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PUBLIC NOTICE

Availability of Draft Environmental Impact Report for San Francisco Overlook Development Residential Project Planning Department Case No. 2004.0093E State Clearinghouse No. 2003122131

A Draft Environmental Impact Report (EIR) has been prepared by the San Francisco Planning Department in connection with this project. The report is available for public review and comment on the Planning Department's Negative Declarations and EIRs web page (http://tinyurl.com/sfceqadocs). CDs and paper copies are also available at the Planning Information Center (PIC) counter on the first floor of 1660 Mission Street, San Francisco. Referenced materials are available for review at the Planning Department, 1650 Mission Street, Suite 400. (Call Irene Nishimura, (415) 575-9041, or e-mail irene.nishimura@sfgov.org.)

Project Description:

The proposed project would consist of new construction of 12 duplex buildings and a 10-unit townhouse building, for a total of 34 dwelling units within approximately 65,750 gross square feet (gsf); 68 parking spaces within the duplex and townhouse buildings; and an approximately 670-foot long, 20-foot-wide new private street on an approximately 63,890-square-foot, undeveloped steeply down-sloped site, (Lots 025 and 028 in Assessor's Block 2636). The heights of the proposed buildings would range from 16 to 40 feet high, as measured from the new street grade. The project site is within an RM-1 (Residential, Mixed, Low-Density) District and a 40-X Height and Bulk District; and is near the north end of Crestmont Drive, on the northwest slope of Mount Sutro, in the Forest Knolls neighborhood.

The Draft EIR found that implementation of the proposed project would lead to significant impacts related to cultural resources, paleontological resources, air quality, geology and soils, and hydrology. The significant impacts would be reduced to less-than-significant levels with implementation of mitigation measures identified in the Draft EIR. In addition, the Initial Study found that implementation of the project would result in significant impacts related to archeological resources, noise and biological resources. These significant impacts would be reduced to less-than-significant levels with implementation of the mitigation measures identified in the Initial Study, Appendix A in the Draft EIR.

A **public hearing** on this Draft EIR and other matters has been scheduled by the City Planning Commission for June 7, 2012, in Room 400, City Hall, 1 Dr. Carlton B. Goodlett Place. (Call (415) 558-6422 the week of the hearing for a recorded message giving a more specific time.)

Public comments will be accepted from May 3, 2012 to 5:00 p.m. on June 18, 2012. Written comments should be addressed to Bill Wycko, Environmental Review Officer, San Francisco Planning Department, 1650 Mission Street, Suite 400, San Francisco, CA 94103. Comments received at the public hearing and in writing will be responded to in a draft EIR comments and responses document.

If you have any questions about the **environmental review** of the proposed project, please call Irene Nishimura at (415) 575-9041, or e-mail irene.nishimura@sfgov.org.

DRAFT ENVIRONMENTAL IMPACT REPORT

San Francisco Overlook Development Residential Project

PLANNING DEPARTMENT CASE NO. 2004.0093E

STATE CLEARINGHOUSE NO. 2003122131

Draft EIR Publication Date:	**May 2, 2012**
Draft EIR Public Hearing Date:	**June 7, 2012**
Draft EIR Public Comment Period:	**May 2 – June 18, 2012**

SAN FRANCISCO PLANNING DEPARTMENT

Written comments should be sent to:
Bill Wycko, Environmental Review Officer | 1650 Mission Street, Suite 400 | San Francisco, CA 94103
or bill.wycko@sfgov.org

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DATE: May 2, 2012

TO: Distribution List for the San Francisco Overlook Development Residential Project

FROM: Bill Wycko, Environmental Review Officer

SUBJECT: Request for the Final Environmental Impact Report for the San Francisco Overlook Development Residential Project (Planning Department Case No. 2004.0093E)

This is the Draft of the Environmental Impact Report (EIR) for the San Francisco Overlook Development Residential Project. A public hearing will be held on the adequacy and accuracy of this document. After the public hearing, our office will prepare and publish a document titled "Comments and Responses" that will contain all relevant comments on this Draft EIR and our responses to those comments. It may also specify changes to this Draft EIR. Those who testify at the hearing on the Draft EIR will automatically receive a copy of the Comments and Responses document, along with notice of the date reserved for certification of the Final EIR by the Planning Commission; others may receive a copy of the Comments and Responses and notice by request or by visiting our office. This Draft EIR together with the Comments and Responses document will be considered by the Planning Commission in an advertised public meeting and will be certified as a Final EIR if deemed adequate.

