0.1	0.0001
Residential	553152.7, 4161883.53	0.1	0.0001
Residential	553074.9, 4161950.45	0.1	0.0001
Residential	553619.5, 4162117.75	0.1	0.0001
Residential	553074.9, 4162251.59	0.1	0.0001
Residential	553036, 4162117.75	0.1	0.0001
Residential	553036, 4162084.29	0.1	0.0001
Residential	553036, 4162151.21	0.1	0.0001
Residential	553619.5, 4162151.21	0.1	0.0001
Residential	553541.7, 4162251.59	0.1	0.0001
Residential	553036, 4162050.83	0.1	0.0001
Residential	553113.8, 4161883.53	0.1	0.0001
Residential	553036, 4162184.67	0.1	0.0001
Residential	553036, 4162017.37	0.1	0.0001
Residential	553074.9, 4161916.99	0.1	0.0001
Residential	553502.8, 4162285.05	0.1	0.0001
Residential	553036, 4161983.91	0.1	0.0001
Residential	553152.7, 4161850.07	0.1	0.0001
Residential	553113.8, 4161850.07	0.1	0.0001
Residential	553074.9, 4161883.53	0.1	0.0001
Residential	553036, 4161950.45	0.1	0.0001
Residential	553036, 4161916.99	0.1	0.0001
Residential	552997.1, 4162084.29	0.1	0.0001
Residential	552997.1, 4162117.75	0.1	0.0001
Residential	552997.1, 4162151.21	0.1	0.0001
Residential	553191.6, 4161816.61	0.1	0.0001
Residential	553152.7, 4161816.61	0.1	0.0001
Residential	552997.1, 4162050.83	0.1	0.0001
Residential	552997.1, 4162184.67	0.1	0.0001
Residential	553074.9, 4161850.07	0.1	0.0001
Residential	552997.1, 4162017.37	0.1	0.0001
Residential	553113.8, 4161816.61	0.1	0.0001
Residential	552997.1, 4162218.13	0.1	0.0001
Residential	553036, 4161883.53	0.1	0.0001
Residential	552997.1, 4161983.91	0.1	0.0001
Residential	553036, 4162318.51	0.1	0.0001
Residential	553386.1, 4161883.53	0.1	0.0001
Residential	552997.1, 4161950.45	0.1	0.0001
Residential	553074.9, 4161816.61	0.1	0.0001
Residential	553036, 4161850.07	0.1	0.0001
Residential	552997.1, 4161916.99	0.1	0.0001
Residential	552958.2, 4162117.75	0.1	0.0001

Residential	552958.2, 4162151.21	0.1	0.0001
Residential	552997.1, 4162285.05	0.1	0.0001
Residential	552958.2, 4162184.67	0.1	0.0001
Residential	553347.2, 4161850.07	0.1	0.0001
Residential	552958.2, 4162218.13	0.1	0.0001
Residential	553308.3, 4161816.61	0.0	0.0001
Residential	552997.1, 4162318.51	0.0	0.0001
Residential	552958.2, 4162251.59	0.0	0.0001
Residential	553386.1, 4161850.07	0.0	0.0001
Residential	552958.2, 4162285.05	0.0	0.0001
Residential	552997.1, 4162351.97	0.0	0.0001
Residential	553347.2, 4161816.61	0.0	0.0001

Receptor ID (Group Name)	Type	Location Lookup	PM2.5 Total (ug/m3)
UCART1	Residential	553386.1, 4162151.21	0.15
UCART1	Residential	553191.6, 4162084.29	0.13
UCART1	Residential	553386.1, 4162184.67	0.12
UCART1	Residential	553425, 4162151.21	0.08
UCART1	Residential	553152.7, 4162117.75	0.07
UCART1	Residential	553425, 4162184.67	0.07
UCART1	Residential	553152.7, 4162084.29	0.07
UCART1	Residential	553152.7, 4162050.83	0.06
UCART1	Residential	553463.9, 4162151.21	0.05
UCART1	Residential	553425, 4162218.13	0.05
UCART1	Residential	553463.9, 4162184.67	0.05
UCART1	Residential	553113.8, 4162117.75	0.04
UCART1	Residential	553502.8, 4162117.75	0.04
UCART1	Residential	553113.8, 4162084.29	0.04
UCART1	Residential	553502.8, 4162084.29	0.04
UCART1	Residential	553502.8, 4162151.21	0.04
UCART1	Residential	553113.8, 4162184.67	0.04
UCART1	Residential	553463.9, 4162218.13	0.04
UCART1	Residential	553113.8, 4162050.83	0.04
UCART1	Residential	553502.8, 4162184.67	0.03
UCART1	Residential	553113.8, 4162017.37	0.03
UCART1	Residential	553113.8, 4162218.13	0.03
UCART1	Residential	553541.7, 4162117.75	0.03
UCART1	Residential	553541.7, 4162084.29	0.03
UCART1	Residential	553541.7, 4162151.21	0.03
UCART1	Residential	553541.7, 4162050.83	0.03
UCART1	Residential	553463.9, 4162251.59	0.03
UCART1	Residential	553502.8, 4162218.13	0.03
UCART1	Residential	553074.9, 4162151.21	0.03
UCART1	Residential	553541.7, 4162017.37	0.03
UCART1	Residential	553074.9, 4162117.75	0.03
UCART1	Residential	553541.7, 4162184.67	0.02
UCART1	Residential	553074.9, 4162084.29	0.02
UCART1	Residential	553152.7, 4161916.99	0.02
UCART1	Residential	553074.9, 4162184.67	0.02
UCART1	Residential	553113.8, 4161950.45	0.02
UCART1	Residential	553074.9, 4162050.83	0.02
UCART1	Residential	553580.6, 4162084.29	0.02
UCART1	Residential	553580.6, 4162117.75	0.02
UCART1	Residential	553580.6, 4162050.83	0.02
UCART1	Residential	553074.9, 4162017.37	0.02
UCART1	Residential	553580.6, 4162151.21	0.02
UCART1	Residential	553502.8, 4162251.59	0.02
UCART1	Residential	553074.9, 4162218.13	0.02

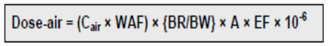
UCART1	Residential	553541.7, 4162218.13	0.02
UCART1	Residential	553580.6, 4162017.37	0.02
UCART1	Residential	553074.9, 4161983.91	0.02
UCART1	Residential	553113.8, 4161916.99	0.02
UCART1	Residential	553152.7, 4161883.53	0.02
UCART1	Residential	553580.6, 4162184.67	0.02
UCART1	Residential	553619.5, 4162117.75	0.02
UCART1	Residential	553074.9, 4161950.45	0.02
UCART1	Residential	553074.9, 4162251.59	0.02
UCART1	Residential	553036, 4162151.21	0.02
UCART1	Residential	553036, 4162117.75	0.02
UCART1	Residential	553619.5, 4162151.21	0.02
UCART1	Residential	553036, 4162084.29	0.02
UCART1	Residential	553036, 4162184.67	0.02
UCART1	Residential	553113.8, 4161883.53	0.02
UCART1	Residential	553541.7, 4162251.59	0.02
UCART1	Residential	553036, 4162050.83	0.02
UCART1	Residential	553074.9, 4161916.99	0.02
UCART1	Residential	553152.7, 4161850.07	0.02
UCART1	Residential	553502.8, 4162285.05	0.02
UCART1	Residential	553036, 4162017.37	0.02
UCART1	Residential	553036, 4161983.91	0.01
UCART1	Residential	553113.8, 4161850.07	0.01
UCART1	Residential	553074.9, 4161883.53	0.01
UCART1	Residential	553036, 4161950.45	0.01
UCART1	Residential	553191.6, 4161816.61	0.01
UCART1	Residential	553152.7, 4161816.61	0.01
UCART1	Residential	552997.1, 4162151.21	0.01
UCART1	Residential	552997.1, 4162117.75	0.01
UCART1	Residential	553036, 4161916.99	0.01
UCART1	Residential	552997.1, 4162184.67	0.01
UCART1	Residential	552997.1, 4162084.29	0.01
UCART1	Residential	553074.9, 4161850.07	0.01
UCART1	Residential	553113.8, 4161816.61	0.01
UCART1	Residential	552997.1, 4162050.83	0.01
UCART1	Residential	552997.1, 4162218.13	0.01
UCART1	Residential	552997.1, 4162017.37	0.01
UCART1	Residential	553036, 4161883.53	0.01
UCART1	Residential	552997.1, 4161983.91	0.01
UCART1	Residential	553036, 4162318.51	0.01
UCART1	Residential	553074.9, 4161816.61	0.01
UCART1	Residential	552997.1, 4161950.45	0.01
UCART1	Residential	553036, 4161850.07	0.01
UCART1	Residential	552997.1, 4161916.99	0.01
UCART1	Residential	552958.2, 4162151.21	0.01
UCART1	Residential	552958.2, 4162117.75	0.01
UCART1	Residential	553386.1, 4161883.53	0.01

UCART1	Residential	552958.2, 4162184.67	0.01
UCART1	Residential	552997.1, 4162285.05	0.01
UCART1	Residential	552958.2, 4162218.13	0.01
UCART1	Residential	552997.1, 4162318.51	0.01
UCART1	Residential	552958.2, 4162251.59	0.01
UCART1	Residential	553347.2, 4161850.07	0.01
UCART1	Residential	553308.3, 4161816.61	0.01
UCART1	Residential	552997.1, 4162351.97	0.01
UCART1	Residential	552958.2, 4162285.05	0.01
UCART1	Residential	553386.1, 4161850.07	0.01
UCART1	Residential	553347.2, 4161816.61	0.01

Health Risk - Dose and Risk Factors and Values

Dose factors


$$\text{Dose-air} = C_{air} \times \{BR/BW\} \times A \times EF \times 10^{-6}$$


$$\text{Dose-air} = (C_{air} \times WAF) \times \{BR/BW\} \times A \times EF \times 10^{-6}$$

		3rd trimester	0<2	2<9	2<16	16<30	16-70	source
Daily Breath Rate (BR/BW) (L/kg-day)	Residential	361	1090	631	572	261	233	OEHHA 2015, Table 5.6, 95th %ile for 3rdtri-2yrs old; 80th for other age groups
	Recreational	240	1200	640	520	240	230	OEHHA 2015, Table 5.8 (95th, moderate) for all bins but 3rd tri, which was taken from SJVAPC
A		1	1	1	1	1	1	OEHHA 2015, page 5-24
EF, Exposure frequency (unitless), days/365 days	Residential	0.96	0.96	0.96	0.96	0.96	0.96	OEHHA 2015, page 5-24, 350 days/yr
	Recreational	0.024	0.024	0.024	0.024	0.024	0.024	OEHHA 2012
Conversion Factor		1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	(mg/ug + m3/L)

Risk Factors


$$RISK_{inh\text{-}res} = DOSE_{air} \times CPF \times ASF \times ED/AT \times FAH$$

		3rd trimester	0<2	2<9	2<16	16<30	16-70	source
CPF, DPM ($[mg/kg\text{-}day]^{-1}$)		1.1	1.1	1.1	1.1	1.1	1.1	OEHHA 2015, Table 7.1
Average Age Sensitivity Factor		10	10	3	3	1	1	OEHHA 2015, Table 8.3
AT, Average Time (days)		70	70	70	70	70	70	Averaging time for lifetime cancer risk
FAH		0.85	0.85	0.72	0.72	0.73	0.73	OEHHA 2015, Table 8.4: Use FAH = 1 if a school is within the 1×10-6 (or greater) cancer risk isopleth
ED, Exposure Duration (years)		0.25	2	7	14	14	54	Equation 8.2.4 A, OEHHA 2015
Adjustment Factor	Residential	1.00	1.00	1.00	1.00	1.00	1.00	OEHHA 2015, Page 4-44 and Equation 4.1; exposure is adjusted upward to account for
	Recreational	3.36	3.36	3.36	3.36	3.36	3.36	OEHHA 2015, Page 4-44 and Equation 4.1; exposure is adjusted upward to account for overlapping daytime exposure.

Hazard Index

Chronic Inhalation Reference Exposure Level, respiratory, DPM	5	OEHHA 2015, Table 6.3

Source Inputs

San Mateo Population	766,573	https://www.census.gov/quickfacts/sanmateocountycalifornia

offroad sources

Release Height (RH)	4.1	m
Vertical Dimension	3.81	m
Elevation	0	m

onroad/truck sources

Release Height (RH)	3.4	m
Vertical Dimension	3.16	m
Elevation	0	m

fugitive dust

Release Height (RH)	0.9	m
Vertical Dimension	0.79	m
Elevation	0	m

receptor height (m)	1.5

met from San Francisco Airport (X-X)

PM2.5 Exhaust from non-employees = DPM

AERMOD Output Available Upon Request

Appendix E

Preliminary Geotechnical Investigation

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ROCKRIDGE
GEOTECHNICAL

Prepared for **WP West Acquisitions**

PRELIMINARY GEOTECHNICAL INVESTIGATION
PROPOSED MIXED-USE BUILDING
959 EL CAMINO REAL
Millbrae, California

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January 16, 2020
Project No. 19-1795

ROCKRIDGE
GEOTECHNICAL

January 16, 2020
Project No. 19-1795

Ms. Julia Wilk
WP West Acquisitions
3 Harbor Drive, Suite 115
Sausalito, California 94965

Subject: Preliminary Geotechnical Investigation Report
Proposed Mixed-Use Building
959 El Camino Real
Millbrae, California

Dear Ms. Wilk:

We are pleased to present our preliminary geotechnical investigation report in support of the due diligence evaluation of the property located at 959 El Camino Real in Millbrae, California. Our preliminary geotechnical investigation was performed in accordance with our proposal dated December 17, 2019.

The subject property is bordered by El Camino Real to the northeast, Meadow Glen Avenue to the northwest, Broadway to the southwest, and a neighboring parking lot to the southeast. The site is rectangular shaped with plan dimensions of about 220 by 430 feet. The site is currently occupied by a retail building (Office Depot) and a surface parking lot. There is also an existing utility easement along the southeastern property line.

Conceptual plans call for demolition of the existing building and construction of a mixed-use building with five stories of residential units over two podium levels of parking, retail and amenity spaces. The building will also have one level of subterranean parking. Finished floor for the subterranean parking will be about 10 feet below the ground floor. The footprint of the proposed building will encompass the entire site, except along the southeast where the building will be set back from the existing utility easement.

Based on the results of our preliminary geotechnical investigation, we conclude there are no major geotechnical issues that would preclude development of the site as proposed. The primary geotechnical issues affecting the proposed development include:

- providing adequate foundation support for the proposed building; and
- the presence of soil layers underlying the foundation level that may be susceptible to liquefaction and may result in liquefaction-induced settlement and reduction in bearing capacity during a major seismic event.

We preliminarily conclude a mat foundation would be the most appropriate foundation system for the proposed building.

Preliminary conclusions and recommendations regarding seismic hazards, foundation design, basement wall design, seismic design, temporary shoring, and other geotechnical aspects of the project are presented in the attached report. The recommendations contained in our report are based on limited subsurface exploration and review of available data for the site and are not intended for final design. Prior to final design, additional borings and/or CPTs should be performed within the proposed building footprint to supplement existing subsurface information and to develop final geotechnical conclusions and recommendations.

We appreciate the opportunity to provide our services to you on this project. If you have any questions, please call.

Sincerely yours,
ROCKRIDGE GEOTECHNICAL, INC.

HUI JUN LIANG
GE2663
Exp. 6/30/2020

CRAIG S. SHIELDS
GE2116
3/31/21

Linda H. J. Liang, P.E., G.E.
Associate Engineer

Craig S. Shields, P.E., G.E.
Principal Geotechnical Engineer

Enclosure

TABLE OF CONTENTS

LIST OF FIGURES

APPENDIX A

PRELIMINARY GEOTECHNICAL INVESTIGATION
PROPOSED MIXED-USE BUILDING
959 EL CAMINO REAL
Millbrae, California

1.0 INTRODUCTION

This report presents the results of the preliminary geotechnical investigation performed by Rockridge Geotechnical, Inc. in support of the due diligence evaluation of the property located at 959 El Camino Real in Millbrae, California. The subject property is located on the southern corner of the intersection of El Camino Real and Meadow Glen Avenue as shown on the Site Location Map, Figure 1.

The subject property is bordered by El Camino Real to the northeast, Meadow Glen Avenue to the northwest, Broadway to the southwest, and a neighboring parking lot to the southeast, as shown on the Site Plan, Figure 2. The site is rectangular shaped with plan dimensions of about 220 by 430 feet and is currently occupied by a retail building (Office Depot) and a surface parking lot. There is also an existing utility easement along the southeastern property line.

Conceptual plans call for demolition of the existing building and construction of a mixed-use building with five stories of residential units over two podium levels of parking, retail and amenity spaces. The building will also have one level of subterranean parking. Finished floor for the subterranean parking will be about 10 feet below the ground floor. The footprint of the proposed building will encompass the entire site, except along the southeast where the building will be set back from the existing utility easement.

2.0 SCOPE OF SERVICES

Our preliminary geotechnical investigation was performed in accordance with our proposal dated December 17, 2019. Our scope of services consisted of reviewing available subsurface information and geologic maps of the site and vicinity, exploring subsurface conditions at the site by performing cone penetration tests (CPTs), and performing engineering analyses to develop preliminary conclusions and recommendations regarding:

- subsurface soil and groundwater conditions
- site seismicity and seismic hazards, including the potential for liquefaction and lateral spreading, and total and differential resulting from liquefaction and/or cyclic densification
- the most appropriate foundation type(s) for the proposed building
- preliminary design criteria for the recommended foundation type(s)
- estimates of foundation settlement under static and seismic conditions
- lateral earth pressures for basement wall design
- temporary shoring
- dewatering
- 2019 California Building Code (CBC) site class and design spectral response acceleration parameters
- construction considerations.

3.0 FIELD INVESTIGATION

Our subsurface investigation consisted of performing four CPTs to provide continuous in-situ soil data. The CPTs, designated as CPT-1 through CPT-4, were advanced at the approximate locations shown on Figure 2. Prior to performing the CPTs, we obtained a drilling permit from the San Mateo County Environmental Health Department (SMCEHD), contacted Underground Service Alert (USA) to notify them of our work, as required by law, and retained Precision Locating, LLC, a private utility locator, to check that the CPT locations were clear of underground utilities.

The CPTs were performed by Middle Earth Geo Testing, Inc. of Orange, California on January 10, 2020. CPT-1 and CPT-2 were advanced to a depth of approximately 50 feet below the ground surface (bgs). CPT-3 and CPT-4 were planned to be advanced to a depth of 50 feet bgs, but these CPTs encountered early refusal a few feet below ground due to obstructions (likely concrete or concrete debris).

The CPTs were performed by hydraulically pushing a 1.7-inch-diameter cone-tipped probe with a projected area of 15 square centimeters into the ground using a 25-ton truck rig. The cone-tipped probe measured tip resistance and the friction sleeve behind the cone tip measured frictional resistance. Electrical strain gauges within the cone continuously measured soil parameters for the entire depth advanced. Soil data, including tip resistance, frictional resistance, and pore water pressure, were recorded by a computer while the test was conducted. Accumulated data were processed by computer to provide engineering information such as the soil behavior types and approximate strength characteristics. The CPT logs, showing tip resistance, friction ratio, and pore water pressure by depth, as well as correlated soil behavior type (Robertson, 2010), are presented in Appendix A on Figures A-1 and A-2. Groundwater was measured in CPT-1 and CPT-2 using a weighted measuring tape prior to grouting. Upon completion, the CPTs were backfilled with cement grout and patched with concrete.

4.0 SUBSURFACE CONDITIONS

A regional geologic map prepared by Graymer, et al. (2006), a portion of which is presented on Figure 3, indicates the site is underlain by early Pleistocene-aged alluvium (Qoa). The results of the CPTs indicate the site is underlain by alluvium consisting of clay and silty clay interbedded with silty sand to the maximum depth explored of 50 feet bgs. The clay and silty clay layers are generally very stiff to hard and the interbedded silty sand layers are generally medium dense to dense.

4.1 Groundwater

Groundwater was measured at a depth of about 20 feet in CPT-1 and CPT-2 with a weighted measuring tape during our field investigation. It should be noted the groundwater level in the CPTs was likely not given adequate time to stabilize at the time the measurements were taken.

The groundwater level at the site is expected to fluctuate several feet seasonally with potentially larger fluctuations annually, depending on the amount of rainfall.

To estimate the highest potential groundwater level at the site, we reviewed information on the State of California Water Resources Control Board GeoTracker website (http://geotracker.waterboards.ca.gov/). The closest site with substantial historic groundwater data on the GeoTracker website is located at 1009 El Camino Real in Millbrae. The closest monitoring wells at the 1009 El Camino Real site are located at the eastern corner of the intersection of El Camino Real and Meadow Glen Avenue and range in distance from approximately 75 to 200 feet from the project site. Within the groundwater monitoring period from 2003 to 2019, the depth to groundwater fluctuated about 10 feet with a high groundwater level of about 10 feet bgs.

5.0 SEISMIC CONSIDERATIONS

The San Francisco Bay Area is considered to be one of the more seismically active regions in the world. This section provides an evaluation and identifies geologic and seismic considerations for the project site.

5.1 Regional Seismicity and Faulting

The major active faults in the area are the San Andreas, San Gregorio, Hayward and Calaveras faults. These and other faults of the region are shown on Figure 4. The fault systems in the Bay Area consist of several major right-lateral strike-slip faults that define the boundary zone between the Pacific and the North American tectonic plates. Numerous damaging earthquakes have occurred along these fault systems in recorded time. For these and other active faults within a 50-kilometer radius of the site, the distance from the site and estimated mean characteristic moment magnitude[1] [Working Group on California Earthquake Probabilities (WGCEP, 2008) and Cao et al. (2003)] are summarized in Table 1.

TABLE 1
Regional Faults and Seismicity

Fault Segment	Approximate Distance from Site (km)	Direction from Site	Mean Characteristic Moment Magnitude
N. San Andreas - Peninsula	1.9	West	7.23
N. San Andreas (1906 event)	1.9	West	8.05
San Gregorio Connected	12	West	7.50
Monte Vista-Shannon	23	Southeast	6.50
N. San Andreas - North Coast	25	Northwest	7.51
Total Hayward	27	Northeast	7.00
Total Hayward-Rodgers Creek	27	Northeast	7.33
Total Calaveras	41	East	7.03
Mount Diablo Thrust	44	Northeast	6.70
Green Valley Connected	49	Northeast	6.70

Since 1800, four major earthquakes (i.e., Magnitude > 6) have been recorded on the San Andreas Fault. In 1836, an earthquake with an estimated maximum intensity of VII on the Modified Mercalli (MM) Intensity Scale occurred east of Monterey Bay on the San Andreas Fault (Toppozada and Borchardt, 1998). The estimated moment magnitude, M_w, for this earthquake is about 6.25. In 1838, an earthquake occurred on the Peninsula segment of the San Andreas Fault. Severe shaking occurred with an MM of about VIII-IX, corresponding to an M_w of about 7.5. The San Francisco Earthquake of 1906 caused the most significant damage in the history of the

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[1] Moment magnitude is an energy-based scale and provides a physically meaningful measure of the size of a faulting event. Moment magnitude is directly related to average slip and fault rupture area.

Bay Area in terms of loss of lives and property damage. This earthquake created a surface rupture along the San Andreas Fault from Shelter Cove to San Juan Bautista approximately 470 kilometers in length. It had a maximum intensity of XI (MM), an M_w of about 7.9, and was felt 560 kilometers away in Oregon, Nevada, and Los Angeles. The most recent earthquake to affect the Bay Area was the Loma Prieta Earthquake of October 17, 1989 with an M_w of 6.9. This earthquake occurred in the Santa Cruz Mountains about 78 kilometers southwest of the site.

In 1868, an earthquake with an estimated maximum intensity of X on the MM scale occurred on the southern segment (between San Leandro and Fremont) of the Hayward Fault. The estimated M_w for the earthquake is 7.0. In 1861, an earthquake of unknown magnitude (probably an M_w of about 6.5) was reported on the Calaveras Fault. The most recent significant earthquake on this fault was the 1984 Morgan Hill earthquake ($M_w = 6.2$).

The U.S. Geological Survey's 2014 Working Group on California Earthquake Probabilities has compiled the earthquake fault research for the San Francisco Bay area in order to estimate the probability of fault segment rupture. They have determined that the overall probability of moment magnitude 6.7 or greater earthquake occurring in the San Francisco Bay Region during the next 30 years (starting from 2014) is 72 percent. The highest probabilities are assigned to the Hayward Fault, Calaveras Fault, and the northern segment of the San Andreas Fault. These probabilities are 14.3, 7.4, and 6.4 percent, respectively.

5.2 Seismic Hazards

During a major earthquake on a segment of one of the nearby faults, strong to very strong ground shaking is expected to occur at the project site. Strong shaking during an earthquake can result in ground failure such as that associated with soil liquefaction[2], lateral spreading[3], and cyclic densification[4]. We used the results of the CPTs to evaluate the potential of these phenomena occurring at the project site.

5.2.1 Ground Shaking

The ground shaking intensity felt at the project site will depend on: 1) the size of the earthquake (magnitude), 2) the distance from the site to the fault source, 3) the directivity (focusing of earthquake energy along the fault in the direction of the rupture), and 4) site-specific soil conditions. The site is less than 2 kilometers from the San Andreas Fault. Therefore, the potential exists for a large earthquake to induce strong to very strong ground shaking at the site during the life of the project.

5.2.2 Ground Surface Rupture

Historically, ground surface displacements closely follow the trace of geologically young faults. The site is not within an Earthquake Fault Zone, as defined by the Alquist-Priolo Earthquake Fault Zoning Act, and no known active or potentially active faults exist on the site. We therefore conclude the risk of fault offset at the site from a known active fault is very low. In a seismically active area, the remote possibility exists for future faulting in areas where no faults previously existed; however, we conclude the risk of surface faulting and consequent secondary ground failure from previously unknown faults is also very low.

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[2] Liquefaction is a phenomenon where loose, saturated, cohesionless soil experiences temporary reduction in strength during cyclic loading such as that produced by earthquakes.

[3] Lateral spreading is a phenomenon in which surficial soil displaces along a shear zone that has formed within an underlying liquefied layer. Upon reaching mobilization, the surficial blocks are transported downslope or in the direction of a free face by earthquake and gravitational forces.

[4] Cyclic densification is a phenomenon in which non-saturated, cohesionless soil is compacted by earthquake vibrations, causing ground-surface settlement.

5.2.3 Liquefaction and Associated Hazards

When a saturated, cohesionless soil liquefies, it experiences a temporary loss of shear strength created by a transient rise in excess pore pressure generated by strong ground motion. Soil susceptible to liquefaction includes loose to medium dense sand and gravel, low-plasticity silt, and some low-plasticity clay deposits. Flow failure, lateral spreading, differential settlement, loss of bearing strength, ground fissures and sand boils are evidence of excess pore pressure generation and liquefaction.

The site has been mapped within a zone of very low liquefaction susceptibility as shown on the map titled *Maps of Quaternary Deposits and Liquefaction Susceptibility in the Central San Francisco Bay Region, California, 2006* (see Figure 5). We evaluated liquefaction potential at the site using the data collected from our CPTs.

Liquefaction susceptibility was assessed using the software CLiq v2.0 (GeoLogismiki, 2016). CLiq uses measured field CPT data and assesses liquefaction potential given a user-defined earthquake magnitude and peak ground acceleration (PGA). We performed a liquefaction triggering analysis using the CPT in accordance with the methodology by Boulanger and Idriss (2014). We also used the relationship proposed by Zhang, Robertson, and Brachman (2002) to estimate post-liquefaction volumetric strains and corresponding ground surface settlement; a relationship that is an extension of the work by Ishihara and Yoshimine (1992).

Our analyses were performed using an assumed "during earthquake" groundwater depth of 10 feet bgs. In accordance with the 2019 CBC, we used a peak ground acceleration of 1.06 times gravity (g) in our liquefaction evaluation; this peak ground acceleration is consistent with the Maximum Considered Earthquake Geometric Mean (MCE_G) peak ground acceleration adjusted for site effects (PGA_M). We also used a moment magnitude 8.05 earthquake, which is consistent with the mean characteristic moment magnitude for the Northern San Andreas Fault (1906 rupture), as presented in Table 1.

The results of our preliminary liquefaction analyses indicate potentially liquefiable soil layers were not encountered in CPT-1, however, there are interbedded layers of potentially liquefiable soil between depths of 10 and 16 feet bgs in CPT-2. The material identified as potentially liquefiable in the liquefaction analyses has a soil behavior type of “silty sand” and “sandy silt” is up to about four feet thick. Considering the proposed project will be founded one level below-grade, we judge that there is a potential for reduction of soil strength and bearing capacity during an earthquake due to liquefaction under the site near CPT-2. Therefore, soil samples should be obtained from these potentially liquefiable soil layers to confirm soil type, susceptibility to liquefaction, and the potential for temporary reduction of bearing capacity below foundations during the final geotechnical investigation.

Based on the results of our preliminary geotechnical investigation, we estimated total and differential settlements associated with liquefaction at the site during a MCE event generating a PGA_M of 1.06g will be up to one inch and 1/2 inch across a horizontal distance of 30 feet, respectively. These settlement estimates are for “free-field” conditions. If there is shear strength loss resulting from seismically induced excess pore pressure in soil underlying foundations, the building may settle more than that estimated for free-field conditions during an MCE event.

Ishihara (1985) presented empirical relationship that provides criteria that can be used to evaluate whether liquefaction-induced ground failure, such as sand boils, would be expected to occur under a given level of shaking for a liquefiable layer of given thickness overlain by a resistant, or protective, surficial layer. We conclude the non-liquefiable soil overlying the potentially liquefiable soil layers is sufficiently thick such that the potential for liquefaction-induced ground failure at the ground surface is low

Considering the site topography is relatively flat and the potentially liquefiable layers are discontinuous, we conclude the risk of lateral spreading is very low.

5.2.4 Cyclic Densification

Cyclic densification (also referred to as differential compaction) of non-saturated sand (sand above groundwater table) can occur during an earthquake, resulting in settlement of the ground surface and overlying improvements. The soil encountered above the groundwater table is not susceptible to cyclic densification because of it cohesion. Therefore, we conclude the potential for cyclic densification to occur at the site is nil.

6.0 PRELIMINARY CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our preliminary geotechnical investigation, we conclude there are no major geotechnical issues that would preclude development of the site as proposed. The primary geotechnical issues affecting the proposed development include:

- providing adequate foundation support for the proposed building
- the presence of soil layers underlying the foundation level that may be susceptible to liquefaction and may result in liquefaction-induced settlement and reduction in bearing capacity during a major seismic event.

Our preliminary conclusions and recommendations regarding these issues are presented in the following sections.

6.1 Design Groundwater Table

Based on the existing groundwater level data from a nearby site (see Section 4.1), we preliminarily conclude a groundwater depth of 10 feet bgs should be used for design. The basement walls, building foundations, and mat/floor slabs extending below the design groundwater level should be waterproofed and designed to resist hydrostatic pressures.

6.2 Foundation and Settlement

The factors influencing the selection of a safe, economical foundation system are adequate foundation support, total and differential settlement of the structure resulting from new building loads, and liquefaction-induced ground settlement. Based on the results of our preliminary investigation, we anticipate the foundation of the proposed building with one subterranean level will be underlain by alluvium that can provide adequate foundation support for moderate loads under static conditions; however, the foundation level is underlain by potentially liquefiable soil layers in localized areas that may result in liquefaction-induced settlement up to about one inch and reduction in bearing capacity for shallow foundations. On the basis of our experience, we judge the anticipated total and differential settlements due to static foundation loads and post-liquefaction reconsolidation will exceed the typical tolerance of a conventional spread footing foundation system; in addition, spread footings bearing on localized liquefiable layers may experience bearing failures during a major seismic event.

We preliminarily conclude a mat foundation would be the most appropriate foundation system for the proposed building. The mat should be capable of minimizing distortion of the superstructure from static and seismically induced differential settlement and redistributing the building foundation loads over localized areas of liquefied soil with temporary reduction in bearing capacity during a major seismic event. The foundation will be bottomed below the preliminary design groundwater table of 10 feet bgs; therefore, the mat foundation should be designed to resist hydrostatic uplift forces and be waterproofed.

For structural design of the mat foundation, we preliminarily recommend using an initial coefficient of vertical subgrade reaction of 40 pounds per cubic inch (pci); this coefficient of vertical subgrade reaction value has been reduced to account for the size of the mat (therefore, this is not k_{v1} for 1-foot-square plate). We recommend the mat be designed using an allowable bearing pressure of 3,000 pounds per square foot (psf) for dead-plus-live loads; we anticipate the average bearing pressure will be significantly lower. This value may be increased by one-third for total loads (including seismic and wind loads).

We estimate the total settlement of a mat-supported building under the static building loads would be about 3/4 inch and differential settlement would be approximately 1/2 inch over a horizontal distance of 30 feet. As discussed in Section 5.2.3, the mat should be designed for an additional 1 inch of total liquefaction-induced settlement and 1/2 inch of differential liquefaction-induced settlement over a horizontal distance of 30 feet.

Lateral loads may be resisted by a combination of friction along the base of the mat and passive resistance against the vertical faces of the mat foundation. To compute lateral resistance, we recommend using a uniform pressure of 1,200 psf for transient load conditions and an equivalent fluid weight of 150 pounds per cubic foot (pcf) for sustained loading; the upper foot of soil should be ignored unless confined by a slab. For bentonite-based waterproofing membranes, such as Paraseal or Voltex, a friction factor of 0.12 should be used (assumes a bentonite friction angle of 10 degrees). If Preprufe is used, a base friction factor of 0.20 should be used. Friction factors for other types of waterproofing membranes can be provided upon request. The passive pressure and frictional resistance values include a factor of safety of at least 1.5 and may be used in combination without further reduction.

Depending on the groundwater level at the time of construction and depth of excavation, the soil subgrade at foundation level may be saturated and sensitive to disturbance from construction equipment. The final two feet of excavation and fine grading of the building subgrade should be performed with tracked equipment to minimize heavy concentrated loads that may disturb the wet soil. The subgrade should be free of standing water, debris, and disturbed materials and be approved by the geotechnical engineer prior to placing a mud slab. A three-inch-thick mud slab should be placed on the mat subgrade to protect it from disturbance during placement of waterproofing and reinforcing steel.

6.3 Basement Walls

Basement walls should be designed to resist both static lateral earth pressures, hydrostatic pressures, and lateral pressures caused by earthquakes. We recommend basement walls at the site be designed for the more critical of the following criteria:

- At-rest equivalent fluid weights of 55 pcf above the design groundwater table and 89 pcf below, plus a traffic increment where the wall will be within 10 feet of adjacent streets.

- Active pressure of 35 pcf plus a seismic increment of 42 pcf (triangular distribution) above the design groundwater level, and 79 pcf plus a seismic increment of 20 pcf (triangular distribution) below the design groundwater level.

The recommended pressures above are based on a level backfill condition with no additional surcharge loads. Where the permanent wall will be subject to vehicular loading within 10 feet of the wall, an additional uniform lateral pressure of 50 psf should be applied to the upper 10 feet of the wall.

The design pressures recommended for above the design water level are based on fully drained walls above the design groundwater table. One acceptable method for back-draining a basement wall is to place a prefabricated drainage panel against the back of the wall. The drainage panel should extend down to the design groundwater table.

To protect against moisture migration, below-grade basement walls should be waterproofed and water stops should be placed at all construction joints. In recent years, we have observed numerous leaks in below-grade portions of buildings constructed with waterproofed, shotcrete walls. In areas where there is a high sensitivity to leaks, we recommend cast-in-place concrete be considered.

If backfill is required behind below-grade walls, the walls should be braced, or hand compaction equipment used, to prevent unacceptable surcharges on walls (as determined by the structural engineer).

6.4 Excavation Considerations

We estimate construction of the proposed building with one subterranean level will require an excavation extending to a depth of about 12 to 14 feet bgs. Excavations that will be deeper than five feet and will be entered by workers should be sloped or shored in accordance with CAL-OSHA standards (29 CFR Part 1926). We judge that temporary cuts in on-site soil inclined in accordance to OSHA guidelines for Type B soil will be stable provided the excavation is not surcharged by equipment or building material. Temporary shoring will be required where temporary slopes are not possible because of space constraints. Excavations will likely extend several feet below the design groundwater table and, therefore, temporary dewatering will likely be needed.

6.4.1 Temporary Shoring

We preliminarily conclude a soldier pile-and-lagging shoring system or a continuous soil-cement mixing (SMX) system would be the most suitable and economical temporary shoring systems for the project site. For excavations that retain less than 14 feet of soil, a soldier pile-and-lagging or SMX system can typically provide shoring without tiebacks and, therefore, will not encroach beyond the property lines.

A soldier pile-and-lagging system usually consists of steel H-beams and concrete placed in predrilled holes extending below the bottom of the excavation. Wood lagging is placed between the piles as the excavation proceeds. About 18 inches of horizontal space is required for installation of this type of shoring. Seepage through the sides of the excavation should be expected with the construction of a soldier pile-and-lagging system.

As an alternative to the soldier pile-and-lagging system, a continuous SMX, also called deep soil mixing (DSM), is a viable option for creating a continuous shoring wall that supports the excavation, as well as provides a hydraulic barrier when properly constructed. SMX columns are installed by injecting and blending cement into the soil using a drill rig equipped with single or multiple augers/paddles, or a specialized proprietary cutterhead. The soil is mixed with the binder material(s) in situ, forming continuous, overlapping, soil-cement columns or a continuous wall of uniform thickness. Steel beams are placed in the soil-cement columns to provide rigidity. The SMX system, in combination with steel soldier beams and tiebacks, serves to shore the excavation as well as cut off lateral groundwater flow, thus reducing the potential for groundwater seepage into the excavation and reduce dewatering costs.

The selection, design, construction, and performance of the shoring system should be the responsibility of the contractor. A structural engineer/civil engineer knowledgeable in this type of construction should design the shoring. We should review the geotechnical aspects of the proposed shoring system to ensure that it meets our requirements. During construction, we should observe the installation of the shoring system and check the condition of the soil encountered during excavation.

6.4.2 Dewatering

The proposed excavation will likely extend about four feet below the design groundwater level. If the excavation extends below the groundwater at the time of construction, groundwater will flow into the excavation unless collected and removed prior to reaching the work area. Therefore, a temporary dewatering system should be installed to provide a firm, relatively dry base from which to construct the foundation system. We anticipate an active dewatering system consisting of a series of extraction wells installed outside the excavation would be the most appropriate temporary dewatering system if a soldier pile and lagging shoring system will be used. If the temporary shoring system will consist of a groundwater cut-off wall (i.e. secant pile wall or SMX wall), an active dewatering system will not be required. We anticipate a passive system, in which water is collected from a series of trench drains around the perimeter and across the base of the excavation, would be the most appropriate temporary dewatering system to be used in combination with a cut-off wall shoring system. The method used to dewater the excavation should be the responsibility of the contractor.

6.5 Seismic Design

As discussed in Section 5.2.3, the site is underlain by thin zones of potentially liquefiable soil in localized areas. Although the 2019 CBC calls for a Site Class F designation for sites underlain by potentially liquefiable soil, we conclude a Site Class D designation is more appropriate because the potentially liquefiable layers are relatively thin and the estimated post-liquefaction shear strength is relatively high. Therefore, we judge the site will not incur significant nonlinear behavior during strong ground shaking.

The latitude and longitude of the site are 37.6052° and -122.3967°, respectively. For design in accordance with 2019 CBC, we recommend the following:

- Site Class D
- S_S = 2.243g, S_1 = 0.935g

The 2019 CBC is based on the guidelines contained within ASCE 7-16 which stipulates that where S_1 is greater than 0.2 times gravity (g) for Site Class D, a ground motion hazard analysis is needed unless the seismic response coefficient (C_s) value will be calculated as outlined in Section 11.4.8, Exception 2. Assuming the C_s value will be calculated as outlined in Section 11.4.8, Exception 2, we recommend the following seismic design parameters:

- F_a = 1.0, F_v = 1.7
- S_{MS} = 2.243g, S_{M1} = 1.590g
- S_{DS} = 1.495g, S_{D1} = 1.060g
- Seismic Design Category E for Risk Factors I, II, and III

Depending on the structural design methodology and fundamental period of the proposed building, it may be advantageous to perform a ground motion hazard analysis (the project structural engineer should confirm). We can perform a ground motion hazard analysis upon request.

7.0 ADDITIONAL GEOTECHNICAL SERVICES

Prior to final design, additional borings and/or CPTs should be performed within the proposed building footprint to supplement existing subsurface information and to develop final geotechnical conclusions and recommendations.

8.0 LIMITATIONS

This preliminary geotechnical investigation has been conducted in accordance with the standard of care commonly used as state-of-practice in the profession. No other warranties are either expressed or implied. The preliminary recommendations made in this report are based on the assumption that the subsurface conditions do not deviate appreciably from those disclosed in the exploratory CPTs. If any variations or undesirable conditions are encountered during construction, we should be notified so that additional recommendations can be made. The preliminary foundation recommendations presented in this report are developed exclusively for the proposed development described in this report and are not valid for other locations and construction in the project vicinity.