After certification, we will modify the Draft EIR as specified by the Comments and Responses document and print both documents in a single publication called the Final EIR. The Final EIR will add no new information to the combination of the two documents except to reproduce the certification motion. It will simply provide the information in one document, rather than two. Therefore, if you receive a copy of the Comments and Responses document in addition to this copy of the Draft EIR, you will technically have a copy of the Final EIR, in which changes from the Draft EIR were identified in the Comments and Responses document.

We are aware that many people who receive the Draft EIR and Comments and Responses have no interest in receiving virtually the same information after the EIR has been certified. To avoid expending money and paper needlessly, we would like to send copies of the Final EIR to private individuals only if they request them. If you would like a copy of the Final EIR, therefore, please fill out and mail the postcard provided on the back cover to the Environmental Planning division of the Planning Department within two weeks after certification of the EIR. Any private party not requesting a Final EIR by that time will not be mailed a copy. Responsible and trustee agencies on the distribution list will automatically receive a copy of the Final EIR.

Thank you for your interest in this project.

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City and County of San Francisco
Planning Department

SAN FRANCISCO OVERLOOK DEVELOPMENT RESIDENTIAL PROJECT

DRAFT ENVIRONMENTAL IMPACT REPORT

Planning Department Case No. 2004.0093E

State Clearinghouse No. 2003122131

Draft EIR Publication Date: May 2, 2012
Draft EIR Public Hearing Date: June 7, 2012
Draft EIR Public Comment Period: May 2 to June 18, 2012

Please send written comments on this document to:

Bill Wycko
Environmental Review Officer
San Francisco Planning Department
1650 Mission Street, Suite 400
San Francisco, CA 94103

or bill.wycko@sfgov.org

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List of Abbreviations and Acronyms

-sq.ft.	-square-foot
ABAG	Association of Bay Area Governments
ADA	Americans with Disabilities Act
ATHS	Air Toxic Hot Spots
BAAQMD	Bay Area Air Quality Management District
BART	Bay Area Rapid Transit
bgs	below ground surface
BI	Biological Resources
BMR	Below Market Rate
BRT	Bus Rapid Transit
CA DPR	California Department of Public Resources
CAA	Clean Air Act
CAFE	corporate average fuel economy
CalEEMod™	California Emissions Estimator Model
CAP	Clean Air Plan
CAAQS	California ambient air quality standard
CARB	California Air Resources Board
CC&Rs	Covenants, Conditions, and Restrictions
CCR	California Code of Regulations
CCSF	City and County of San Francisco
CDFG	California Department of Fish and Game
CDMG	California Division of Mines and Geology
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CFC	chlorofluorocarbon
CH_4	methane
CHRIS	California Historical Resources Information System
CMP	Congestion Management Plan
CMU	concrete masonry unit
CO	carbon monoxide
CO_2	carbon dioxide
CO_2E	carbon dioxide-equivalent
CP	Cultural and Paleontological Resources
CPT	cone penetration test
CPUC	California Public Utilities Commission
dBA	decibels, A-weighted scale
DBI	Department of Building Inspection
DPH	Department of Public Health
DPW	Department of Public Works
EIR	Environmental Impact Report
EISA	Energy and Independence Security Act
EP	Environmental Planning (Division of Planning Department)
EPA	Environmental Protection Agency
EPCA	Energy Policy and Conservation Act
ERO	Environmental Review Officer
ESA	Environmental Site Assessment
ESL	Environmental Screening Level