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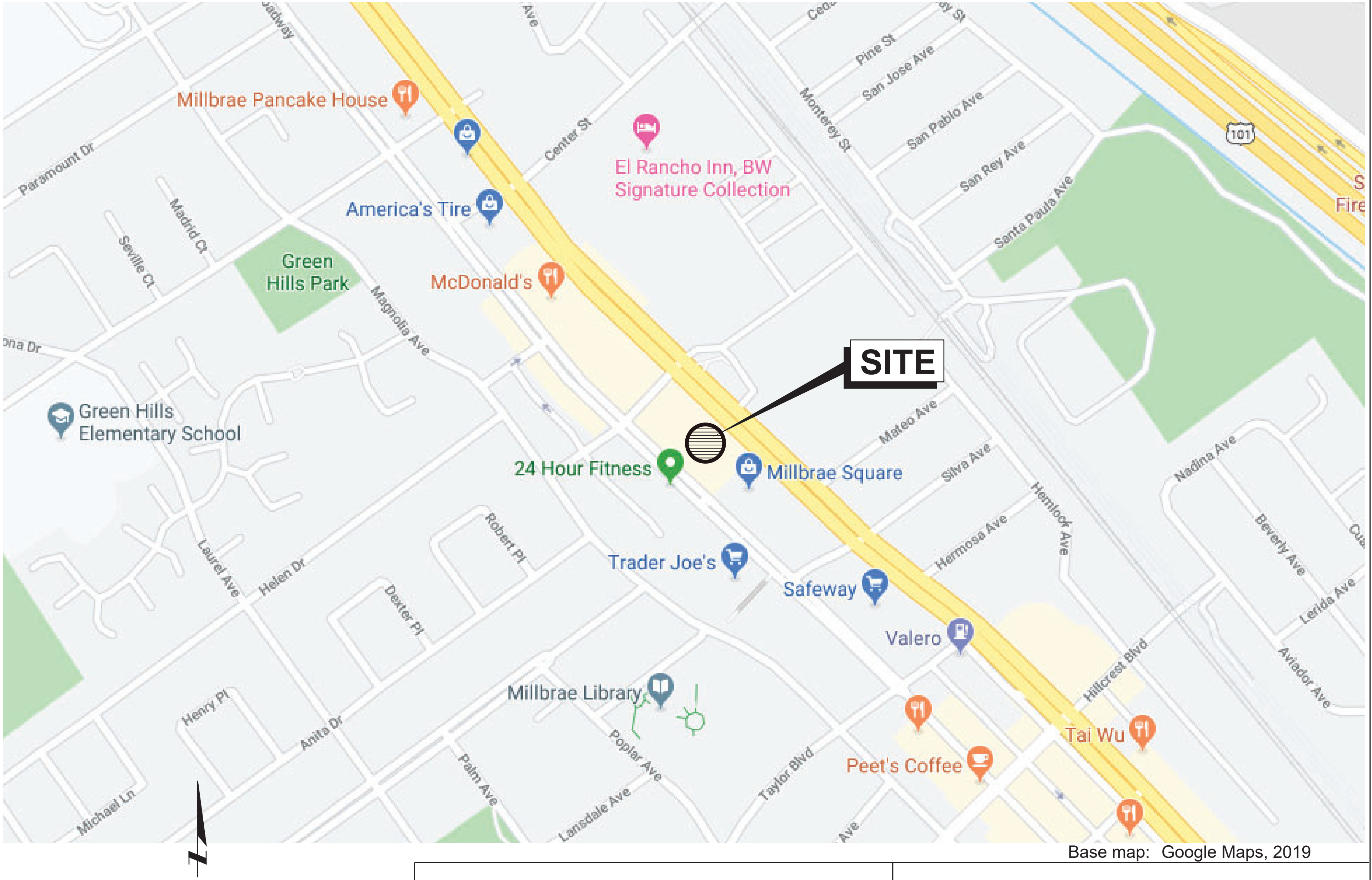
FIGURES



Base map: Google Maps, 2019

0 500 1,000 Feet

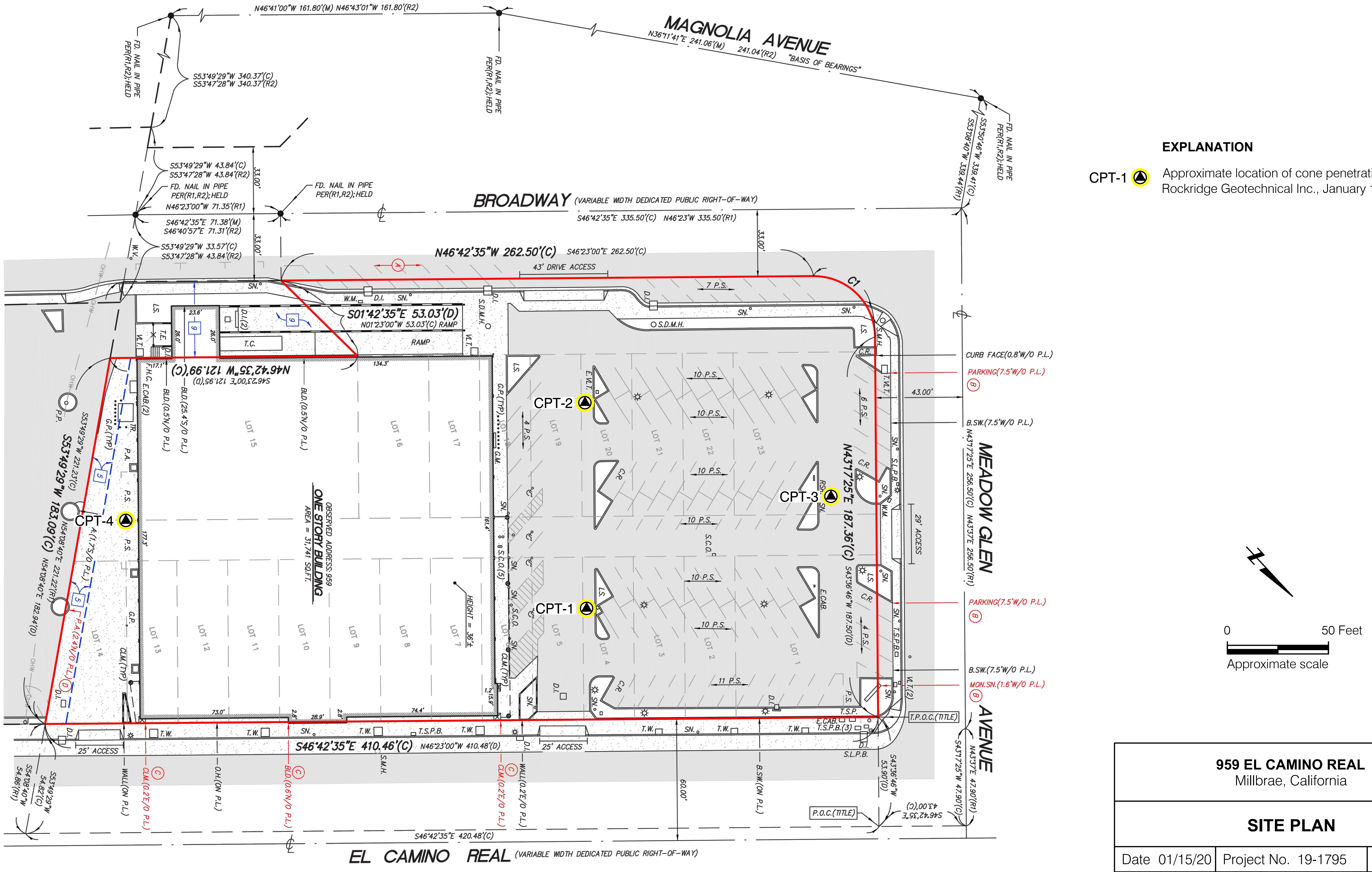
Approximate scale

959 EL CAMINO REAL
Millbrae, California

ROCKRIDGE
GEOTECHNICAL

SITE LOCATION MAP

Date 01/14/20 | Project No. 19-1795 | Figure 1



EXPLANATION

CPT-1 ▲ Approximate location of cone penetration test by Rockridge Geotechnical Inc., January 10, 2020

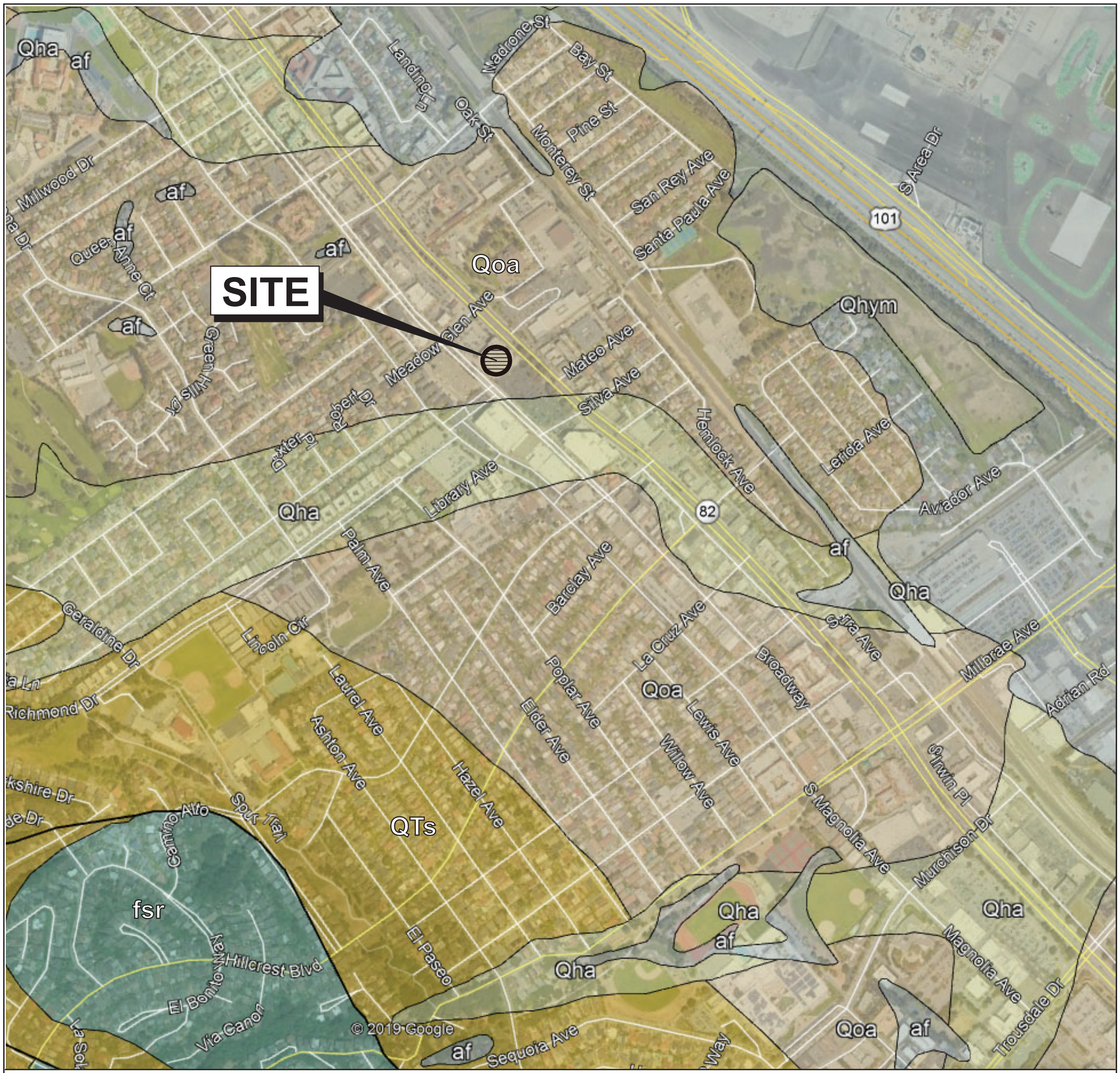
Reference: Base map from a drawing titled "Site Survey", by MBH Arch, dated November 22, 2019.

959 EL CAMINO REAL
Millbrae, California

SITE PLAN

Date 01/15/20	Project No. 19-1795	Figure 2

ROCKRIDGE GEOTECHNICAL



Base map: Google Earth with U.S. Geological Survey (USGS), San Mateo County, 2019.

EXPLANATION

af	Artificial Fill
Qoa	Alluvium (early (Pleistocene)
Qhym	Mud deposits (late Holocene)
Qha	Alluvium (Holocene)
QTs	Sediments (early Pleistocene and (or) Pliocene)
fsr	Franciscan Complex melange (Eocene, Paleocene, and (or) Late Cretaceous)

Geologic contact:
dashed where approximate and dotted
where concealed, queried where uncertain

0 1000 2000 Feet

Approximate scale

959 EL CAMINO REAL
Millbrae, California

ROCKRIDGE
GEOTECHNICAL

REGIONAL GEOLOGIC MAP

Date 01/15/20	Project No. 19-1795	Figure 3

Base Map: U.S. Geological Survey (USGS), National Seismic Hazards Maps - Fault Sources, 2008.

EXPLANATION

🟥	Strike slip
■	Thrust (Reverse)
🟦	Normal

0 5 10 Miles

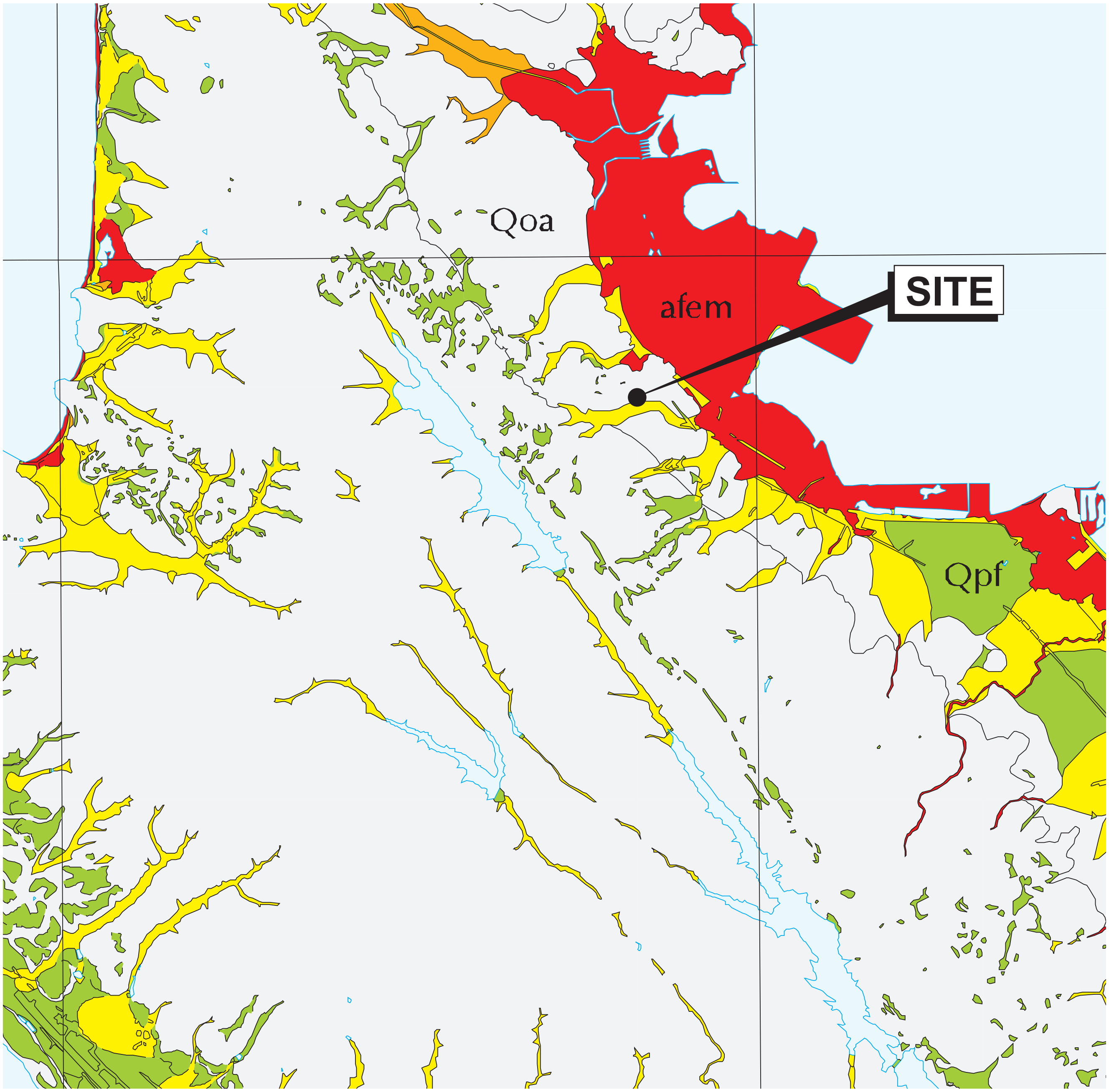
Approximate scale

959 EL CAMINO REAL
Millbrae, California

ROCKRIDGE
GEOTECHNICAL

REGIONAL FAULT MAP

Date 01/14/20 | Project No. 19-1795 | Figure 4



LIQUEFACTION SUSCEPTIBILITY

🟥 VERY HIGH

🟧 HIGH

🟨 MODERATE

🟩 LOW

⬜ VERY LOW

Lines

———————— — — —

Contact, dashed where location uncertainty is greater than about +- 100 m.

0 1.5 3 Miles

Approximate scale

Reference:
Maps of Quaternary Deposits and Liquefaction Susceptibility
in the Central San Francisco Bay Region, California, 2006

959 EL CAMINO REAL
Millbrae, California

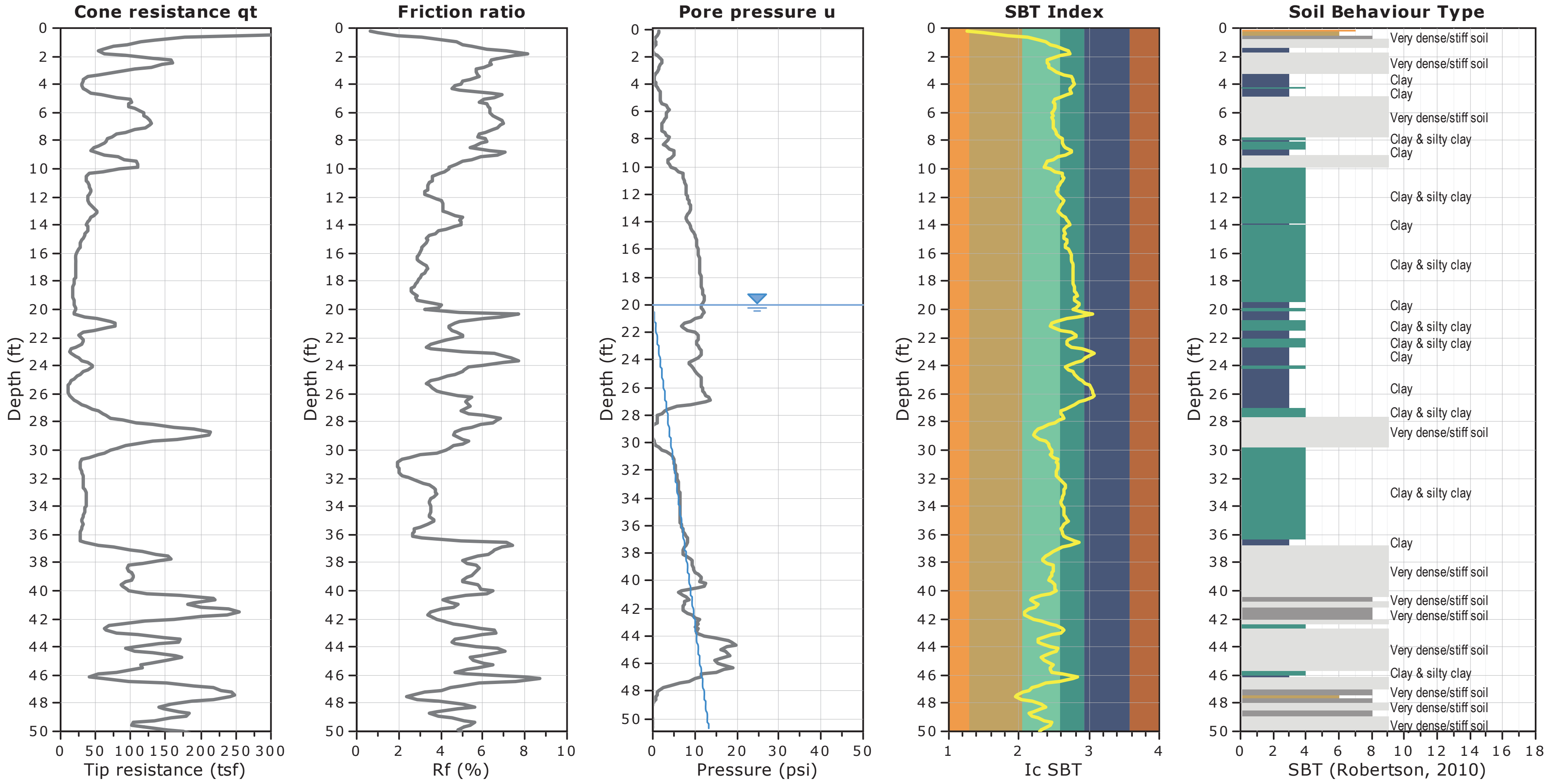
ROCKRIDGE
GEOTECHNICAL

LIQUEFACTION SUSCEPTIBILITY MAP

Date 01/14/20	Project No. 19-1795	Figure 5

APPENDIX A

Cone Penetration Test Results



SBT legend

- 🟥 1. Sensitive fine grained
- 🟫 2. Organic material
- 🟦 3. Clay to silty clay
- 🟩 4. Clayey silt to silty clay
- 🟩 5. Silty sand to sandy silt
- 🟫 6. Clean sand to silty sand
- 🟧 7. Gravely sand to sand
- ⬛ 8. Very stiff sand to clayey sand
- ⬜ 9. Very stiff fine grained

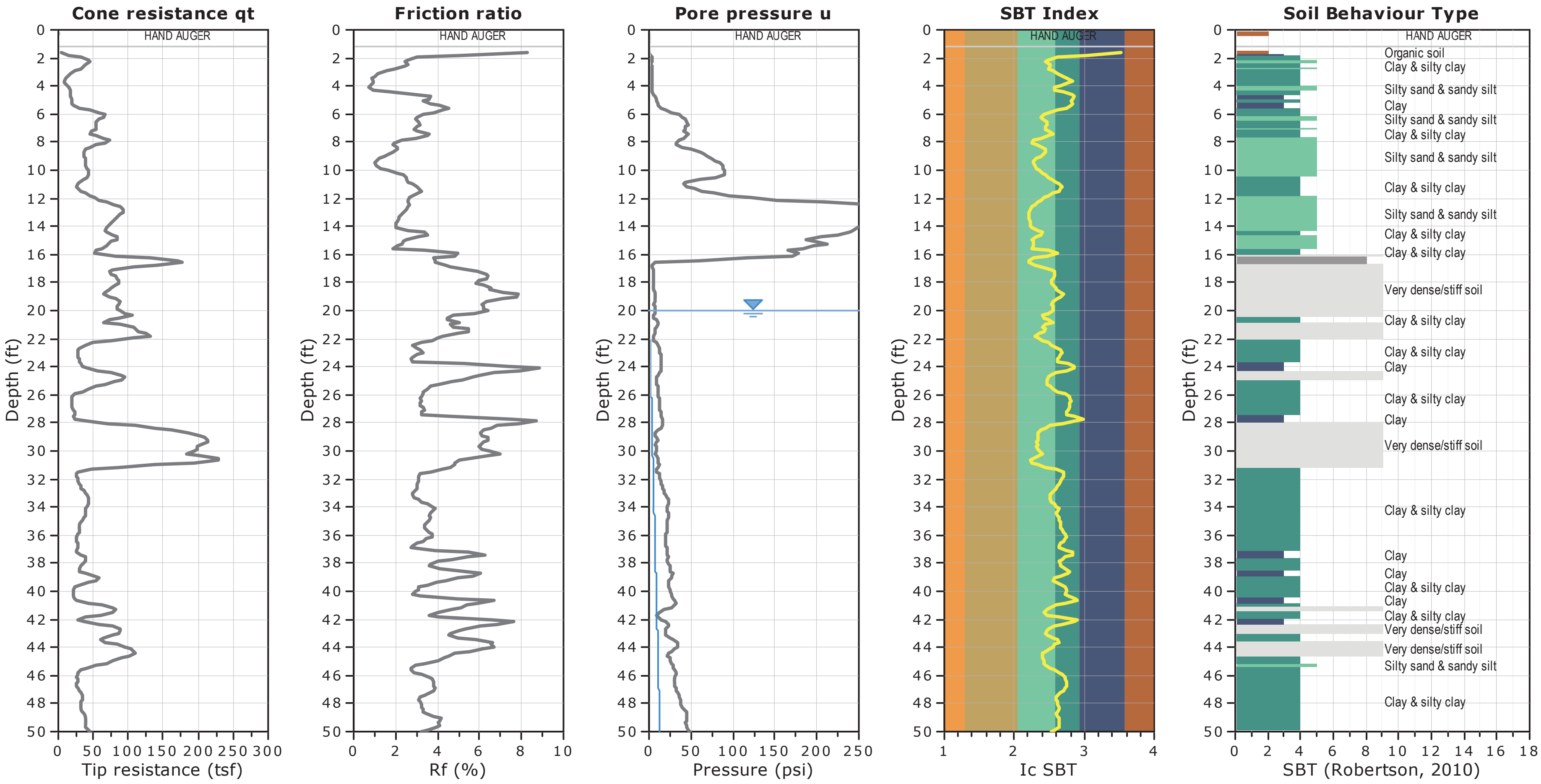
Total depth: 50 ft, Date: 1/10/2020
Estimated Groundwater Depth: 20 feet (measured using weighted tape)
Cone Operator: Middle Earth Geo Testing, Inc.

959 EL CAMINO REAL
Millbrae, California

ROCKRIDGE
GEOTECHNICAL

CONE PENETRATION TEST RESULTS
CPT-1

Date 01/14/20	Project No. 19-1795	Figure A-1



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959 EL CAMINO REAL
Millbrae, California

ROCKRIDGE
GEOTECHNICAL

CONE PENETRATION TEST RESULTS
CPT-2

Date 01/14/20	Project No. 19-1795	Figure A-2

Appendix F

Phase 1 Environmental Site Assessment

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REPORT ON

ASTM PHASE I ENVIRONMENTAL SITE ASSESSMENT
959 EL CAMINO REAL
MILLBRAE, CALIFORNIA

by
Haley & Aldrich, Inc.
Walnut Creek, California

for
HIGH STREET NO. CAL. DEVLOPMENT, INC.
San Francisco, California

File No. 0200442
September 2021

HALEY & ALDRICH, INC.
2033 N. Main Street
Suite 309
Walnut Creek, CA 94596
925.949.1012

1 September 2021
File No. 0200442

HIGH STREET NO. CAL. DEVELOPMENT, INC.
415 Mission Street, 45th Floor
San Francisco, California 94105

Attention: Brian Pianca
Senior Vice President, Development Management

Subject: ASTM Phase I Environmental Site Assessment
959 El Camino Real
Millbrae, California 94030

Dear Mr. Pianca:

The enclosed report presents the results of a Phase I Environmental Site Assessment (Phase I) conducted at the above-referenced property, located at 959 El Camino Real in Millbrae, California (herein referred to as the "subject site"). This work was performed by Haley & Aldrich, Inc. (Haley & Aldrich), in accordance with our proposal to HIGH STREET NO. CAL. DEVELOPMENT, INC. dated 25 November 2020 ("Agreement") as authorized on 25 November 2020. This Phase I was conducted in conformance with the scope and limitations of the American Society for Testing and Materials (ASTM) E 1527-13 Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process as referenced in 40 Code of Federal Regulations (CFR) Part 312 (the All Appropriate Inquiries [AAI] Rule).

The objective of a Phase I is to assess whether known and suspect "recognized environmental conditions" (REC), historical RECs (HREC), or controlled RECs (CREC) are associated with the subject site, as defined in the ASTM E 1527-13 Standard.

This Phase I has revealed no evidence of RECs associated with the subject site.

Thank you for the opportunity to perform these services for you. Please do not hesitate to contact us if you have any questions or comments.

Sincerely yours,
HALEY & ALDRICH, INC.

B Mellin

Katy Decker

Brooke Mellin, P.G.
Assistant Project Manager

Katy Decker, P.G.
Project Manager

Enclosures

\\haleyaldrich.com\share\CF\Projects\0200442\Phase I ESA\2021-0901_HAI_TCC_ASTM Phase I_959 El Camino_F2.docx

Executive Summary

Haley & Aldrich, Inc. (Haley & Aldrich) has performed a Phase I Environmental Site Assessment (Phase I) of the property located at 959 El Camino Real in Millbrae, California (herein referred to as the "subject site"). The scope of work is described and conditioned by our proposal dated 25 November 2020. This Phase I was performed for HIGH STREET NO. CAL. DEVELOPMENT, INC. in support of the potential purchase of the subject site. This Phase I was performed in conformance with the scope and limitations of the ASTM E 1527-13 Standard and All Appropriate Inquiries (AAI) Rule.[1] Deviations from this Standard are described in Section 1.4 of this report.

SUBJECT SITE DESCRIPTION

As shown on Figure 2, the subject site consists of a parcel of land totaling approximately 1.86 acres. The subject site is developed with an approximately 31,000-square-foot commercial building with an adjacent parking lot and landscaping. The subject site was formerly occupied by Office Depot, a commercial office supplies retailer, and has been vacant since November 2020.

OBJECTIVE

The objective of a Phase I is to assess whether "recognized environmental conditions" (REC), historical RECs (HREC), and controlled RECs (CREC) are associated with the subject site. Our conclusions are intended to help the user evaluate the "business environmental risk" associated with the subject site. Our opinion regarding a REC's potential impact on the subject site is based on the scope of our work, the information obtained during the course of our work, the conditions prevailing at the time our work was performed, the applicable regulatory requirements in effect at the time our work was performed, our experience evaluating similar sites, and on our understanding of the client's intention to purchase the property.

RECOGNIZED ENVIRONMENTAL CONDITIONS

The ASTM E 1527-13 Standard defines a REC in part as "the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to any release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment."

RECs were not identified in connection with the subject site.

CONTROLLED RECOGNIZED ENVIRONMENTAL CONDITIONS

The ASTM E 1527-13 Standard defines a CREC as a recognized environmental condition resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction

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[1] American Society for Testing and Materials (ASTM) E 1527-13 Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process as referenced in 40 Code of Federal Regulations (CFR) Part 312 (the All Appropriate Inquiries [AAI] Rule) ("ASTM E 1527-13 Standard"). Specified terms as are used in ASTM E 1527-13 are highlighted in blue in this report and defined in the Glossary at the end of the report text.

of the applicable regulatory authority with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls.

CRECs were not identified in connection with the subject site.

HISTORICAL RECOGNIZED ENVIRONMENTAL CONDITIONS

The ASTM E 1527-13 Standard defines an HREC as "a past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls (for example, property use restrictions, activity and use limitations, institutional controls, or engineering controls)."

HRECs were not identified in connection with the subject site.

DE MINIMIS CONDITIONS

The ASTM E 1527-13 Standard defines *de minimis* conditions as those conditions which "do not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies." The ASTM E 1527-13 Standard notes that "conditions determined to be *de minimis* are not recognized environmental conditions."

The following *de minimis* conditions listed below were identified in connection with the subject site.

- *De Minimis* #1: Staining was observed throughout the floor of the building, primarily beneath the former retail shelves, near the trash compactor access door, in the janitor's closet, in several of the offices, the kitchen, and the main storage room. Staining was also observed in some of the ceiling panels in one of the offices.
- *De Minimis* #2: Staining observed throughout the parking lot area of the subject site, likely due to vehicle oil leaks.

POTENTIAL ENVIRONMENTAL CONCERNS

The following potential environmental concern was identified in association with the redevelopment of the subject site:

- A petroleum hydrocarbon groundwater plume associated with the Olympian Service Station/Rob Baker's Garage facility has been identified. This facility is located adjacent to the subject site to the northwest. The plume extent has been mapped in Pangea's annual groundwater monitoring reports. These reports consistently show the plume does not extend onto the subject site; however, it borders the northwestern edge of Meadow Glen Avenue (farthest from the subject site), which separates the two properties. Groundwater flow direction is to the northeast, cross-gradient of the subject site.

  Haley & Aldrich understands the site is planned for a new mixed-use 7-story structure with 1-story below grade parking. Based on proximity to the groundwater plume, impacted groundwater has the potential to be pulled onto the subject site by dewatering operations during redevelopment. Haley & Aldrich recommends performing a dewatering analysis and permitting evaluation prior to construction such that construction dewatering discharge may be appropriately permitted and, if necessary, treated.

NON-SCOPE CONSIDERATIONS

The ASTM E 1527-13 Standard contains a list of "additional issues" that are non-scope considerations outside of the scope of the ASTM Phase I Practice. The list includes ACM, biological agents, radon, LBP, lead in drinking water, wetlands regulatory compliance, cultural and historic resources, industrial hygiene health and safety, ecological resources, endangered species, indoor air quality unrelated to releases of hazardous substances or petroleum products into the environment, and mold. Trammell Crow Company's "Scope of Work for Performance of Phase I Environmental Site Assessment," dated November 2013, requires review of four non-ASTM scope elements: 1) summary of existing ACM survey(s); 2) visual overview inspection for the presence of mold; 3) desktop review of the national wetlands database and inventory; and 4) summary of USEPA radon testing results. Concerns related to these four non-ASTM scope elements are discussed below. The remaining items were not included in this Phase I prepared for the subject site.

Asbestos-Containing Material (ACM)

A visual inspection for the presence of asbestos containing materials (ACMs) was not conducted during the site reconnaissance, nor were previous ACM survey reports provided or available for review; however, due to the age of the building at the subject site, ACMs are suspected to be potentially present in roof mastic, insulation, floor tiles, and/or other building materials. An asbestos survey should be performed prior to demolition of the building to determine whether pre-demolition abatement is required.

Visual Mold Inspection

A visual inspection for the presence of mold was conducted as part of the Phase I site reconnaissance; the presence of mold was not observed.

National Wetlands Database and Inventory

The "National Wetlands Inventory" website maintained by the United States Fish & Wildlife Service was reviewed to determine whether any wetlands or jurisdictional waters are present on the subject site. The subject site is not located in any of these areas.

Radon

The Radon Zones established by USEPA were reviewed for the subject site. This review identified that the county in which the subject site is located, San Mateo County, is categorized as a Radon Zone 2, which indicates this county is predicted to contain average indoor radon screening levels from 2 to 4 picocuries per liter (pCi/L). This predicted range does not exceed the USEPA's radon action level of 4 pCi/L for when mitigation measures are recommended.

SUMMARY AND RECOMMENDATIONS

We did not identify RECs, HRECs, or CRECs during this Phase I. Further assessment is not recommended at this time.

The remainder of this report contains additional information regarding the Phase I, the resulting findings summarized above, and limitations affecting this report.

Table of Contents

List of Figures

1. Introduction

This report presents the results of an ASTM Phase I Environmental Site Assessment (Phase I) conducted at 959 El Camino Real in Millbrae, California (herein referred to as the "subject site"). The subject site consists of an approximately 31,000-square-foot commercial building and adjacent parking lot, as shown on the Project Locus, Figure 1. This Phase I was conducted in consideration of HIGH STREET NO. CAL. DEVELOPMENT, INC.'s intention to purchase the property.

1.1 OBJECTIVE

The objective of a Phase I is to assess whether "recognized environmental conditions" (REC), historical RECs (HREC), and controlled RECs (CREC) are associated with the subject site by evaluating site history, interviews, existing observable conditions, current site use, and current and former uses of adjoining properties as well as potential releases at surrounding properties that may impact the subject site. Our conclusions are intended to help the user evaluate the "business environmental risk" associated with the subject site.

RECs are defined in the ASTM E 1527-13 Standard as "the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to any release to the environment; (2) under conditions indicative of a release to the environment; or under conditions that pose a material threat of a future release to the environment." The definitions of RECs, HRECs, and CRECs are included in the Glossary section of this report.

1.2 SCOPE OF SERVICES

This work was performed by Haley & Aldrich, Inc. (Haley & Aldrich) and this Phase I was performed in conformance with the scope and limitations of the ASTM E 1527-13 Standard and All Appropriate Inquiries (AAI) Rule[2] and in accordance with our proposal to HIGH STREET NO. CAL. DEVELOPMENT, INC. dated 25 November 2020 ("Agreement") as authorized on 25 November 2020. The Phase I limitations are attached hereto as Appendix A. In addition, this Phase I was prepared to comply with Trammell Crow Company's "Scope of Work for Performance of Phase I Environmental Site Assessment," dated November 2013.

As part of this Phase I, Haley & Aldrich conducted visual observations of site conditions and of abutting property use and interviewed a key site manager and applicable tenant representatives (site reconnaissance); reviewed federal, state, tribal, and local environmental database information, federal and state environmental files, previous reports (if identified and provided), and site historical use records; and formulated conclusions regarding the potential presence and impact of RECs.

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[2] American Society for Testing and Materials (ASTM) E 1527-13 Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process as referenced in 40 Code of Federal Regulations (CFR) Part 312 (the All Appropriate Inquiries [AAI] Rule) ("ASTM E 1527-13 Standard"). Specified terms as are used in ASTM E 1527-13 are highlighted in blue in this report and defined in the Glossary at the end of the report text.

1.3 NON-SCOPE CONSIDERATIONS

The ASTM E 1527-13 Standard includes the following list of “additional issues” that are non-scope considerations outside of the scope of the ASTM Phase I practice: asbestos-containing materials (ACM), biological agents, radon, lead-based paint (LBP), lead in drinking water, wetlands, regulatory compliance, cultural and historic resources, industrial hygiene, health and safety, ecological resources, endangered species, indoor air quality unrelated to releases of hazardous substances or petroleum products into the environment, and mold. Trammell Crow Company’s “Scope of Work for Performance of Phase I Environmental Site Assessment,” dated November 2013, requires review of four non-ASTM scope elements: 1) summary of existing ACM survey(s); 2) visual overview inspection for the presence of mold; 3) desktop review of the national wetlands database and inventory; and 4) summary of the United States Environmental Protection Agency (USEPA) radon testing results. Concerns related to these four non-ASTM scope elements are discussed in Section 7.7. The remaining items were not included in this Phase I prepared for the subject site.

1.4 LIMITING CONDITIONS/DEVIATIONS

Haley & Aldrich completed this Phase I in substantial conformance with the ASTM E 1527-13 Standard. In our opinion, no additions were made to or deviations and deletions made from the ASTM work scope in completing this Phase I.

1.5 USER RESPONSIBILITIES

The completion of this Phase I is only one component of the process required to satisfy the AAI Rule. In addition, the user must adhere to a set of user responsibilities as defined by the ASTM E 1527-13 Standard and the AAI Rule. User responsibilities are discussed in Section 6.6 of this report. A user seeking protection from Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) liability as an innocent landowner, bona fide prospective purchaser, or contiguous property owner must complete all components of the AAI process in addition to meeting ongoing obligations. AAI components, CERCLA liability relief, and ongoing obligations are discussed in the AAI Rule and in Appendix XI of the ASTM E 1527-13 Standard.

2. Site Description

A description of the subject site is detailed in the sections below. Refer to Figure 1 for a project locus and Figure 2 for a site plan showing relevant site features and adjacent properties.

2.1 SITE OWNERSHIP, LOCATION, AND VICINITY DESCRIPTION

<table>
<tr><th colspan="3">Site Description</th></tr>
<tr><td>Owner</td><td colspan="2">Bay Properties, Inc.</td></tr>
<tr><td>Occupant</td><td colspan="2">Vacant</td></tr>
<tr><td>Current Site Use</td><td colspan="2">The subject site is not currently used. It was formerly used as an office supply retail store.</td></tr>
<tr><td>Size</td><td colspan="2">Approximately 1.86 acres</td></tr>
<tr><td>Building Square Footage</td><td colspan="2">Approximately 31,000 square feet</td></tr>
<tr><td>USGS 7.5 Minute Topographic Map</td><td colspan="2">5641104 Montara Mountain, CA, 2012</td></tr>
<tr><td>Site County</td><td colspan="2">San Mateo County</td></tr>
<tr><td>Zoning</td><td colspan="2">C - Commercial</td></tr>
<tr><td>Parcel Information</td><td colspan="2">021364080</td></tr>
<tr><td rowspan="4">Utilities</td><td>Water:</td><td rowspan="2">City of Millbrae</td></tr>
<tr><td>Sewerage:</td></tr>
<tr><td>Electricity:</td><td rowspan="2">Pacific Gas and Electric Company (PG&E)</td></tr>
<tr><td>Gas:</td></tr>
<tr><td>Heating/Cooling System</td><td colspan="2">The building has a central roof-mounted HVAC system with internal ducts.</td></tr>
<tr><th colspan="3">Site Vicinity Description</th></tr>
<tr><td>General Area Description</td><td colspan="2">The subject site vicinity is mixed use, consisting of developed commercial buildings and business complexes, residential buildings, and government buildings.</td></tr>
<tr><td rowspan="4">Adjoining Property Description</td><td>Northwest:</td><td>Meadow Glen Avenue followed by Olympian gas station and Rob Baker’s Garage, Citibank</td></tr>
<tr><td>Northeast:</td><td>El Camino Real followed by KFC and A&W fast food restaurants, former Orchard Supply Hardware</td></tr>
<tr><td>Southwest:</td><td>Broadway followed by a 2-story multi-tenant commercial building</td></tr>
<tr><td>Southeast:</td><td>Shopping center parking lot</td></tr>
</table>

2.2 PHYSICAL SETTING

Subsurface explorations and/or hydrogeologic investigations were not performed for this Phase I. Subject site geology and hydrology were evaluated on the basis of readily available public information or references, and/or based upon our experience and understanding of subsurface conditions in the vicinity of the subject site. It is unknown to what extent localized variations in groundwater depth and flow occur on the subject site.

Physical Setting		Source
Topography Summary	The subject site is relatively flat and slopes gently to the northeast.	1, 2
Site Elevation	The subject site elevation is approximately 41 feet above mean sea level.	2
Overburden Soils	Overburden soils consist of clay and silty clay interbedded with silty sand.	3
Bedrock Formation	The site is underlain by early Pleistocene-aged alluvial deposits.	3
Depth to Bedrock	Depth to bedrock was not determined for this Phase I.	
Depth to Groundwater	Depth to groundwater was measured at a depth of approximately 20 feet below ground surface (bgs) during a 2019 Cone Penetrometer Test (CPT) investigation at the subject site. Depth to groundwater was reported to be approximately 17 feet bgs at the adjacent site to the northwest (Olympian/Rob Baker's Garage).	3, 4
Surface Water Flow Direction	Surface water flow follows regional topography which generally slopes to the northeast, towards San Francisco Bay.	1
Regional Groundwater Flow Direction	Regional groundwater flow direction is presumed to be to the northeast, following topography towards the San Francisco Bay. Groundwater flow direction is reported to be to the northeast at the adjacent site to the northwest (Olympian/Rob Baker's Garage).	1, 4
Nearest Surface Water Body	The San Francisco Bay is located approximately 1 mile east of the subject site.	1
Floodplain	The subject site is not located in a 100- or 500-year flood zone.	2
Mapped Wetlands	The subject site is not located in a National Wetland Inventory or State Wetlands area.	2

Sources:

1. USGS 7.5 Minute Topographic Map, Montara Mountain, California Quadrangle, 2012.
2. Environmental Data Resources, Inc., Database Report, dated 30 November 2020.
3. Rockridge Geotechnical. Preliminary Geotechnical Investigation, Proposed Mixed-Use Building, 959 El Camino Real, Millbrae, California, dated 16 January 2020.
4. Pangea Environmental Services, Inc. Annual Groundwater Monitoring Report – 2019, Olympian Service Station, 1009 El Camino Real, Millbrae, California 94030, SMC-GPP Site No. 990026, APN 021-363-030, dated 15 November 2019.

3. Previous Reports

The following report previously prepared for the subject site was reviewed for this Phase I. Information contained in this report is included herein. Relevant excerpts from this report are included in Appendix B.

- *Phase I Environmental Site Assessment, Office Depot, 959 El Camino Real, Millbrae, California 94030*, dated 14 November 2019, prepared by the Vertex Companies, Inc. (Vertex), prepared for WP West Acquisitions, LLC.

  This Phase I was prepared in conformance with the scope and limitations of the ASTM E 1527-13 Standard Practice for Environmental Site Assessments. At the time of the site reconnaissance on 12 November 2019, the subject site was developed to its current state and occupied by Office Deport. No RECs, CRECs, or HRECs were identified for the subject site as part of this report.

  Vertex identified Olympian Service Station (Rob Baker's Garage), located on the northwest adjoining property at 1009 El Camino Real, on the leaking underground storage tank (LUST) database with a release of petroleum hydrocarbons to groundwater. Vertex indicated the impact originated on the eastern corner of the gasoline station property and concentrations exceeding Environmental Screening Levels (ESLs) extended to the street (El Camino Real) and a portion of the adjacent City of San Francisco Water Department (SFWD) property. As drawn by Pangea Environmental Services, Inc. (Pangea), the consultant for Olympian Service Station, at the time of issuance of Vertex's Phase I, the groundwater exceeding San Francisco Bay Regional Water Quality Control Board (SFRWQCB) ESLs did not extend onto the subject site. Given the groundwater impacts from the adjacent gasoline station did not appear to impact the subject site at concentrations exceeding ESLs, Vertex did not consider this facility to be a REC for the subject site.

  Vertex noted that the subject site is planned for future retail and residential development, including one level of below grade parking to 9 feet bgs. Vertex did not consider the current conditions at the Olympian Service Station to pose a REC or vapor intrusion concern to the subject site. However, Vertex noted that if dewatering is required for planned site redevelopment, it is possible that the nearby petroleum hydrocarbon plume may be pulled towards the site by an on-site dewatering system, causing the produced groundwater to require treatment before release to the storm drainage system. If dewatering is performed, Vertex recommended appropriate sampling to confirm contaminant concentrations prior to discharge.

4. Site History

Haley & Aldrich assessed past usage of the subject site and adjoining properties through a review of:

- Topographic Maps dated 1896, 1899, 1915, 1939, 1947, 1949, 1956, 1968, 1980, 1993, 1995, 1996, 1997, and 2012;
- Aerial Photographs dated 1943, 1946, 1956, 1963, 1968, 1974, 1982, 1993, 1998, 2006, 2009, 2012, and 2016;
- Sanborn Fire Insurance Maps dated 1949 and 1954;
- City Directories dated 1972, 1976, 1981, 1986, 1992, 1995, 2000, 2005, 2010, 2014, and 2017;
- Previous reports; and
- Interviews with subject site personnel.

Copies of information obtained from historical references reviewed are included in Appendix C. Unless otherwise noted below, per the ASTM standard, sources were reviewed dating back to 1940 or first developed use, whichever is earlier, and at 5-year intervals if the use of the property has changed within the time period.