FAR	floor area ratio
FARR	Final Archeological Resources Report
GE	Geology and Soils
GGBHTD	Golden Gate Bridge, Highway, and Transportation District
GHG	greenhouse gas
HC	hydrocarbons
HI	hazard index
HRE	Historical Resources Evaluation
HRER	Historical Resources Evaluation Response
HVAC	heating, ventilation, and air-conditioning
IS	Initial Study
LEED	Leadership in Energy Efficient Design
LOS	Level of Service
M-BI	Mitigation Measure, Biological Resources
M-CP	Mitigation Measure, Cultural and Paleontological Resource
MEA	Major Environmental Analysis
MEI	maximally exposed individual
MEISR	maximally exposed individual sensitive receptor
MLP	maximum load point
MMRP	Mitigation Monitoring and Reporting Program
$MMTCO_2E$	million metric tons of CO_2E
MRZ	Mineral Resource Zone
MTC	Metropolitan Transportation Commission
MTS	Metropolitan Transportation System
Muni	San Francisco Municipal Railway
Mw	moment magnitude
MY	model year
NAAQS	national ambient air quality standards
NHTSA	National Highway Traffic Safety Administration
NC-2	Neighborhood Commercial, Small-Scale
NCD	Neighborhood Commercial District
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO_2	nitrogen dioxide
N_2O	nitrous oxide
NOA	Notice of Availability
NOP	Notice of Preparation
NOx	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NSR	New Source Review
NWIC	California Archeological Site Survey Northwest Information Center
OHP	Office of Historic Preservation
OPR	Governor’s Office of Planning and Research
OS	Open Space
OSHA	Occupational Safety and Health Administration
P	Public (District)
PCB	polychlorinated biphenyl
$PM_{2.5}$	particulate matter 2.5 microns across
PM_{10}	particulate matter 10 microns across
ppm	parts per million

PRC	peer review committee
PSD	federal prevention of significant deterioration
PUD	Planned Unit Development
PV	Photovoltaic
RC-3	Residential-Commercial Combined, Medium Density
RC-4	Residential-Commercial Combined, High Density
RH-3	Residential, House, Three-Family
RM-1	Residential, Mixed, Low Density
RM-2	Residential, Mixed, Moderate Density
RHNA	Regional Housing Needs Allocation
RHND	Regional Housing Needs Determination
ROG	reactive organic gases
RTP	Regional Transportation Plan
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SDG	Stormwater Design Guidelines
SFIA	San Francisco International Airport
SFCTA	San Francisco County Transportation Authority
SFFD	San Francisco Fire Department
SFPD	San Francisco Police Department
SFMTA	San Francisco Municipal Transportation Agency
SFPUC	San Francisco Public Utilities Commission
SFUSD	San Francisco Unified School District
SHPO	State Historic Preservation Officer
SHRC	State Historical Resources Commission
SIL	significant impact level
SO_2	sulfur dioxide
sq.ft.	square feet
SVOC	semi-volatile organic compounds
TAC	Toxic Air Contaminant
TEP	Transit Effectiveness Project
TPD-d	diesel
TPH-g	gasoline
TPH-mo	motor oil
$\mu g/m^3$	micrograms per cubic meter
UCSF	University of California, San Francisco
ULEV	ultra-low emission vehicle
URBEMIS	Urban Land Use Emissions Model
US EPA	United States Environmental Protection Agency
UST	underground storage tank
UWMP	Urban Water Management Plan
VOC	volatile organic compounds
VMT	Vehicle Miles Traveled
ZEV	zero emission vehicle

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GLOSSARY

Alluvium: Soil deposited at the base of a slope by water movement.

Bedding, bedding attitude, adverse bedding conditions: The strata of soil and layered rock and their orientation (e.g. flat, vertical, 45 degree slope, etc.). When the orientation of the bedding is at steep slope and therefore prone to earth movement, it is called adverse bedding.