4.1 SUBJECT SITE

The table below provides a detailed summary of pertinent information from the historical sources reviewed:

Dates	Description of Subject Site	Sources
1896 - 1947	The subject site was undeveloped. In the 1943 aerial photograph, a portion of a fenced field extended onto the subject site from the adjoining property to the west.	Topographic Maps, Aerial Photographs, Previous Reports
1950s - 1996	The subject site building was constructed in the mid-1950s. This building and adjacent parking lot first appear in the 1956 aerial photograph and the 1956 topographic map. The building is also shown in the 1954 Sanborn map. According to subject site personnel, the subject site was used as a grocery store from its construction until 1996. The subject site is listed in the city directory in 1981, 1986, and 1992 as “Quality Foods, Inc.” In 1995, it is listed as “Bell Markets.”	Topographic Maps, Aerial Photographs, Sanborn Maps, City Directories, Interviews with subject site personnel
1996 - November 2020	The subject site was occupied by Office Depot from 1996 until November 2020.	City Directories, Interviews with subject site personnel
November 2020 – Present	The subject site is currently vacant.	Interviews with subject site personnel, Site reconnaissance

4.2 ADJOINING PROPERTIES

The table below provides a summary of pertinent information from the historical sources reviewed regarding adjacent properties:

Dates	Description of Adjacent Properties	Sources
1896 - 1946	Adjoining properties are primarily undeveloped. El Camino Real, which bounds the subject site to the northeast, appears in the 1896 topographic map. The San Francisco Water building is visible in the 1943 aerial photograph.	Topographic Maps, Aerial Photographs
1949	Broadway, which bounds the subject site to the southwest, and Meadow Glen Avenue, which bounds the subject site to the northwest, first appear in the 1949 Sanborn map and 1949 topographic map.	Topographic Maps, Sanborn Maps
1954 - 1956	In the 1954 Sanborn map, a “Gas & Oil” facility appears in the adjoining property to the northwest (now Olympian Service Station/Rob Baker’s Garage). A small building also appears here in the 1956 aerial photograph.	Aerial Photographs, Sanborn Maps
1963	In the 1963 aerial photograph, a small commercial building in the adjoining property to the northeast first appears.	Aerial Photographs
1968	In the 1968 aerial photograph, a large parking lot appears in the adjoining property to the southeast.	Aerial Photographs
1974	In the 1974 aerial photograph and the 1980 topographic map, the 2-story commercial building appears in the adjoining property to the southwest.	Topographic Maps, Aerial Photographs
1982	By 1982 the bank building in the adjoining property to the northwest (southwest of Olympian gas station) appears.	Aerial Photographs
1993 - Present	By 1993, the small commercial building in the adjoining property to the northeast is replaced by a large commercial building (formerly Orchard Supply Hardware). Adjoining properties remain relatively unchanged through present day.	Aerial Photographs

5. Environmental Records Review

5.1 ENVIRONMENTAL DATABASE RECORDS SEARCH

Haley & Aldrich used the electronic database service, Environmental Data Resources (EDR) to complete the environmental records review. The database search was used to identify properties that may be listed in the referenced agency records, located within the ASTM-specified approximate minimum search distances as shown in the table below. A description of each database searched is in Section 11.2 of this report. The complete environmental database report is provided in Appendix D. Pertinent information obtained from the database is summarized in Section 5.3 below.

Database Searched	Approximate Minimum Search Distance	Subject Site Listed?	Number of Sites within Search Distance[1]
1. NPL Sites	1 mile	No	0
2. Delisted NPL Sites	0.5 mile	No	0
3. CERCLIS[2] Sites	0.5 mile	No	0
4. CERCLIS-NFRAP[2] Sites	0.5 mile	No	0
5. Federal ERNS	Site only	No	Not Applicable
6. RCRA non-CORRACTS TSD Facilities	0.5 mile	No	0
7. RCRA CORRACTS TSD Facilities	1 mile	No	0
8. RCRA Generators	Site & Adjoining	No	0
9. Federal Institutional/Engineering Controls	Site Only	No	Not Applicable
10. State/Tribal Equivalent NPL Sites	1 mile	No	0
11. State/Tribal Equivalent CERCLIS[2] Sites	0.5 mile	No	1
12. State/Tribal Registered Storage Tanks	Site & Adjoining	No	2
13. State/Tribal Landfills and Solid Waste Disposal Sites	0.5 mile	No	0
14. State/Tribal Leaking Storage Tanks	0.5 mile	No	27
15. State/Tribal Institutional Controls/Engineering Controls	Site Only	No	Not Applicable
16. State/Tribal Voluntary Cleanup Sites	0.5 mile	No	0
17. State/Tribal Brownfield Sites	0.5 mile	No	2
18. Orphan Site List[3]	Site & Adjoining	No	0

Database Searched	Approximate Minimum Search Distance	Subject Site Listed?	Number of Sites within Search Distance[1]
19. CERS HAZ WASTE[4]	0.25 mile	Yes	14
20. CHMIRS[4]	Site Only	Yes	Not Applicable
21. RCRA NonGen / NLR[4]	0.25 mile	Yes	24
22. FINDS[4]	Site Only	Yes	Not Applicable
23. ECHO[4]	Site Only	Yes	Not Applicable
24. San Mateo Co. BI[4]	0.25 mile	Yes	97
25. HAZNET[4]	Site Only	Yes	Not Applicable
26. HWTS[4]	Site Only	Yes	Not Applicable

Notes:

1. *Some sites may be included on multiple databases.*
2. *The USEPA retired the CERCLIS database in October 2013. In January 2016, the Superfund Enterprise Management System (SEMS), which replaces the CERCLIS database, became active. The CERCLIS database records search included as part of this assessment includes currently ascertainable data from the SEMS and SEMS-Archive databases as reported through the database vendor.*
3. *Haley & Aldrich also searched the Orphan Site List provided in the database report for the subject site and sites adjoining the subject site. Orphan sites are those that, due to incorrect or incomplete addresses, could not be mapped.*
4. *If applicable, other relevant databases, not specifically required by ASTM were included in the database review.*

5.2 ADDITIONAL ENVIRONMENTAL RECORDS OR FILE REVIEW

To supplement the environmental record search, we contacted the following state and local government agencies and searched applicable online databases. If copies of the documents reviewed were obtained, pertinent material is included in Appendix D. Relevant information obtained is included in the appropriate sections of the report and/or discussed in Section 5.3 below. Adjacent properties were also included in requests for additional information if a significant incident or release was identified.

Agency	Request Sent or Files Searched		Files Exist and Are Available for Review	Files Reviewed
	Subject Site	Adjoining Properties		
San Francisco Bay Regional Water Quality Control Board (SFRWQCB)[1]	Yes	Yes	On 17 December 2020 SFRWQCB responded that they had no records pertaining to the subject site. In addition, the State Water Resources Control Board's (SWRCB's) website, GeoTracker, generally contains information on sites that impact groundwater, especially those that require groundwater cleanup, and permitted facilities. There were no GeoTracker files pertaining to the subject site. GeoTracker files pertaining to adjacent and nearby properties are discussed in Section 5.3.2.	Yes
Department of Toxic Substances Control (DTSC)[2]	Yes	Yes	On 24 December 2020 DTSC responded that they had no records pertaining to the subject site. In additoin, the DTSC's website, EnviroStor, generally contains all existing DTSC information on permits and corrective action at hazardous waste facilities, as well as site cleanup projects. There were no EnviroStor files pertaining to the subject site or adjoining properties.	N/A
California Governor's Office of Emergency Services (Cal OES)[3]	Yes	Yes	The online Cal OES database was accessed on 15 December 2020. There were no records for the subject site. One record pertaining to a nearby site is described in Section 5.3.2.	Yes
Bay Area Air Quality Management District (BAAQMD)[4]	Yes	No	On 14 December 2020, BAAQMD responded that they had no records pertaining to the subject site.	N/A
San Mateo County Department of Environmental Health (SMCDEH)[5]	Yes	Yes	On 7 January 2021 SMCDEH responded with several records including stormwater facility inspection reports and retail food facility inspection reports. Minor violations were found, related to trash and debris from the dumpster area near a storm drain and minor soil buildup in a storm drain.	Yes

Notes:

1. *The San Francisco Bay Regional Water Quality Control Board maintains information regarding water, monitoring wells, underground storage tanks (USTs), and cleanups.*

2. *The California Department of Toxic Substances Control maintains records related to site cleanups, hazardous waste, and USTs.*
3. *The California Governor's Office of Emergency Services maintains records of hazardous materials spill reports.*
4. *The Bay Area Air Quality Management District maintains information regarding indoor air, asbestos, equipment permitting, and violations related to air quality.*
5. *The San Mateo County Department of Environmental Health maintains records related to hazardous materials and waste, USTs, and site mitigation.*

5.3 DETAILED DESCRIPTION OF RELEVANT INFORMATION

5.3.1 Subject Site

The subject site was listed in the following databases:

Listing	Description	Potential Impact
HAZNET, HWTS, San Mateo Co. BI, FINDS, ECHO, RCRA NonGen/ NLR, CERS HAZ WASTE	The subject site (Office Depot) was listed in several databases pertaining to, or likely pertaining to the former generation, storage, and disposal of hazardous wastes at the subject site. These hazardous wastes related to retail office supply operations include waste aerosols, batteries, solvent mixtures, aged or surplus organics, and inorganic solid waste. There were a few minor compliance violations noted during inspections. Office Depot returned to compliance shortly after in each instance. No spills or major violations were found.	No spills or major violations were found. This does not appear to have impacted the subject site and is not considered a REC.
CHMIRS	The subject site was listed in the CHMIRS database for an OES incident which occurred on 5 January 2008. 1,000 gallons of sewage was reportedly released into a storm drain as a surcharge due to rains.	Due to the age and type of incident, and lack of any additional reports since the release, this does not appear to have impacted the subject site and is not considered a REC.

5.3.2 Nearby Sites

Several sites were listed in the database report within the applicable search radii or identified in regulatory records reviews. Due to their location with respect to the subject site (on the opposite side of a hydrogeologic barrier, distance from the site, location of the site relative to inferred groundwater flow, subsurface utilities and building levels, etc., or their status (closed out release, etc.), several of the sites are not likely to adversely affect the subject site and are not discussed herein. Only those sites adjacent to the subject site and sites with a potential to have impacted the subject site are discussed below. The complete database report and relevant records review information is included in Appendix D.

1. **Olympian Service Station/Rob Baker's Garage – 1009 El Camino Real**

This property is located adjacent to the subject site to the northwest. This facility was identified on GeoTracker and in several EDR databases including LUST and UST listings pertaining to an active LUST case under oversight of SMCDEH. In January 1999, two 4,000-gallon gasoline USTs, one 6,000-gallon gasoline UST, and one 6,000-gallon diesel UST and associated piping were removed from the property. Petroleum hydrocarbons were detected in soil and approximately 500 cubic yards of contaminated soil was over-excavated from the former UST cavity in February 1999. In October 2000, six soil borings evaluated the lateral extent of soil and groundwater contamination at the Site. In July 2003, monitoring wells MW-1 through MW-4 were installed and periodic groundwater monitoring was initiated. In December 2003, offsite soil borings were completed to further evaluate the lateral extent of contaminant migration.

Assessment of the offsite extent of petroleum hydrocarbons and methyl-tertiary-butyl-ether (MTBE) has been ongoing since 2003. The Crystal Springs water-supply right-of-way and the offices and maintenance facilities of the San Francisco Water Department (SFWD) of the San Francisco Public Utilities Commission (SFPUC) are located northeast of the property directly across El Camino Real. According to a letter dated 16 February 2010 and subsequent correspondence, the SFPUC was concerned about potential MTBE impact to their existing water supply test well and future water supply well. Five offsite monitoring wells were installed on SFWD property in March 2011.

Interim remediation was performed using dual phase extraction (DPE) in 2008, 2009, and 2012 to remediate free product in MW-4 and to reduce dissolved-phase hydrocarbon and MTBE concentrations.

Groundwater monitoring activities are currently conducted annually. The most recent groundwater monitoring report (Pangea, 2019), documented sampling that occurred in September and October 2019. According to this report, petroleum hydrocarbons concentrations were generally lower than the previous monitoring event with wells exhibiting stable to decreasing concentration trends. However, MTBE concentrations increased in one offsite deep well and TBA concentrations increased in two offsite deep wells compared to 2018 data.

No monitoring wells are located on the subject site. Previous soil borings/temporary monitoring wells "E" and "G" were drilled in Meadow Glen Avenue adjacent to the subject site boundary. Total petroleum hydrocarbons (TPH) quantified as diesel (TPHd) was reported in the groundwater sample from boring G at a concentration of 70 micrograms per liter (μg/L) in 2003, which did not exceed the current SFRWQCB Tier 1 ESL of 100 μg/L. No TPH quantified as gasoline (TPHg) or benzene, toluene, ethylbenzene, and xylenes (BTEX collectively) were reported at concentrations at or above their lab reporting limits. According to groundwater contour maps drawn by Pangea, the groundwater contaminant plumes do not extend onto the subject site. Groundwater flow direction is cross-gradient of the subject site, and offsite impacts from this facility appear to be limited to the SFWD property.

2. **Kohl's Department Stores – 855 Broadway**

This property is located approximately 98 feet south-southwest of the subject site and is identified in the HAZNET, HWTS and San Mateo Co. BI databases for the generation, storage, and disposal of hazardous waste. The facility's status is inactive. Hazardous wastes listed in 2009 included unspecified oil-containing wastes, asbestos-containing waste, polychlorinated biphenyl (PCB)-containing waste, waste oil and mixed oil. No violations, incidents, or spills were found in these records. This does not appear to impact the subject site.

3. Kentucky Fried Chicken – 950 El Camino Real

This property is located approximately 105 feet east-northeast of the subject site and is identified in the CERS and San Mateo Co. BI databases related to storage of hazardous materials, including "MV Fuels or Waste Only." Several minor compliance violations were listed. No spills or major violations were found. This does not appear to impact the subject site.

4. San Francisco Public Utilities/San Francisco Department of Public Works/San Francisco Water Department – 970/1000 El Camino Real

This facility is located approximately 120 feet north of the subject site and is identified on GeoTracker, in the Cal OES database, and in several EDR databases including LUST, RCRA-SQG, UST, and HWTS. Two cases on GeoTracker include a closed LUST case and an open cleanup program site under oversight of SMCDEH.

Three gasoline USTs (1,000 gallons, 2,000 gallons, and 10,000 gallons), a 1,500-gallon diesel UST, a 100-gallon fuel oil UST, and associated piping were removed from the facility in May 1994. Four hundred twenty-five cubic yards of soil were removed, and soil and groundwater were sampled. Case closure was granted by SMCDEH on 12 August 2009. The case was addressed to the satisfaction of the regulatory agency. This does not appear to impact the subject site.

The open cleanup program case is related a spill of approximately 700 gallons of #2 red dye diesel from an aboveground storage tank (AST) onto the concrete pad and asphalt parking lot, which occurred on 6 September 2010. Some of the initial response actions inadvertently resulted in movement of water containing diesel through the storm drain system and discharging to the ground within the CalTrain right-of-way at the back of the property. As a result, additional site investigations and removal actions were completed in 2010, 2011, and 2013 with SMCDEH providing regulatory oversight for the characterization and cleanup of the property. A total of 36 soil samples were analyzed from 2010 to 2013 with highest concentrations of TPHd detected at 2 to 3 feet bgs. A grab groundwater sample collected in 2013 did not contain TPHd above the detection limit of 50 µg/L. In 2010 and 2013, approximately 12 cubic yards of soil were removed from the spill area. Given the diesel impacts are limited to shallow soil at this facility and the distant and downgradient direction from the subject site, this does not appear to impact the subject site.

A Cal OES hazardous material spill report indicated there was a spill of less than 1 gallon of "petroleum." The caller had reported a main line failed beneath a mechanical service shop causing water to wash through the shop area. There was no sheen or evidence of a petroleum release observed. The minor spill does not appear to impact the subject site.

5.4 VAPOR MIGRATION

The ASTM 1527-13 Standard states that "for the purposes of this practice, "migrate" and "migration" refers to the movement of hazardous substances or petroleum products in any form, including, for example, solid and liquid at the surface or subsurface, and vapor in the subsurface." Thus, this section specifies whether or not we perceive a risk of vapor migration to the subject site.

To assess a vapor migration risk we conducted a detailed review and analysis of the site-specific environmental database report and/or other reasonably ascertainable records to assess whether:

1. Off-site properties have documented chlorinated volatile organic compound (VOC) contamination located within 100 feet of the subject property, or

2. Off-site properties have documented volatile petroleum hydrocarbon contamination within 30 feet of the subject property.

A petroleum hydrocarbon groundwater plume originating from the adjacent property to the northwest (Olympian Service Station/Rob Baker's Garage) is located approximately 60 feet northwest of the northwestern edge of the subject site property boundary. Due to the distance of the groundwater plume and the groundwater flow direction cross-gradient of the subject site, a vapor migration risk at the subject site is unlikely.

5.5 ENVIRONMENTAL LIEN AND AUL

According to EDR's Environmental Lien and AUL Search™ Report, dated 1 December 2020, there are no environmental liens or activity and use limitations (AULs) for the subject site. This research was completed by EDR using the following Assessor Parcel Number provided by Haley & Aldrich:

- 021364080

A copy of the Environmental Lien and AUL Search™ Report and Deed is included in Appendix D.

5.6 CHAIN OF TITLE

According to the EDR Report dated 4 January 2021, the current owner of the subject site is "Bay Properties, Inc.," who received the title from "the Estate of Richard J. Nasser and Argent Nasser" in March 1997. No other deeds were located for the subject site. A copy of the EDR 1940 Chain of Title report is included in Appendix C.

6. Site Reconnaissance and Key Personnel Interview(s)

A site visit to observe subject site conditions was conducted by Brooke Mellin of Haley & Aldrich, on 4 December 2020. Access to the subject site was provided by Steve Nasser of Bay Properties and Eric Flint of Left Coast Property Services. Haley & Aldrich personnel observed accessible interior areas of the subject site building, including common areas, kitchen and breakroom area, and storage spaces. Haley & Aldrich also observed the exterior portions of the subject site, including the property boundaries, and observed adjoining property conditions from the subject site boundaries and/or public thoroughfares. No weather-related conditions or other conditions that would limit our ability to observe the subject site or adjoining properties occurred during our site visit.

An interview with Steve Nasser of Bay Properties, the key site manager, and Eric Flint of Left Coast Property Services was performed in conjunction with the site visit. Per the ASTM Standard, past owners, operators, and occupants of the subject site who are likely to have material information regarding the potential for contamination at the subject property shall be contacted to the extent that they can be identified and that the information likely to be obtained is not duplicative of information already obtained from other sources. Haley & Aldrich was not provided with contact information in order to interview past owners and/or operators at the subject site. Based upon historical data collected from other sources, this potential data gap is not expected to adversely impact the results of this assessment.

The findings of the site visit and interviews are discussed below. Site photographs are included in Appendix E.

ASTM E 1527-13 Standard Section 10.8 requires that, prior to the site visit, the current subject site owner or key site manager and user, if different from the current owner or key site manager, be asked if there are any helpful documents that can be made available for review. Documents were not provided.

6.1 CURRENT USE OF THE PROPERTY

The subject site is currently vacant. It was formerly used as an Office Depot, a commercial office supplies retailer. At the time of the site reconnaissance, no furniture, equipment, office supply products, or any other items remained at the subject site. The northwestern half of the property is used as a parking lot.

6.2 GENERAL DESCRIPTION OF STRUCTURES

The subject site consists of an approximately 31,000-square-foot commercial building consisting of a main retail area, small offices, storage rooms, a kitchen/breakroom, and restrooms. A loading dock and ramp is located along the southwestern side of the building and trash compactor is located adjacent to the outside of the south corner of the building. The northwest half of the property consists of an asphalt-paved parking lot with landscaping.

6.3 USE, STORAGE, AND DISPOSAL OF PETROLEUM PRODUCTS AND HAZARDOUS MATERIALS

The use, storage and/or disposal of petroleum products or hazardous materials was not observed at the subject site. According to the key site manager, the subject site formerly stored and properly disposed batteries and used printer cartridges in one of the offices. These items were not present at the time of the site reconnaissance.

6.4 OTHER SUBJECT SITE OBSERVATIONS

The table below summarizes items that were observed and/or reported at the subject site during the site visit other than those items related to use, storage, and disposal of petroleum or hazardous materials (described in Section 6.3 above). If items were observed or reported, they are further described either in the table or below.

Description	Observed or Reported at Time of Site Visit	Observations/Comments
Potable Water Supply	Yes	City of Millbrae
Nearest Drinking Water Source	N/A	
Sewage Disposal System	Yes	Restrooms are located inside the building. Service is provided by the City of Millbrae.
Septic System	N/A	
Unidentified Storage Containers	No	
Wastewater Discharge	N/A	
Stormwater Discharge	Yes	Two storm drains are located along the northeastern edge of the subject site. Two drains are located at the end of the ramp in the loading dock area. Two sumps are located at the western and southern corners of the building, which reportedly pump stormwater that enters these drains into the storm sewer. The sumps were covered with metal panels, which could not be accessed for inspection at the time of the site reconnaissance.
Odors	No	
PCBs Associated with Electrical or Hydraulic Equipment	Yes	A PG&E-owned pad-mounted electrical transformer is located at the southern corner of the subject site. No labels regarding PCB content were observed. Based on the age of the building, it is possible the transformer may contain PCBs. No evidence of staining was observed on the concrete beneath the transformer.
Elevators (Traction or Hydraulic)	No	No elevators were observed, but a hydraulic trash compactor is located near the loading dock along the southwestern side of the building. *De minimis* staining associated with the hydraulic oil reservoir was observed, but no history of spills was reported.
Vehicle Maintenance Lifts	N/A	
Emergency Generators	No	

Description	Observed or Reported at Time of Site Visit	Observations/Comments
Sprinkler System Pumps	No	
Heating System	Yes	The building has a central roof-mounted HVAC system with internal ducts.
Cooling System	Yes	The building has a central roof-mounted HVAC system with internal ducts.
Stains or Corrosion on Floors, Walls, or Ceilings	Yes	*De minimis* staining was observed throughout the floor of the building-primarily beneath the former retail shelves, near the trash compactor access door, in the janitor's closet, in several of the offices, the kitchen, and the main storage room. Staining was also observed in some of the ceiling panels in one of the offices.
Floor Drains	Yes	Floor drains were observed in the janitor's closet and restrooms of the building.
Sumps	Yes	Two sumps are located on the western and southern corners of the building. The sumps reportedly pump stormwater that enters drains located at the bottom of the loading dock ramp into the storm sewer. The sumps were covered with metal panels, which could not be accessed for inspection at the time of the site reconnaissance.
Catch Basins	N/A	
Pits, Ponds, Lagoons, and Pools of Liquid	N/A	
Stained Soil or Pavement	Yes	*De minimis* staining was observed throughout the parking lot area of the subject site.
Stressed Vegetation	No	
Solid Waste and Evidence of Waste Filling	No	
Dry Wells	N/A	
Monitoring Wells	N/A	
Water Supply Wells	N/A	
Irrigation Wells	N/A	
Injection Wells	N/A	
Abandoned Wells	N/A	

Notes:

1. *N/A items are those that were not observed or reported and/or not anticipated to be present given the nature of the site (e.g., building features not present on an undeveloped property).*

6.5 ADJOINING PROPERTY OBSERVATIONS

The subject site is bounded to the northeast by El Camino Real, followed by KFC and A&W fast food restaurants and a former Orchard Supply Hardware which appeared to be vacant at the time of the site reconnaissance. North of the subject site, beyond El Camino Real, is a San Francisco Water government office. The subject site is bounded to the northwest by Meadow Glen Avenue, followed by an Olympian Service Station/Rob Baker's Garage and Citibank, a bank. The adjoining property to the southeast is a large shopping center parking lot. The subject site is bounded to the southwest by Broadway followed by a 2-story multi-tenant commercial building. No conditions of environmental concern were observed on the adjoining properties during the site reconnaissance.

6.6 USER RESPONSIBILITIES

The AAI Rule requires that the User of the report consider the following:

- Whether the user has specialized knowledge about previous ownership or uses of the subject site that may be material to identifying RECs;
- whether the user has determined that the subject site's Title contains environmental liens or other information related to the environmental condition of the property, including engineering and institutional controls and AULs, as defined by ASTM;
- whether the user is aware of commonly known or reasonably ascertainable information about the subject site including whether or not the presence of contamination is likely on the subject site and to what degree it can be detected; and
- whether the user has prior knowledge that the price of the subject site has been reduced for environmentally related reasons.

While such information is not required to be provided to the environmental professional(s), the information can assist the environmental professional in identifying recognized environmental conditions. The "All Appropriate Inquiries" Final Rule (40 CFR Part 312) requires that these tasks be performed by or on behalf of a party seeking to qualify for a Landowner Liability Protection (LLP) to CERCLA liability.

Haley & Aldrich conducted an interview with Mr. Brian Pianca, Senior Vice President with HIGH STREET NO. CAL. DEVELOPMENT, INC., in December 2020. Mr. Pianca indicated he had no specialized knowledge regarding the subject site not already known to the environmental professional.

7. Findings and Opinions

7.1 DATA GAPS

Our ability to identify and evaluate RECs at the subject site is conditioned upon data gaps identified as part of this Phase I.

No significant data gaps were identified during the performance of this Phase I. Thus, it is our opinion that sufficient information was obtained to identify subject site conditions indicative of releases or threatened releases of hazardous substances and petroleum hydrocarbons. Our opinion is limited by the conditions prevailing at the time our work is performed and the applicable regulatory requirements in effect.

7.2 RECOGNIZED ENVIRONMENTAL CONDITIONS

The ASTM E 1527-13 Standard defines a REC in part as “the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment.”

Our opinion regarding a REC's potential impact on the subject site is based on the scope of our work, the information obtained during the course of our work, the conditions prevailing at the time our work was performed, the applicable regulatory requirements in effect at the time our work was performed, our experience evaluating similar sites, and on our understanding of the client's intended use for the subject site.

RECs were not identified in connection with the subject site.

7.3 CONTROLLED RECOGNIZED ENVIRONMENTAL CONDITIONS

The ASTM E 1527-13 Standard defines a CREC as a recognized environmental condition resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls.

CRECs were not identified in connection with the subject site.

7.4 HISTORICAL RECOGNIZED ENVIRONMENTAL CONDITIONS

The ASTM E 1527-13 Standard defines an HREC as “a past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls (for example, property use restrictions, activity and use limitations, institutional controls, or engineering controls).”

HRECs were not identified in connection with the subject site.

7.5 DE MINIMIS CONDITIONS

The ASTM E 1527-13 Standard defines *de minimis* conditions as those conditions which “do not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies.” The ASTM E 1527-13 Standard notes that “conditions determined to be *de minimis* are not recognized environmental conditions.”

The following *de minimis* conditions listed below were identified in connection with the subject site.

- *De Minimis* #1: Staining was observed throughout the floor of the building, primarily beneath the former retail shelves, near the trash compactor access door, in the janitor’s closet, in several of the offices, the kitchen, and the main storage room. Staining was also observed in some of the ceiling panels in one of the offices.
- *De Minimis* #2: Staining observed throughout the parking lot area of the subject site, likely due to vehicle oil leaks.

7.6 POTENTIAL ENVIRONMENTAL CONCERNS

The following potential environmental concern was identified in association with the redevelopment of the subject site:

- A petroleum hydrocarbon groundwater plume associated with the Olympian Service Station/Rob Baker’s Garage facility has been identified. This facility is located adjacent to the subject site to the northwest. The plume extent has been mapped in Pangea’s annual groundwater monitoring reports. These reports consistently show the plume does not extend onto the subject site; however, it borders the northwestern edge of Meadow Glen Avenue (farthest from the subject site), which separates the two properties. Groundwater flow direction is to the northeast, cross-gradient of the subject site.

  Haley & Aldrich understands the site is planned for a new mixed-use 7-story structure with 1-story below grade parking. Based on proximity to the groundwater plume, impacted groundwater has the potential to be pulled onto the subject site by dewatering operations during redevelopment. Haley & Aldrich recommends performing a dewatering analysis and permitting evaluation prior to construction such that construction dewatering discharge may be appropriately permitted and, if necessary, treated.

7.7 NON-SCOPE CONSIDERATIONS

The ASTM E 1527-13 Standard contains a list of “additional issues” that are non-scope considerations outside of the scope of the ASTM Phase I Practice. The list includes ACM, biological agents, radon, LBP, lead in drinking water, wetlands regulatory compliance, cultural and historic resources, industrial hygiene health and safety, ecological resources, endangered species, indoor air quality unrelated to releases of hazardous substances or petroleum products into the environment, and mold. Trammell Crow Company’s “Scope of Work for Performance of Phase I Environmental Site Assessment,” dated November 2013, requires review of four non-ASTM scope elements: 1) summary of existing ACM survey(s); 2) visual overview inspection for the presence of mold; 3) desktop review of the national wetlands database and inventory; and 4) summary of USEPA radon testing results. Concerns related to these four non-ASTM scope elements are discussed below. The remaining items were not included in this Phase I prepared for the subject site.

7.7.1 Asbestos-Containing Material (ACM)

A visual inspection for the presence of asbestos containing materials (ACMs) was not conducted during the site reconnaissance, nor were previous ACM survey reports provided or available for review; however, due to the age of the building at the subject site, ACMs are suspected to be potentially present in roof mastic, insulation, floor tiles, and/or other building materials. An asbestos survey should be performed prior to demolition of the building to determine whether pre-demolition abatement is required.

7.7.2 Visual Mold Inspection

A visual inspection for the presence of mold was conducted as part of the Phase I site reconnaissance; the presence of mold was not observed.

7.7.3 National Wetlands Database and Inventory

The “National Wetlands Inventory” website maintained by the United States Fish & Wildlife Service was reviewed to determine whether any wetlands or jurisdictional waters are present on the subject site. The subject site is not located in any of these areas.

7.7.4 Radon

The Radon Zones established by USEPA were reviewed for the subject site. This review identified that the county in which the subject site is located, San Mateo County, is categorized as a Radon Zone 2, which indicates this county is predicted to contain average indoor radon screening levels from 2 to 4 picocuries per liter (pCi/L). This predicted range does not exceed the USEPA’s radon action level of 4 pCi/L for when mitigation measures are recommended.

8. Conclusions

We have performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of the ASTM Practice E 1527 of the subject site, located at 959 El Camino Real, in Millbrae, California. Any exceptions to or deletions from this practice are described in Section 1.4 of this report.

This assessment has revealed no evidence of recognized environmental conditions (RECs) in connection with the property. We do not recommend additional physical investigation of the subject site at this time.

9. Environmental Professional Certification

The undersigned declare the following:

We declare that, to the best of our professional knowledge and belief, we meet the definition of Environmental Professional as defined in §312.10 of 40 CFR Part 312 and

We have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. We have developed and performed all the appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

BMellin

Brooke Mellin, P.G.
Assistant Project Manager

Katy Decker

Katy Decker, P.G.
Project Manager

10. Credentials

This Phase I report was prepared by Brooke Mellin, P.G. and Katy Decker, P.G., who served as the Environmental Professionals for this project. Qualification information for the project personnel is provided below.

Brooke Mellin, P.G.
Assistant Project Manager

Ms. Mellin holds a B.A. in Geology and an M.A. in Earth and Planetary Science from UC Berkeley and is a California Professional Geologist. Ms. Mellin has over 7 years of environmental consulting experience and has been involved in a wide range of environmental investigation and remediation projects including soil, soil gas, and groundwater cleanup sites.

Katy M. Decker, P.G.
Project Manager

Ms. Decker has over 10 years of experience in environmental consulting and is a Professional Geologist registered in Idaho and California. She has experience in preparing Phase I and Phase II Environmental Site Assessments, conducting soil and groundwater investigations, and preparing site closure reports. She is a certified stormwater professional and has worked in permitting and compliance for wastewater discharge under the National Pollutant Discharge Elimination System and Waste Discharge Requirements Programs.

11. Glossary and Other Descriptions

11.1 GLOSSARY

All Appropriate Inquiry (AAI) — that inquiry constituting "all appropriate inquiry into the previous ownership and uses of the property consistent with good commercial or customary practice" as defined in CERCLA, 42 U.S.C §9601(35)(B), that will qualify a party to a commercial real estate transaction for one of threshold criteria for satisfying the LLPs to CERCLA liability (42 U.S.C §9601(35)(A) & (B), §9607(b)(3), §9607(q); and §9607(r)), assuming compliance with other elements of the defense.

Business Environmental Risk — a risk which can have a material environmental or environmentally-driven impact on the business associated with the current or planned use of a parcel of commercial real estate, not necessarily limited to those environmental issues required to be investigated in this practice. Consideration of business environmental risk issues may involve addressing one or more non-scope considerations.

Controlled Recognized Environmental Condition (CREC) – a recognized environmental condition resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority (for example, as evidenced by the issuance of a no further action letter or equivalent, or meeting risk-based criteria established by regulatory authority), with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls (for example, property use restrictions, activity and use limitations, institutional controls, or engineering controls).

Data Gap — a lack of or inability to obtain information required by this practice despite good faith efforts by the environmental professional to gather such information. Data gaps may result from incompleteness in any of the activities required by this practice, including, but not limited to site reconnaissance (for example, an inability to conduct the site visit), and interviews (for example, an inability to interview the key site manager, regulatory officials, etc.).

De Minimis Conditions — conditions which do not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies. Conditions determined to be *de minimis* conditions are not recognized environmental conditions nor controlled recognized environmental conditions.

Environmental Professional — a person meeting the education, training, and experience requirements as set forth in 40 CFR §312.10(b).

Historical Recognized Environmental Condition (HREC) — a past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority, without subjecting the property to any required controls (for example, property use restrictions, activity and use limitations, institutional controls, or engineering controls).

Key Site Manager — the person identified by the owner or operator of a property as having good knowledge of the uses and physical characteristics of the property.

Material Threat —a physically observable or obvious threat which is reasonably likely to lead to a release that, in the opinion of the environmental professional, is threatening and might result in impact to public health or the environment. An example might include an aboveground storage tank system that contains a hazardous substance and which shows evidence of damage. The damage would represent a material threat if it is deemed serious enough that it may cause or contribute to tank integrity failure with a release of contents to the environment.

Orphan Site — (not ASTM E 1527-13 definition) — sites that could not be mapped due to poor or inadequate address information.

Recognized Environmental Condition (REC) — the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment. *De minimis* conditions are not recognized environmental conditions.

11.2 DESCRIPTIONS OF DATABASES SEARCHED

Numerous regulatory databases were searched during this Phase I. Each database reviewed is described in the database report presented in Appendix D. Those databases required by the ASTM E 1527-13 Standard are identified below.

1. **NPL Sites:** The National Priorities List (NPL) is a list of contaminated sites that are considered the highest priority for cleanup by the U.S. Environmental Protection Agency (USEPA).

2. **Delisted NPL Sites:** The Delisted National Priorities List (NPL) is a list of formal NPL sites formerly considered the highest priority for cleanup by the USEPA that met the criteria of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for deletion from the NPL because a no further response was appropriate.

3. **CERCLIS Sites:** The Comprehensive Environmental Response, Compensation, and Liability Act Information System (CERCLIS) list identifies sites which are suspected to have contamination and require additional investigation to assess whether they should be considered for inclusion on the NPL.

4. **CERCLIS-NFRAP Sites:** CERCLIS-NFRAP status indicates that a site was once on the CERCLIS List but has No Further Response Actions Planned (NFRAP). Sites on the CERCLIS-NFRAP List were removed from the CERCLIS List in February 1995 because, after an initial investigation was performed, no contamination was found, contamination was removed quickly, or the contamination was not significant enough to warrant NPL status.

5. **Federal ERNS:** The Federal Emergency Response Notification System (ERNS) list tracks information on reported releases of oil and hazardous materials.

6. **RCRA non-CORRACTS TSD facilities:** The Resource Conservation and Recovery Act (RCRA) non-CORRACTS TSD Facilities List tracks facilities which treat, store, or dispose of hazardous waste and are not associated with corrective action activity.

7. **RCRA CORRACTS TSD facilities:** The RCRA CORRACTS TSD Facilities list catalogues facilities that treat, store, or dispose of hazardous waste and have been associated with corrective action activity.

8. **RCRA Generators:** The RCRA Generator list is maintained by the USEPA to track facilities that generate hazardous waste.

9. **Federal Institutional Controls/Engineering Controls:** The Federal Institutional Control list and Engineering Control list are maintained by the USEPA. Some Institutional Control and Engineering Control information may not be made publicly available and therefore will not be included on this registry.

10. **State and Tribal Equivalent CERCLIS Sites:** The (ASTM E 1527-13 Standard) requires searching "State and Tribal Equivalent NPL Sites." In California, the equivalent NPL is the RESPONSE database and the equivalent CERCLIS is the ENVIROSTOR database, which are maintained by the California Department of Toxic Substances Control (DTSC).

11. **State and Tribal Registered Storage Tanks:** In California, local regulatory agencies (e.g., County health departments and fire departments) and the State Water Resources Control Board (SWRCB) maintain lists of aboveground and underground storage tanks registered with those agencies (e.g., County health departments). For tribal property, the USEPA Region 9 maintains a list of underground storage tanks on Indian land.

12. **State and Tribal Landfills and Solid Waste Disposal Sites:** In California, the SWRCB in coordination with the Regional Water Quality Control Boards (RWQCB), and the Integrated Waste Management Board (IWMB) maintain lists of regulated waste disposal sites.

13. **State and Tribal Leaking Storage Tanks:** In California, the SWRCB in coordination with the RWQCBs maintains lists of Leaking Storage Tanks (LUST/LAST). The LUST/LAST lists are a listing of release sites that have an underground or aboveground storage tank listed as the source. For tribal property, the USEPA Region 9 maintains a list of leaking USTs on Indian land.

14. **State and Tribal Institutional Controls/Engineering Controls:** The USEPA maintains lists of sites with Institutional controls or Engineering controls in place. In addition, DTSC maintains a list of environmental deed restrictions.

15. **State and Tribal Voluntary Cleanup Sites:** In California, the DTSC, RWQCBs, and local regulatory agencies (e.g., County health departments) maintain lists of Voluntary Cleanup sites.

16. **State and Tribal Brownfield Sites:** In California, the DTSC maintains a list of Brownfield sites which includes any property where a redevelopment or re-use may be compromised by the presence or presumed presence of hazardous materials or petroleum.

17. Other site-specific relevant databases searched:

    - **CERS HAZ WASTE** – List of sites in the California Environmental Protection Agency (CalEPA) Regulated Site Portal which fall under the Hazardous Chemical Management, Hazardous Waste Onsite Treatment, Household Hazardous Waste Collection, Hazardous Waste Generator, and RCRA LQ HW Generator programs.

    - **CHMIRS** – California Hazardous Material Incident Report System. California Hazardous Material Incident Reporting System. CHMIRS contains information on reported hazardous material incidents (accidental releases or spills).

    - **RCRA NonGen / NLR** – RCRA - Non Generators / No Longer Regulated RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

    - **FINDS** – Facility Index System/Facility Registry System – Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

    - **ECHO** – Enforcement & Compliance History Information. ECHO provides integrated compliance and enforcement information for about 800,000 regulated facilities nationwide.

    - **San Mateo Co. BI** – San Mateo County Business Inventory list includes Hazardous Materials Business Plan, hazardous waste generators, and underground storage tanks.

    - **HAZNET** – Facility and Manifest Data. Facility and Manifest Data. The data is extracted from the copies of hazardous waste manifests received each year by the

DTSC. The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, and disposal method. This database begins with calendar year 1993.

- **HWTS** – Hazardous Waste Tracking System. DTSC maintains the Hazardous Waste Tracking System that stores ID number information since the early 1980s and manifest data since 1993. The system collects both manifest copies from the generator and destination facility.

12. References

1. Topographic Map, Montara Mountain, United States Geological Survey 7.5 minute series, 2012.

2. Haley & Aldrich, Inc., site visit conducted by Brooke Mellin on 4 December 2020.

3. Steve Nasser of Bay Properties, interview with Haley & Aldrich, 4 December 2020.

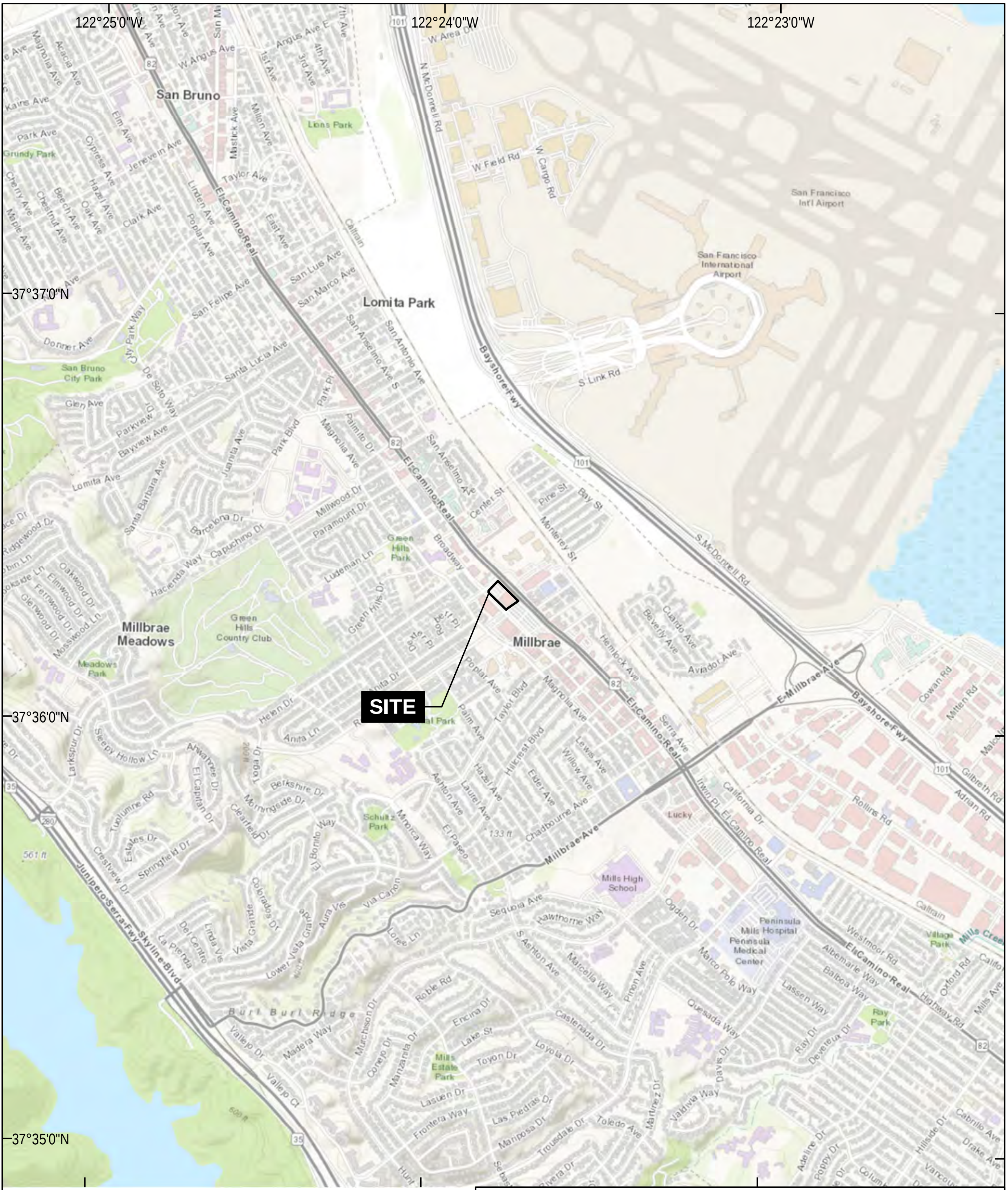
4. Environmental Data Resources, Inc., *The EDR Radius Map Report*, 30 November 2020.

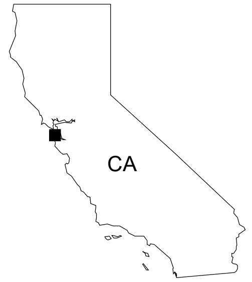
5. Pangea Environmental Services, Inc. Annual Groundwater Monitoring Report – 2019, Olympian Service Station, 1009 El Camino Real, Millbrae, California 94030, SMC-GPP Site No. 990026, APN 021-363-030, 15 November 2019.