Bedding plane: The surface that separates one layer of stratified rock from the other.

Bench: A relatively level step, excavated into a slope on which fill is to be placed. Its purpose is to provide a firm stable contact between the existing material and the new fill that is to be placed.

Bin wall: A wall consisting of a series of small bin or box like structures constructed of concrete or corrugated steel, that, when placed side by side, create a wall. The bins are filled with sand or a similar material, which ultimately forms a gravity retaining structure.

Caisson-drill: An auger-like machine (or an attachment for a crane) used in foundation work to cut a vertical or inclined circular shaft in the earth for a building footing which is placed in to solid material below ground surface. Used for piers/stitch piers.

Catch basin: (1) A receptacle at the entrance to a drainage system designed to keep out large or obstructive matter, or (2) a reservoir for collecting surface drainage or runoff.

Colluvium: Soil deposited at the base of a slope by gravity.

Competent soil: Soil that is stable and able to provide resistance to soil movement above.

Creep, substantial creep: Creep is movement of soil and subsoil downslope that is invisible to the naked eye. Substantial creep is creep that causes sloughing, or soil stability failure.

Debris wall: Wall placed at the foot of a slope to contain colluvium and prevent its downslope movement.

Declaration of Covenants, Conditions, and Restrictions (CC&Rs): A CC&R is the declaration of private covenants, conditions, and restrictions that control a condominium or planned development, and is required of all condominiums. Once completed, they are recorded with the county and become a part of public record. Each CC&R is different depending on the owners and the properties involved. Generally, CC&Rs address issues such as boundaries, definition of common areas, responsibilities and processes required of each owner, and protocol for property usage, building rules and regulations, and communication and resolution of problems and disputes.

Depositional contact: Material that will eventually form a sandstone bedding layer has been directly deposited on the underlying bedding layer and then undergone concretization (consolidation) to become the overlying sandstone rock unit; the sandstone rock layer has not been formed elsewhere and arrived by tectonic faulting and folding movement.

Earthflow: Rapid movement of muddy or slippery soil mass, usually caused by high precipitation or snowmelt; *mudflow.*

Earth movement: See creep, earthflow, landslide, lateral spreading, or settling.

Fill: Subsoil and or/ rocks used to create slopes or fill depressions.

Grubbing: Digging up and removing all plants (roots and stem or trunk) in order to clear the land.

Gunite: A form of shotcrete in which dry-mixed concrete is forced through a hose with water injected into the stream immediately before application.

Hydraugers: A small pipe installed horizontally inside earth embankments for the removal of water.

Joint: A fracture in the bedding planes causing a discontinuity in the layers of rock.

Joint shear: A fracture in the bedding planes causing a discontinuity in the layers of rock.

Keying, Keyway: Digging a channel (a keyway) into existing soil and adding new. Its purpose, like that of benching, is to provide a firm stable contact between the existing material and the new fill that is to be placed.

Lagging: Lagging is a common earth retention system. Wooden piers (or soldier piers) are driven into the ground at even intervals, deep enough to reach bedrock or a soil layer that is competent (not unstable and able to provide resistance to soil movement above), and wooden planks are bolted across them to form an earth retaining wall.

Landslide: Large movement of soil and subsoil downslope relatively quickly. A *deep-seated landslide* could include weathered bedrock.

Lateral pressure/spreading: Soil pressure and movement in a horizontal manner, for instance the movement that displaces retaining walls.

Lifts: A layer of soil, either excavated or filled. During lagging, a lift is an excavation downwards, followed by more lagging. During backfilling, a lift is a layer of soil added to the excavation and then compressed, followed by another layer.

Liquefaction: Soil acting like fluid, from shear stress on a cohesionless soil (as in an earthquake).

Loads, loading: Weight or pressure on soil, as from overlying structures or earth movement.

Mudflow: See earthflow.

Piers, drilled piers, stitch piers: Columns placed into the ground to provide soil and slope stability. The pier shaft is excavated and the pier material poured in or installed. Stitch piers are smaller and more numerous and are specifically for soil stability.