6. Rockridge Geotechnical. Preliminary Geotechnical Investigation, Proposed Mixed-Use Building, 959 El Camino Real, Millbrae, California, 16 January 2020.

7. The Vertex Companies, Inc. (Vertex). *Phase I Environmental Site Assessment, Office Depot, 959 El Camino Real, Millbrae, California 94030*, 14 November 2019.

FIGURES





MAP SOURCE: ESRI
SITE COORDINATES: 37°36'18"N, 122°23'47"W

HALEY ALDRICH

HIGH STREET NO. CAL. DEVELOPMENT, INC.
PHASE I ESA
959 EL CAMINO REAL
MILLBRAE, CALIFORNIA

PROJECT LOCUS

APPROXIMATE SCALE: 1 IN = 2000 FT
DECEMBER 2020

FIGURE 1

GIS FILE PATH: C:\Users\lphillips\OneDrive - haleyaldrich.com\Desktop\gis_working\0200442\Global\GIS\Maps\2020_12\200442_001_0001_PROJECT_LOCUS.mxd — USER: lphillips — LAST SAVED: 12/17/2020 1:03:13 PM

LEGEND

SITE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. ASSESSOR PARCEL DATA SOURCE: SAN MATEO COUNTY
3. AERIAL IMAGERY SOURCE: ESRI

HALEY ALDRICH

HIGH STREET NO. CAL. DEVELOPMENT, INC.
PHASE I ESA
959 EL CAMINO REAL
MILLBRAE, CALIFORNIA

SITE PLAN

DECEMBER 2020

FIGURE 2

GIS FILE PATH: C:\Users\lphillips\OneDrive - haleyaldrich.com\Desktop\gis_working\0200442\Global\GIS\Maps\2020_12\200442_001_0002_SITE_PLAN.mxd — USER: lphillips — LAST SAVED: 12/17/2020 2:55:34 PM

Appendix G
Historic Resources Evaluation Report

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HISTORIC RESOURCES EVALUATION REPORT

959 El Camino Real
Millbrae, California

Prepared for:
Brian Pianca,
High Street Residential

August 2021

Broadway Market on opening day, September 4, 1952 Source: Millbrae Historical Society

Prepared by:

Brad Brewster
Brewster Historic Preservation

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(415) 519-0254
brad.brewster@brewsterpreservation.com

TABLE OF CONTENTS

Appendices

HISTORIC RESOURCE EVALUATION

1. Introduction

This historic resource evaluation report provides a review of the potential historic significance of a commercial property at 959 El Camino Real (Assessor's Parcel Number 021-364-080), in Millbrae, California. The property is bounded by El Camino Real on the east, Broadway on the west, Meadow Glen Avenue on the north, and Silva Avenue on the south. The single-story building has approximately 32,000 square feet of interior floor area on a lot that is 1.86 acres in size, including a surface level parking lot. The subject property was originally constructed in 1952 as a supermarket called *Broadway Market*, operated as a supermarket under various other names until 1997, and was extensively remodeled in 1998 when it was converted to an Office Depot. The building is currently unoccupied.

High Street Residential is seeking to develop the property for multi-family housing which would require demolition of the present structure and associated parking lot. As the proposed project would demolish a building constructed more than 45 years ago, which is the minimum age threshold for potential listing in the California Register of Historical Resources, the City of Millbrae requires an historic resource evaluation of the property as part of a development preapplication under SB330. This report is intended to address this requirement.

This report provides an architectural description of the property, a brief history of the City of Millbrae and the development of the subject property, and an evaluation of its potential historic significance under the criteria provided by the California Register of Historical Resources. Methodologies used to prepare the report included a pedestrian site survey to photograph and record the property, as well as historical research completed at the Millbrae Historical Society, the City of Millbrae, and numerous online sources.

This report was prepared by Brad Brewster, Architectural Historian and Preservation Planner with Brewster Historic Preservation, who meets the Secretary of the Interior's Professional Qualification Standards for architectural history. Mr. Brewster's professional resume is provided in **Appendix A**.

No resources located within the subject parcel have been previously evaluated as historically significant or locally designated. Only two historic resources in the City of Millbrae are listed in the Office of Historic Preservation's Built Environment Resource Directory for San Mateo County.[1] These are the Millbrae Train Station at 21 Millbrae Avenue, and the Alfred F. Green

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[1] Office of Historic Preservation, *Built Environment Resources Directory*, San Mateo County, Available online at https://ohp.parks.ca.gov/?page_id=30338, Accessed February 27, 2021.

House at 1 Lewis Avenue, both of which are listed on the National Register of Historic Places and the California Register of Historical Resources. These historic resources are located between 3,850 feet and 3,250 feet southeast, respectively, from the subject property. Finally, the property is not located within or near a designated historic district.

2. Building and Property Description

The following provides an architectural description of the current elevations, ornamentation, finishes, and visible alterations of the exterior of the property at 959 El Camino Real. The property description is based on a pedestrian site survey which occurred on March 1, 2021. The site visit included photographing the subject property, shown in **Figures 1 – 11**, and surrounding properties, shown in **Figures 12 – 15,** on the following pages.

Completed in 1952 with alterations in 1998, the subject property at 959 El Camino Real is a single-story commercial building with approximately 32,000 square feet of interior space on a 1.86-acre lot. Construction type is poured, reinforced concrete with concrete walls and expressed concrete columns supporting a wood frame bowstring truss roof clad in asphalt shingles, with a concrete slab foundation. The primary roof form is a barrel arch, with a secondary flat roof form. Exterior siding is primarily painted concrete, except for the east elevation which has a painted stucco cornice and tiled columns, and smaller portions of the north and south elevations which have stucco canopies.

The north elevation which faces a surface parking lot contains the primary entry to the building. The entry consists of automatic sliding aluminum frame commercial doors beneath a stucco-clad canopy. The canopy is supported by a row of four cylindrical concrete columns which run about half of the length of the north elevation. The canopy supports a large wall of mirrored glass above the entry and on the northeast end of this elevation. Centered above the entrance and behind the wall of mirrored glass stands a 60-foot-tall monument sign which is clad in scored stucco and has a curve at the top-right corner. The remainder of the north elevation consists of painted concrete walls with expressed concrete columns lacking any fenestration.

The east elevation which faces El Camino Real consists of a row of aluminum frame commercial windows set within a series of square pillars clad in painted tile. Aluminum frame spandrel panels fill the area between the window sills and the terrazzo base. At the approximate center of this elevation is a scored stucco wall which rises above the cornice. The cornice itself has a slight outward angle and is also clad in stucco.

The south elevation contains a secondary entrance, which is similar to the primary entrance on the north elevation, but at a smaller scale. This entrance consists of automatic sliding aluminum frame commercial doors beneath a stucco-clad canopy supported by one cylindrical concrete column. A smaller-scale wall of mirrored glass is centered over this secondary entrance. The remainder of the south elevation consists of painted concrete walls with expressed concrete columns lacking any fenestration. A stucco-clad trash enclosure is located near the western end of this elevation.

The west elevation consists of painted concrete walls with expressed concrete columns devoid of fenestration. This elevation also contains a service bay with associated truck ramp, a stucco-clad cement wall, and metal railings.

The architectural style of the subject property is Mid-Century Modern, exhibited by its barrel arch roof, expressed structural columns, monument sign, row of aluminum frame commercial windows, its rectilinear, geometric forms, and overall lack of architectural embellishment. A more contemporary style exhibited by the cylindrical concrete columns supporting a stucco-clad canopy with walls of mirrored glass over the front and rear entries was added to the building in the late 1990s.

Figure 1. North elevation, view looking south. Primary entrance on left, and associated parking lot in foreground.

Figure 2. Primary entry detail, view looking southeast.

Figure 3. North and east elevations, view looking southwest across El Camino Real

Figure 4 East elevation, view looking west across El Camino Real.

Figure 5. Detail of east elevation aluminum frame windows and stucco cornice, view looking southeast.

Figure 6. Rear (south) elevation, view looking north. Secondary entrance on right.

Figure 7. Detail view of secondary entrance on rear (south) elevation, view looking northwest.

Figure 8. South and west elevations, view looking northeast.

Figure 9. West elevation, view looking east.

Figure 11. Detail view of loading bay and truck parking ramp, view looking south.

Figure 10. North and west elevations, view looking southeast.

Figure 12. Context view of commercial buildings opposite El Camino Real from subject property, view looking southeast.

Figure 13. Context view of the intersection of El Camino Real and Meadow Glen Avenue, view looking northeast.

Figure 14. Context view of commercial buildings along Broadway opposite from the subject building, view looking northwest.

Figure 15. Context view of commercial buildings along Broadway and Meadow Glen Road opposite from subject building, view looking north across parking lot.

Visible Alterations

Visible alterations include the revisions to the front and rear entrances with the replacement automatic sliding aluminum frame commercial doors beneath a stucco-clad canopies supported by cylindrical concrete columns and walls of mirrored glass. Other visible alterations include the row of aluminum frame commercial windows, revisions to the stucco-clad cornice, and the infilling of the original entry with scored stucco, all on the east elevation. Other alterations include the loading bay and truck ramp addition on the west elevation, and the trash enclosure on the south elevation.

3. Historic Context

History of the City of Millbrae

Except where noted, the following history of the City of Millbrae was provided by the Millbrae Historical Society as part of a brochure entitled *Millbrae History Walk, A Project of the Millbrae Historical Society* (undated).

Jose Antonio Sanchez, Jr., a Spanish soldier born in 1774, served at the Presidio of San Francisco for 45 years. As a reward for his years of loyal service, Mexican Governor of California Louis Arguello granted Sanchez a 14,600-acre area known as *Rancho Buri Buri*, stretching from present-day South San Francisco to Adeline Drive in Burlingame. After Sanchez's death in 1843, two of his sons, Jose and Manuel de la Cruz, inherited most of the land that makes up Millbrae. Jose de la Cruz Sanchez inherited the 1,500 acres bounded by present-day Millbrae Avenue, El Camino Real, Skyline Boulevard, and Adeline Drive. When Sanchez lost the land due to a bad debt, it was sold at auction to James Wilson for $1,000. Wilson resold the property to gold rush entrepreneur Darius Ogden Mills in 1860 for $20,000.

In 1863, Mills donated a portion of his land to the Southern Pacific Railroad, which constructed a depot in Millbrae and established train service to transport both passengers and freight to and from San Francisco along the Peninsula. Mills also built an estate on his property, featuring a spacious mansion, conservatory, carriage house, elaborate gardens, and rolling hills filled with grazing dairy cattle. He named his estate Millbrae, combining his name (Mills) with the Scottish word for "rolling hills" (brae). Mills established the Millbrae Dairy along El Camino Real to supply milk and income for his estate. Darius Ogden Mills died in Millbrae on January 3, 1910.

The oldest surviving house in Millbrae is the Alfred F. Green House at 1 Lewis Avenue, built in 1865 for Mr. Green and his wife Mary, who moved to Millbrae from San Bruno. Green ran the dairy operations for the Millbrae Dairy in partnership with Darius Ogden Mills for 20 years. For a time in the late 1800s, the dairy was the primary source of employment in Millbrae. Green managed the Mills estate whenever Mr. Mills was away from home for an extended period. He also supervised the construction of the Crystal Springs Dam in San Mateo. Alfred Green was also a successful politician, serving on the San Mateo County Board of Supervisors for thirty years and elected to a single term in the State of California legislature. Alfred Green died in January 1919.

Millbrae remained a small town through the 1920's, with most residential development concentrated in the Millbrae Villa subdivision, created in 1889 to the north of the Mills Estate. An expansion came in 1927 with the establishment of the 280-acre Millbrae Highlands subdivision. A 1931 vote for incorporation failed to win approval. Lacking a municipal government, the residents formed the Millbrae Civic Club, which maintained the train depot, provided garbage collection service, created a volunteer fire department, arranged for local schools, and secured telephone service for the area.

The incorporation debate waged on during the 1930s and 40s, with various proposals made and defeated. Much of the debate centered on a battle between Millbrae residents and the City of Burlingame over the annexation of the land constituting the Mills Estate. Millbrae property owners signed an incorporation petition and submitted it to the County Clerk on in 1946, but when the petition was approved and an election date was set by the County Board of Supervisors, the City of Burlingame filed suit to nullify the incorporation resolution. After a legal battle that last for two and a half years and carried all the way to the California Supreme Court, the City of Millbrae was officially incorporated on January 14, 1948.

The City of Millbrae grew rapidly in the Post-War period, with new subdivisions built in the eastern portions of the city, and many new commercial stores and offices were established along El Camino Real, the City's main commercial thoroughfare. In the 1950s, Millbrae residents united to resist efforts to divide the city by the planned Junipero Serra Freeway which was originally routed parallel to Junipero Serra Boulevard, but was later rerouted through a canyon in San Bruno up to Skyline Boulevard.

From the start of the 20th century, San Francisco MUNI's #40 interurban streetcar traveled through Millbrae, linking the city with San Francisco and San Mateo. Millbrae's high school students rode the streetcar to attend Burlingame High School until Capuchino High School opened on September 11, 1950. The streetcar line was dismantled just after Millbrae's incorporation, leaving the Southern Pacific Railroad as the only railway linking Millbrae with surrounding areas.

The Sixteen Mile House, built in 1872 at the intersection of El Camino Real and Center Street, was a Millbrae landmark along the railroad route. The unsuccessful local effort to save the Sixteen Mile House from demolition in 1970 led to the birth of the Millbrae Historical Society and eventual successful crusades to save the Millbrae train station which now houses the Millbrae Historical Museum. Both the Alfred F. Green House and the Millbrae Train Station are listed in the National Register of Historic Places. [2]

History of the Subject Property

The subject property at 959 El Camino Real was undeveloped open space with wild grasses and relatively flat topography until the middle of the Twentieth Century. Historic aerial photography from 1946, as well as historic Sanborn Fire Insurance Company map of Millbrae from 1949, show only a small, single-story office existed near the corner of El Camino Real and Meadow Glen Avenue, surrounded by open fields and the adjacent El Camino Real, which was only two lanes wide at the time. The present-day Broadway street and the lots immediately surrounding it between El Camino Real on the east and Magnolia Avenue on the west had been subdivided by 1949 with the anticipation that the area would be developed into commercial ventures with large surface parking lots and easy accessibility from El Camino Real.

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[2] The Millbrae Train Station was added to the National Register of Historic Places in 1978. The original depot was destroyed by fire in 1890, and the replacement depot burned down in 1906. The current depot was constructed in 1907, although it has been relocated several hundred feet from its original location, and is now located at 21 Millbrae Avenue.

The subject property was owned by Dr. Richard J. and Argent Nasser since at least 1940. See discussion of the Nasser Family, below. Around 1950, the Nasser's leased the property to two brothers, William and Michael Bouskos, who wanted to develop a supermarket on the subject property that would be their second of such businesses on the Peninsula. The Bouskas brothers opened their first grocery store in San Francisco in 1942, and by 1950, they had a total of four stores there and one in Redwood City.[3]

In late 1950, the San Mateo architectural firm of Irving Caster and L.F. Robinson was engaged to design a Modern, 32,000-square-foot, single-story supermarket with generous surface parking, easy accessibility just off El Camino Real and south of Meadow Glen Avenue, and a 60-foot-tall monument sign visible to motorists along the city's main thoroughfare. Architectural drawings were completed in November, 1950, and revised in January of 1952.[4]

Details visible on the original architectural drawings indicate the monument sign and the entrance on El Camino Real were clad in porcelain enamel metal panels, while the remainder of the exterior elevations consisted of stucco cladding or concrete panel walls. A selection of the architectural plans are provided in Figures 16 – 18.

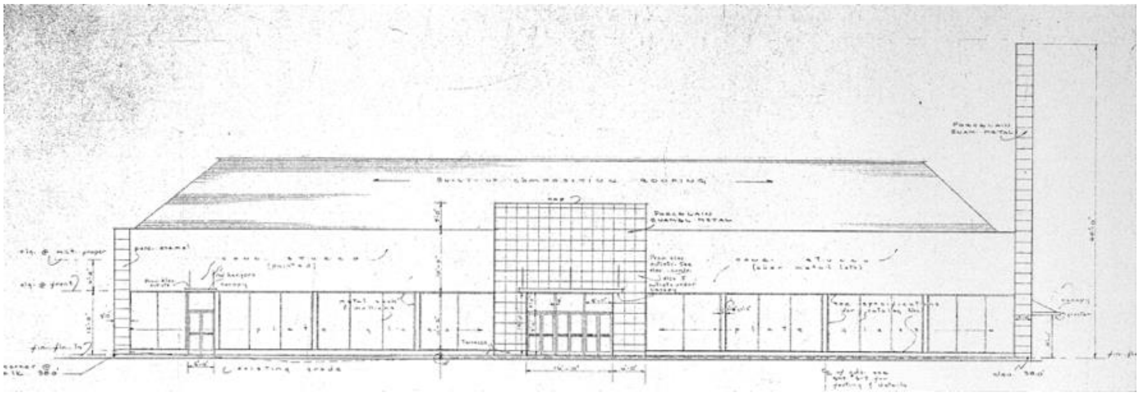

Figure 16. Architectural Elevation, East-Facing Facade, Broadway Market, 1952. Source: Irving Caster and L.F. Robinson, Broadway Market, Architectural Plans, Elevations, Sections, and Details, as revised January 30, 1952.

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[3] "Bouskos to Open Broadway Market," *San Mateo Times*, September 3, 1952.

[4] Irving Caster and L.F. Robinson, *Broadway Market*, Architectural Plans, Sections, Elevations, and Details, as revised January 30, 1952.

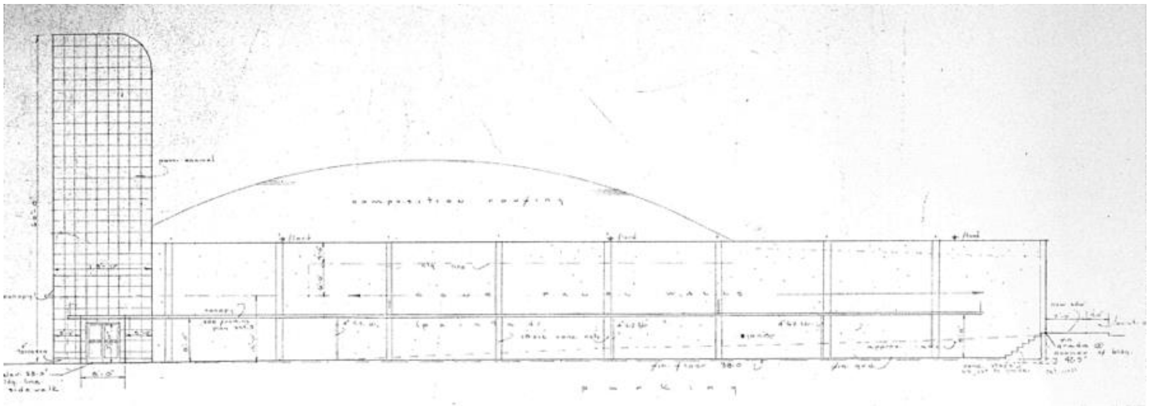

Figure 17. Architectural Elevation, North-Facing Facade, Broadway Market, 1952. Source: Irving Caster and L.F. Robinson, Broadway Market, Architectural Plans, Elevations, Sections, and Details, as revised January 30, 1952.

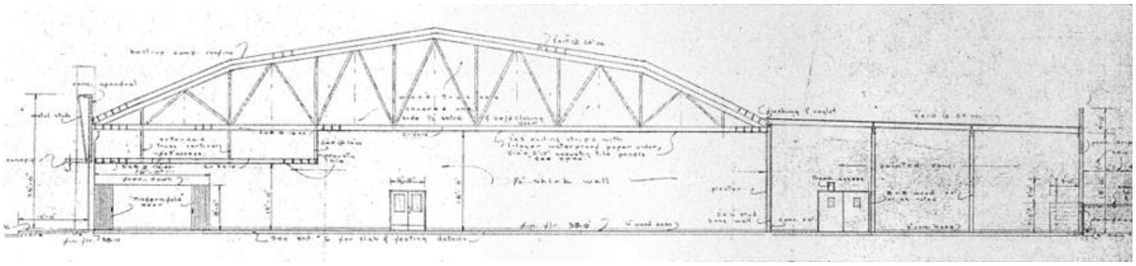

Figure 18. Architectural Section, Broadway Market, 1952. Source: Irving Caster and L.F. Robinson, Broadway Market, Architectural Plans, Elevations, Sections, and Details, as revised January 30, 1952.

In February, 1952, the City of Millbrae issued a building permit to construct the new supermarket at a cost of $150,000.[5] Demolition of the small office building, site grading, and construction of the new store began soon thereafter, and was completed about seven months later in September, 1952. A photo of the building on opening day in 1952 is provided in Figure 19.

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[5] City of Millbrae, Building Inspection Department, Application for Building Permit, *959 El Camino Real*, Permit 969, issued February 19, 1952.

Figure 19. Broadway Market on Opening Day, September 4, 1952. Source: Millbrae Historical Society

The new supermarket, called *Broadway Market*, opened with much anticipation. As noted in the San Mateo Times:

> Tomorrow will herald the opening of Millbrae's new Broadway Market, embodying the latest word in shopping appeal and efficiency, completed with parking for 300 cars. Open seven days a week, it will be maintained by a staff of 50 experienced employees, and will feature a large, self-service meat department staffed by 20 employees. Fully equipped, it will offer a complete selection of the finest meats and variety of delicatessen items which occupies the entire south wall of the market. Another feature will be the stress on fresh produce, delivered daily, and a self-service bakery department offering fresh pastry, hot from the oven each morning. New, modern checking stands have been designed to speed service. Of particular interest to busy mothers will be the special kiddie corral furnished with small tables, and chairs, a television set, and plenty of good reading material to amuse the youngsters while mother shops.[6]

At the time, the main entrance to the supermarket was centered on its east-facing façade along El Camino Real, with a smaller entrance on the north side directly beneath the monument sign and facing the parking lot. The supermarket continued under the name *Broadway Market* until 1960 when the name was changed to *Continental Market*. Aside from new signage, few other physical changes to the building occurred at this time, and the Bouskos brothers continued to operate the store during this period. Two aerial photos of *Continental Market* taken in 1962 are shown in Figure 21 and 22, and a newspaper advertisement published in 1963 showing a rendering of the building is provided in Figure 23.

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[6] "Bouskos to Open Millbrae Market," San Mateo Times, September 3, 1952.

Figure 20. Aerial Photography of Millbrae Looking West, June, 1962. Continental Market at center. Source: Millbrae Historical Society via San Francisco Transportation Commission.

Figure 21. Aerial Photography of Millbrae Looking East, June, 1962. Continental Market at bottom-center, SFO in the distance at top-center. Source: Millbrae Historical Society via San Francisco Transportation Commission.

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THURS. AND FRI. 8 A.M. TO 10 P.M.
Sat. 8 A.M. to 8 P.M.

Figure 22. Newspaper Advertisement of the Continental Market on El Camino Real, March 21, 1963. Source: San Mateo Times

In May 1963, the Bouskos brothers sold the business for $1,000,000 to Quality Foods Inc. (QFI), which at the time was the Bay Area's largest independent retail food chain with a total of six markets, four in San Francisco, one in South San Francisco, and one in San Mateo. With the purchase of the supermarket on the subject property, QFI operated a total of seven stores with a projected annual sales totaling more than $30,000,000.[7] A photo of *QFI* from 1963 is provided in Figure 23. At the time of the purchase by QFI in 1963, the adjacent Richmond Square Shopping Center on Broadway was under construction.[8] The store transitioned without interruptions from *Continental Market* to *QFI* on June 3, 1963, and Norman Gotelli, who was an 18-year veteran of QFI, was assigned as its manager.[9] The supermarket continued to be operated by *QFI* for another 34 years, from 1963 to 1997. A photo of *QFI* from c.1988 is provided in Figure 24.

Figure 23. QFI Market, December 5, 1963. Source: Millbrae Historical Society via Millbrae Sun.

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[7] "QFI Buys Continental Market," *San Mateo Times*, May 27, 1963.
[8] Ibid.
[9] "New Manager for QFI," *San Mateo Times*, June 24, 1963.

Figure 24. QFI Market, circa 1988. Source: Millbrae Historical Society via Millbrae Sun.

In March, 1997, the property was sold from the Estate of Richard J. and Argent Nasser to Bay Properties, Inc., which leased the property to Office Depot, a commercial office supply retailer.[10] In July, 1997, Bay Properties applied to the City of Millbrae for a building permit to remodel the interior and exterior of the building and reconstruct the parking lot at a cost of $800,000, with Flag Construction of Kent, Washington, named as the builder.[11] The permit was granted in November, 1997, and final inspection of the work was approved in May, 1998.[12]

Office Depot was founded in 1986 and opened its first store in Fort Lauderdale, Florida, in 1987. By 1990, Office Depot had 173 stores in 27 states. By 1998, the year the store opened at the subject property, Office Depot had opened a number of stores internationally, had merged with Viking Office Products, and launched its website. In 2013, Office Depot merged with Office Max, and today operates over 1,400 stores worldwide.[13]

Substantial alterations to the building were completed in 1998 to convert the former supermarket into an Office Depot. In addition to the complete demolition of the interior of the building and the construction of an all-new interior, the exterior was altered when the east elevation facing El Camino Real received a series of new aluminum frame commercial windows, a revised stucco-

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[10] Haley & Aldrich, Inc. *Report on ASTM Phase I Environmental Site Assessment, 959 El Camino Real*, Chain-of-Title, February, 2021.

[11] City of Millbrae, Community Development Department Building Permit Application, *959 El Camino Real, Permit 9711-002*, November 3, 1997.

[12] City of Millbrae, Inspection Summary Report, *959 El Camino Real*, May 15, 1998.

[13] Office Depot Company History, available online at www.officedepot.com, Accessed March 2, 2021.

clad cornice, and the closure of the former main entrance and in-filling of this space with scored stucco cladding. The secondary entrance on the north elevation was expanded with new, aluminum frame automatic sliding doors to become the primary entrance to the store, while a new, secondary entrance was installed on the south elevation with a smaller set of aluminum frame sliding doors. Both the primary entrance on the north elevation and the secondary entrance on the south elevation received new architectural treatments in the form of a series of painted, cylindrical concrete columns supporting stucco-clad canopies with walls of mirrored glass above. The primary north entrance received a larger version of this architectural treatment with a row of four columns, a longer canopy, and an elongated wall of mirrored glass above, while the secondary south entrance received a smaller version with only one column, a shorter canopy, and a narrower and shorter wall of mirrored glass above. The original monument sign structure was retained, but was reskinned in scored stucco, and received new signage at the top reading *Office Depot*. New signage was also erected on directly over the north- and south-facing entrances and along the east-facing cornice. A new delivery ramp and receiving bay was added to the west elevation, a trash enclosure was installed on the south elevation, and the barrel arch roof was seismically strengthened and reclad in asphalt shingles.

Office Depot operated at the subject property for 22 years, from June, 1998 to November, 2020. Two photos of the property taken in 2014 when it was operating as Office Depot are provided in Figures 25 and 26. The property is currently vacant, and all exterior signage has been removed.

Figure 25. Office Depot, 2014. Source: Google Maps, Streetview.

Figure 26. Office Depot, 2014. Source: Google Maps, Streetview.

Nasser Family and Nasser Brothers Theaters

The subject property was owned by Dr. Richard J. and Argent Nasser when *Broadway Market* was built in 1952. Richard John Nasser was born in Syria in 1892, and was one of five brothers, all of whom immigrated to the United States with their parents in 1901 and settled in San Francisco's Castro neighborhood.[14] In 1907, the family was living above their candy-making factory and grocery store when the young Nasser brothers decided to convert the family business into a small theater by projecting movies onto the back wall. In 1910, the brothers' new theater business, now called Nasser Brothers Theaters, built a 600-seat theater at 485 Castro Street (today the location of Cliff's Variety). Business boomed at the new Castro Street address in the 1910s, and by 1922, the brothers expanded into the 1875-seat Castro Theatre at few doors down at 429 Castro Street. The brothers hired San Francisco architect Timothy Pfleuger to design the elaborate interior with Egyptian and Moorish themes and a Spanish Colonial style exterior facade. Nasser Brothers Theaters grew into an expansive movie house empire in the 1920s and 1930s, eventually owning the Alhambra on Polk Street, the New Mission, and at one point Oakland's grand Paramount Theater, in addition to their flagship theater on Castro Street. The family continued running the Castro Theater from 1922 through 1976, when the operation was leased by Mel Novikoff's Theater Company. In 2001, the Nasser's took back operations of the Castro Theatre, and the family continues to own and operate it to this day.[15]

Although Richard Nasser was initially trained as a dentist and worked in the field in the 1920s and 1930s, by 1940 he identified himself as an 'independent theater exhibitor' in the US Census of that year. By this time, he was married to Argent, who was born in Washington State in 1914, but spent her youth in Beirut, Lebanon. In the 1940s and early 1950s, the couple lived at 198

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[14] *Richard Nasser Family Tree*, available online at: www.Ancestry.com, Accessed March 3, 2021.

[15] Alex Bevk, *The Epic History of the Castro Theatre, a San Francisco and LGBTQ Landmark*, 1916. Available online at: https://sf.curbed.com/2016/6/22/12004316/san-francisco-pride-castro-theater-history-pictures, Accessed March 3, 2021. Also - *The History of the Castro Theater*, Available online at: https://www.castrotheatre.com/history.html, Accessed March 3, 2021.

Miraloma Drive in San Francisco with their son, Donald. By 1955, Richard and his two brothers, Mitchell and Albert, had split with Nasser Brothers Theaters and started Nasser Candy Company, which was located at 65 Page Street in San Francisco, with another candy store in San Mateo. By the mid-1950s, Richard and Argent Nasser were living in Hillsborough. Nasser Brothers Theaters was owned and operated from about this time forward by Henry and Elias Nasser.[16]

In addition to movie theaters, the Nasser family owned a variety of other commercial, as well as residential, properties in San Francisco and on the Peninsula, including the subject property, which they owned since at least 1940 to 1997. Richard Nasser died in 1988, after which the subject property was owned by the Estate of Dr. Richard J. and Argent Nasser. Argent Nasser, who was involved in numerous local and international charities, died in 2001.[17]

4. Architect/Designer/Builder

The original building plans for the subject property from 1950-1952 indicate that it was designed by the San Mateo-based design firm of Irving Caster, an architectural designer and draftsman, with L.F. Robinson & Associates as consulting structural engineer. Irving Caster was born in Saint Louis, Missouri in 1914 and attended Saint Louis University where he studied architectural design and drafting. In 1940, he was married to Maxine Epstein (1916 - 1976), and the couple lived first in Beverly Hills before settling in San Mateo County around 1945. By 1952, the couple was residing at 1610 Albemarle Way in Burlingame, and Caster identified himself as an ‘architectural designer and draftsman’ working in his own firm located at 126 West 25th Avenue in downtown San Mateo. By the mid-1960s, Irving and Maxine Caster were residents of Menlo Park. Maxine died in 1976, and Irving remarried in 1985 at the age of 70. Irving Caster died in 1992 at the age of 77. Both Irving and Maxine Caster are buried in the Salem Memorial Park and Garden, a Jewish cemetery in Colma, California.[18] Little is known about the work of Irving Caster. Aside from designing the subject property, Caster also designed the Art Deco-style façade of the *Carlos Club* at 612 El Camino Real in San Carlos in 1947, the Modern-style *Hillsdale Inn* at 477 East Hillsdale Boulevard in San Mateo in 1962, and a Modern-style residence in Menlo Park in 1965 (likely his own).[19] It appears that Caster was most active as a San Mateo-based designer and draftsman between the mid-1940s and the mid-1960s, and worked in the Art Deco/Art Moderne and Modern architectural styles that were popular during the period.

Very little is known about the work of L.F. Robinson & Associates. Aside from the subject property where they likely designed the open-span truss roof system, L.F. Robinson & Associates were the consulting structural engineers on Phase III of the Golden Gateway Redevelopment Project in San Francisco in 1978.[20] The builder of the property is unlisted in the original building permit from 1952, and therefore is unknown.

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[16] *Richard Nasser Family Tree*, available online at: www.Ancestry.com, Accessed March 3, 2021.
[17] Ibid.
[18] *Irving Caster Family Tree*, available online at: www.Ancestry.com, Accessed March 3, 2021.
[19] *The Architectural Index for 1965*, published by Irvin J. Bell, Architect, 1965.
[20] *The Architectural Index for 1978*, published by Irvin J. Bell, Architect, 1978.

5. California Register Significance Evaluation

The following provides an evaluation of the subject property for its potential individual significance for listing in the California Register of Historical Resources (CRHR) by applying criteria 1 through 4.

Evaluation of Individual Significance

Criterion 1 (Associations with Historic Events)

There is no information found as a result of this HRE to indicate that the subject property is associated with events that have made a significant contribution to the broad patterns of local or regional history or the cultural heritage of California or the United States from an individual standpoint. Completed in 1952, the subject property was built as a supermarket during a period of rapid commercial and residential growth not only in Millbrae but throughout the San Francisco Bay Area during the post-war period (1945 – 1970) as these areas became easier to access by private automobile with an expanding roadway network. Although the construction of the property is broadly associated with the period of post-war expansion of Millbrae, the subject property itself completed in 1952 and with later modifications does not appear to be a singular or important event within this context. When it opened in 1952, *Broadway Market* was one of six markets operated by the Bouskos Brothers in the Bay Area, and by 1963 when it was acquired by *QFI*, it was one of seven this company operated in the Bay Area. There is little information to indicate that the operation of a supermarket at the subject property would be considered particularly important in the commercial or economic history of the City of Millbrae, the State of California, or the Nation. Rather, the construction of the property appears to be more typical of commercial development in this location along El Camino Real during the post-war period. For these reasons, the subject property at 959 El Camino Real does not appear eligible for listing under Criterion 1 as an individual resource.

Criterion 2 (Associations with Historic Persons)

There is no information found as a result of this HRE to indicate that the building at 959 El Camino Real is directly associated with persons important to local or state history. The property was owned by Richard J. and Argent Nasser from at least 1940 to 1997, and is distantly associated with Nasser Brothers Theaters, one of San Francisco's oldest movie-business families which ran an expansive movie house empire beginning around 1910. As a supermarket enterprise in Millbrae, however, the subject property is not directly associated with Nasser Brothers Theaters, but appears to have been one of many real estate ventures the family was involved in not only in San Francisco but also on the Peninsula. Richard J. Nasser, in particular, had split with his theater-owning brothers in the 1950s to form Nasser Candy Company, with stores in San Francisco and San Mateo. As such, the subject property has only minimal ties to the more well-known Nasser Brothers Theaters. The subject property is also associated with the Bouskos Brothers, who established *Broadway Market* on the site in 1952. Little information about the Bouskos Brothers is available other than they started their business in San Francisco in 1942, and by 1952 with the opening of *Broadway Market*, they had a total of six supermarkets in the Bay Area, including one on the Peninsula in Redwood City. Although they established *Broadway Market* on the subject property, the Bouskos Brothers would not be considered particularly important to local or state history. For these reasons, the subject property at 959 El Camino Real does not appear eligible for listing under Criterion 2 as an individual resource.

Criterion 3 (Architecture and Design)

There is no information found as a result of this HRE to indicate that the property at 959 El Camino Real would be individually significant for its architecture, as expressed by intact stylistic features, forms, or construction methods. The subject property was completed in 1952 in a Mid-Century Modern style of architecture, exhibited by its barrel arch roof, expressed structural columns, 60-foot-tall monument sign, the row of aluminum frame commercial windows on its east elevation, its rectilinear, geometric forms, and overall lack of architectural embellishment. The building would not be considered the embodiment of this style of architecture, but rather a more typical or standard application of the style for a commercial supermarket constructed during the post-war period on the San Francisco Peninsula.

Alterations to the exterior of the property which were completed in 1998 to convert the supermarket into an Office Depot, including expansions to the front and rear entrances with replacement automatic sliding aluminum frame commercial doors beneath stucco-clad canopies supported by cylindrical concrete columns with walls of mirrored glass above, replacement aluminum frame commercial windows, revisions to the stucco-clad cornice, and the infilling of the original entry with scored stucco on the east elevation, as well as the loading bay and truck ramp addition on the west elevation, have substantially altered the building’s physical integrity to the extent where it would no longer be considered a good representation of the Mid-Century Modern style of architecture.

The subject property was designed in the early 1950s by Irving Caster, a San Mateo-based architectural designer and draftsman, who was active on the San Francisco Peninsula from the mid-1940s to the mid-1960s. Aside from the subject property, Caster is known to have designed only a handful of other buildings or façade remodelings in the Art Deco/Art Moderne and Modern styles, and would not be considered a master architect, designer, or craftsman. The consulting structural engineer on the project was L.F. Robinson & Associates, a San Francisco-based engineering firm, of which even less is known. The builder of the subject property is unknown as it is unlisted on the original building permit. For these reasons, the property at 959 El Camino Real would not be considered individually eligible for listing under Criterion 3.

Criterion 4 (Information Potential)

Criterion 4 refers to a property’s information and research potential in terms of its historic or prehistoric values. There is no information found as a result of this HRE to indicate that the subject property would yield information important to history or prehistory, or is an example of a particularly rare construction type.

Historic Districts

The subject property is not located within or near a designated historic district, nor does it appear to contribute to any potential historic districts in the region under any applicable CRHR criteria.

6. Conclusion

No resources located within the subject parcel have been previously evaluated as historically significant or locally designated. Although the property at 959 El Camino Real meets the minimum age threshold for potential eligibility, it does not appear to be individually eligible for listing in the California Register of Historical Resources because it does not meet any of the criteria required for a finding of individual historic significance. As described above, the subject property is not located within or near a designated historic district, nor does it appear to contribute to any potential historic districts in the region under any applicable CRHR criteria. Because the building would not meet the definition as a 'historical resource,' its potential demolition and replacement with a residential development would not be considered a significant impact under the California Environmental Quality Act (CEQA).

7. References

Alex Bevk, *The Epic History of the Castro Theatre, a San Francisco and LGBTQ Landmark*, 1916. Available online at: https://sf.curbed.com/2016/6/22/12004316/san-francisco-pride-castro-theater-history-pictures, Accessed March 3, 2021.

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Office of Historic Preservation, *Built Environment Resources Directory* (BERD), San Mateo County, Available online at: https://ohp.parks.ca.gov/?page_id=30338, Accessed February 27, 2021.

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Sanborn Fire Insurance Company Map, *Millbrae*, 1949.

Architectural Plans

Irving Caster and L.F. Robinson, *Broadway Market,* Architectural Plans, Elevations, Sections, and Details, as revised January 30, 1952.

Newspaper Articles or Advertisements

"Bouskos to Open Broadway Market," *San Mateo Times*, September 3, 1952.

"QFI Buys Continental Market," *San Mateo Times*, May 27, 1963.

"New Manager for QFI," *San Mateo Times*, June 24, 1963.

"Continental Market on El Camino Real," *San Mateo Times, March 21, 1963.*

Historic Photos

Millbrae Historical Society

Broadway Market on Opening Day, September 4, 1952.

Aerial Photography of Millbrae Looking West, June, 1962, and *Aerial Photography of Millbrae Looking East, June, 1962* (via San Francisco Transportation Commission)

QFI Market, December 5, 1963 (via Millbrae Sun)

QFI Market, circa 1988 (via Millbrae Sun)

Google Maps, Streetview, *959 El Camino Real,* 2014. Available online at: www.Google.com, Accessed March 4, 2021.

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APPENDIX A

Preparer's Qualifications

W. Brad Brewster

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SUMMARY OF PROFESSIONAL EXPERIENCE

Brewster Historic Preservation, San Francisco, CA *January 2017 - Present*
Principal and Founder

- Consulting architectural historian and preservation planner, preparing historic architectural evaluations and multi-property surveys under CEQA and NEPA/Section 106 for public and private clients in the Bay Area.

Environmental Science Associates (ESA), San Francisco, CA *September 2004- August 2016*
Senior Architectural Historian, Manager

- ESA's Senior Architectural Historian and Manager within the Bay Area Cultural Resources Group
- Specializing in historic architectural resource surveys and evaluations under CEQA and NEPA/Section 106
- HABS/HAER documentation specialist
- Significant marketing goals and management responsibilities

Carey & Co. Inc., Architects, San Francisco, CA *February 2003 – September 2004*
Senior Project Manager, Preservation Planning

- Senior Project Manager for historic preservation products under CEQA and NEPA
- Specializing in historic building surveys and evaluations, as well as cultural resource sections under CEQA and NEPA/Section 106
- Experience with implementing mitigation measures, such as historic documentation (HABS/HAER) and public interpretation efforts
- Experience managing architects, architectural historians and materials conservators
- Significant marketing responsibilities

EIP Associates, San Francisco, CA *March 2001 - February 2003*
Senior Project Manager, Environmental Planning

- Senior Project Manager for environmental review documents under CEQA and NEPA
- Specializing in EIRs for large and complex urban in-fill projects in San Francisco and the Bay Area
- Experienced in managing large project teams with numerous subconsultants and accelerated schedules
- Specific expertise in historic-architectural resources
- Extensive marketing experience, including managing and writing proposals, attending interviews

EDAW, Inc. San Francisco, CA and Seattle, WA *July 1996 – January 2001*
Project Manager, Environmental Planning

- Managed numerous EIRs under CEQA for various municipalities and private developers, as well as EISs under NEPA for various federal agencies (DoD, BLM, FERC, etc.)
- Specializing in historic architectural resource surveys and management/treatment plans, Section 106 review
- Directly involved with proposal writing and other major marketing efforts

The Bentley Company, Moffett Field, CA *March 1993 – June 1994*
Environmental Planner

- Contract Planner for NASA Ames Research Center (now NASA Research Park) at the former Moffett Naval Air Station
- Co-author of the *Moffett Field Comprehensive Use Plan* to guide NASA development at Moffett Field

Brady and Associates (now LSA), Berkeley, CA *July 1992 – March 1993*
Environmental Planner

- Contributed significantly to numerous Initial Studies and EIRs for California cities and counties
- Wrote various general plan elements for California communities

EDUCATION

1994- 1996	Master of Urban Design and Planning, with Certificates in Urban Design and Historic Preservation, University of Washington, Seattle, WA
1987-1992	Bachelor of Science in City and Regional Planning California Polytechnic State University, San Luis Obispo, CA

AFFILIATIONS

California Preservation Foundation (CPF)
National Trust for Historic Preservation (NTHP)
Society of Architectural Historians (SAH)

CITY OF MILLBRAE

ERRATA TO CEQA ANALYSIS FOR THE 959 EL CAMINO REAL PROJECT

June 22, 2022

959 El Camino Real (APN: 021-364-080)

Planning Application #2021-74

The following changes are made to the CEQA Analysis. Additions are shown in underline and deletions are shown in ~~strikethrough~~.

Page #	Para. #	Text Change
3-30	5	The project construction activities would generate DPM and PM2.5. Existing nearby DPM and PM2.5 sources within 1,000 feet of the site, along with the project, could contribute to a cumulative health risk for existing and future sensitive receptors adjacent to and within the project site. The combined risks from construction and ambient sources are summarized in Table ~~10~~ 3-14.
3-30	6	As shown in Table ~~10~~ 3-14, the combined PM2.5 concentration from project construction and ambient sources would not exceed the BAAQMD cumulative thresholds. Therefore, the project's contribution is considered ***less than cumulatively considerable***.
3-33	4	Because of potential groundwater concerns onsite, the project ~~would~~ could be required to coordinate with the San Mateo County Department of Public Health. Compliance with existing regulations would ensure that the project's potential impact related to groundwater would be reduced to a ***less-than-significant*** level.
4-1	4	The following projects have been approved, are currently under construction, or have been proposed to the City within 1 mile of the project site (the number of units associated with each project is identified in parentheses): • 150 Serra Avenue – mixed-use development (488 units) • 1100 El Camino Real – residential development (384 units) • 480 El Camino Real – mixed-use development (9 units) • 1301 Broadway – residential development (99 units) • 230 Broadway – mixed-use development (6 units) • 97 Broadway – residential development (83 senior living rooms)