Ravel: Easily fractured rock moving downslope.

Re-entrant Stitch Piers: A stitch pier wall that follows the property line of the site.

Resistance, active or passive: Soil, slope, and structure push against each other (see loading). Passive resistance relies on gravity to hold a retaining wall in place; the upslope soil presses on the foot of the retaining wall. In active resistance, the retaining wall has other means, such as bracing or being tied into the slope, to resist the lateral, downward pressure provided by the retained slope.

Rock bolt: Metal rod driven into a rock face to provide stability and prevent rock fall.

Rock unit: The particular body of rocks being discussed, one with surrounding bodies of different compositions.

SC Soil Profile: An SC soil profile is used for very dense soils and soft bedrock and is one of six soil profiles that can be used in seismic design.

Settling: Compaction of soil from a downward load placed on it, such as gravity or a structure above.

Shear: See *joint shear*.

Shotcrete: Concrete pneumatically projected onto a surface at high velocity. It is typically blown through a hand-held nozzle, where water is added to the small aggregate concrete mix just prior to being applied and consolidated. Shotcrete typically costs less and takes less time to complete than a comparable sized cast-in-place concrete project.

Side cast fill: Unconsolidated excavated material pushed to the slope below the road, generally not used as part of the road, and steeper than the natural slope.

Slab on grade: A reinforced concrete slab placed directly on the ground to provide the foundation for the superstructure (the part of a building above its foundation.).

Slickensides: Smoothed surfaces along planes of weakness in the bedding contributing to an adverse bedding condition.

Slide scarp: A steeply cut slope.

Sloughing: Minor collapse of a hill's face.

Soil nail: A rod, usually steel, inserted into soil and secured with grout to increase soil stability.

Spoils: Refuse material removed by drilling or otherwise excavating.

Stitch pier: In general, piers are columns placed into the ground to provide soil and slope stability. The pier shaft is excavated and the pier material poured in or installed. Compared to other types of piers such as drilled piers, stitch piers are smaller and more numerous and are specifically for soil stability.

Subdrain: A perforated or plain underground drain.

Subsoil: The layer below true soil, without organic matter.

Superstructure: The part of a building above its foundation.

Swale: A wide shallow depression in the ground to form a channel for storm water drainage, which may provide some groundwater recharge.

Toe (of a slope): The bottom of a slope or height, where the ground becomes horizontal, however briefly.

V-ditch: A vee-shaped ditch.

Weepholes or weeper holes: Small openings in masonry or concrete walls, typically located near the bottom of the wall, to permit water to pass through the structure without endangering structural integrity.

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SUMMARY

This Environmental Impact Report (EIR) chapter provides a brief summary of the proposed San Francisco Overlook Development Residential Project ("proposed project") and its environmental consequences. The chapter includes a summary description of the proposed project, a summary of environmental issues to be resolved, a summary of environmental impacts and mitigation, findings of this EIR, and a summary of EIR-identified alternatives to the proposed project and their comparative environmental effects.

This summary should not be relied upon for a thorough understanding of the proposed project, individual impacts, and mitigation measures. Please refer to Chapter II for a more complete description of the proposed project, Chapter IV for a more complete description of associated impacts and mitigation measures, and Chapter VI for a more complete description of identified alternatives to the proposed project and the comparative impacts.

A. PROJECT SYNOPSIS

The San Francisco Overlook Development Residential Project site (Assessor's Block 2636, Lots 25 and 28) is in San Francisco's Mount Sutro/Forest Knolls/Clarendon Heights neighborhood on the northwest slope of Mount Sutro, about 0.25 mile southwest of the University of California Medical Center, and approximately 600 feet northwest of the summit of Mount Sutro. The generally rectangular-shaped site includes a hook-shaped area protruding south from the site's western edge. The project site is in an RM-1 (Residential, Mixed, Low Density) District and a 40-X Height and Bulk District. The north portion of the undeveloped, partially wooded and vegetated, approximately 63,890-square-foot (-sq.ft.) project site slopes sharply down to an abandoned quarry that is on an adjacent parcel.

The proposed project would include construction of 34 dwelling units (65,750 square feet of residential space) and a new paved, approximately 20-foot-wide, 700-foot-long private street (13,950 square feet). Twenty-four of the 34 units would be constructed as duplexes (with a two-story upper unit above a two-story lower unit) in 12 structures A single building with ten townhomes would be constructed on the western portion of the site. Thus, there would be a total of 13 structures with a total of 34 dwelling units. The proposed buildings would range between approximately 16 to 40 feet in height above the new street grade. The buildings would be four stories, with one to four stories above street level, and at the rear, down-sloping portion of the project site, at most two stories below street level. Approximately 45,390 square feet of the project site would be developed with the new residential buildings, sidewalk, and new paved private street with a fire truck turn-around area at the west end. The remaining 18,500 square feet of the project site would be left undeveloped except for some soil stabilization geotechnical features, i.e., stitch piers and soil nails. The 34 dwelling units would consist of 30 three-bedroom units and four two-bedroom units. The duplex buildings would have a total of 32 parking spaces, of which 26 would be in the form of two-car stackers, and six would be independently accessible, and the parking garages would contain room for bicycle parking. The townhome building would have 36 spaces in an enclosed parking garage, consisting of three nine-car rotating stackers and nine independently accessible spaces, and a minimum of six bicycle parking spaces. Thus, there would be a total of 68 spaces. After construction of the proposed project buildings and private street, the site would be landscaped.

The project sponsor would comply with the requirements of the Inclusionary Housing Ordinance for below market rate (BMR) units by providing 12 percent of the units on-site as BMR units distributed throughout the project, or by providing 17 percent of units off-site as BMR units, or by paying an in lieu fee.

Development of the site would require excavation to various depths up to approximately 15 feet for footings, foundations, and lower floors of the residential units, as well as for fill in other areas of the site. Much of the volume of excavation would be offset by the required fill, but approximately 1,100 cubic yards of soil would be hauled from the site.

Project construction would occur over approximately 23 months. The project sponsor and developer is San Francisco Overlook Development, LLC, the project architect is Levy Design Partners, and the project geotechnical consultant is Alan Kropp & Associates, Inc.

The geotechnical features summarized below (and described in more detail in Chapter II. Project Description, beginning on page 44) are incorporated into the project's conceptual scope:[1]

- Structures incorporating appropriate seismic factors in the Uniform Building Code and recommendations in the project geotechnical investigation.
- Measures to protect the project from landslides, which could include removal and recompaction of the existing fills beneath the new private road, a retaining wall along the downslope (north) portion of the new private road, a deepened drilled pier foundation system for the road's retaining wall, and a debris wall in combination with stitch piers to protect the project site from the shallow soil instabilities and ongoing sloughing/raveling near the western property line and along the western portion of the north property line.

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1 The geotechnical investigation report (excluding appdendices) is included as Appendix C of this EIR.

- Structures incorporating the factors of safety for slope stability identified in the project's geotechnical investigation.
- Stitch piers installed near the property lines to minimize the encroachment of off-site soil and fill instabilities. If slope materials move over time, which would expose the stitch piers, additional lagging would be installed to provide continued containment. Long-term maintenance for the site would include observations of the slope conditions below the stitch piers.
- A debris wall installed as close as possible to the property line, to prevent soils and debris from shallow sloughing/raveling in the northwest corner of the project site falling beyond the project property limits. To help prevent encroachment of soil and debris generated off-site and uphill from the project site onto the new private road, the project includes a debris wall installed near the upslope edge of the new private road, with an access path behind the wall to allow for collection and removal of accumulated debris from the area behind the wall.
- Soil nail installation to stabilize the adverse shallow bedding conditions in areas where adverse bedding is a concern for soil stability.
- Retaining walls incorporating the recommendations of the project's geotechnical investigation.
- Drainage and erosion control measures such as concrete v-ditches, swales, and catch basins for surface water flows, collection of water on roofs connected to a system of pipes that would extend into a drainage system, subdrains located uphill from and behind proposed retaining walls and debris walls, erosion-resistant vegetation, and erosion control for temporary slopes such as: grading to prevent water from flowing over the top of any slope; planting vegetation including quick-growing native grasses and plants; and installing netting, hay wattles, and silt fences.
- Minimizing the amount of grading for temporary access, to reduce disturbance to the hillside.
- Removal and recompaction of the existing fill beneath the proposed new private road, to provide acceptable supporting conditions for the proposed project.
- Deep drilled pier foundations that extend into competent bedrock materials underlying the native soils, well below the anticipated depth of creep movement, with a wider diameter than typically used in order to provide sufficient reinforcement to resist the anticipated lateral loading.
- Excavation and recompaction of the slide debris within the northeast corner of the project site, to strengthen the ability of drilled pier foundations to resist lateral loads. Subdrains also would be installed to enhance drainage and reduce the lateral load on the piers.
- An obligation in the Declaration of Covenants, Conditions and Restrictions (CC&Rs) for the future homeowners association to maintain elements of the final geotechnical and structural design as a common area maintenance obligation.
- Incorporation of all design and construction recommendations of the project's geotechnical investigation into the project.

The conceptual level of project design, including the features described above, is sufficient to analyze and determine the project's environmental effects, including geological effects, under CEQA. Where appropriate and particularly in Section V.F. Geology and Soils, on pages 179–227, the EIR identifies mitigation measures that could be incorporated into the final design plans to ensure that the final plans avoid impacts or reduce impacts to less-than-significant levels.

B. SUMMARY OF IMPACTS AND MITIGATION MEASURES

This EIR provides information on impacts of the proposed project on land use and land use planning, aesthetics, transportation and circulation, air quality, greenhouse gas emissions, geology and soils, and emergency access. This EIR identifies 14 significant impacts in the areas of air quality, geology and soils, archeological resources, paleontological resources, construction noise, and nesting birds, that would result from the proposed project. Air quality and geology and soils are discussed in separate sections in Chapter IV of this EIR (Sections D and F, respectively), and the remaining areas are addressed in Section H in Chapter IV. Significant impacts and mitigation measures proposed to reduce those impacts to less-than-significant levels are identified in Table S-1, Summary of Impacts and Mitigation Measures Identified in EIR, on pages S-5–S-42. Mitigation measures from the Initial Study (see Appendix A) are described below in Table S-2, Summary of Significant Impacts and Mitigation Measures Identified in Initial Study, on pages S-43 to S-50.

In addition, the San Francisco Planning Department has revised its CEQA Initial Study Checklist since the Initial Study for the proposed project was published on May 27, 2006. Hence, this EIR includes evaluation of environmental topics/issues which are now encompassed by the Planning Department's Initial Study Checklist.

The EIR uses the following terms to describe the level of significance of impacts identified during the course of the environmental analysis:

- **No Impact** – No adverse changes (or impacts) to the environment are expected.
- **Less-than-Significant Impact** – Impact that does not exceed the defined significance criteria or would be eliminated or reduced to a less-than-significant level through compliance with existing local, State, and federal laws and regulations.
- **Less-than-Significant Impact with Mitigation** – Impact that is reduced to a less-than-significant level through implementation of the identified mitigation measures.
- **Significant and Unavoidable Impact** – Impact that exceeds the defined significance criteria and cannot be eliminated or reduced to a less-than-significant level through compliance with existing local, State, and federal laws and regulations and for which there are no feasible mitigation measures.
- **Significant and Unavoidable Impact with Mitigation** – Impact that exceeds the defined significance criteria and can be reduced through compliance with existing local, State, and federal laws and regulations and/or implementation of all feasible mitigation measures, but cannot be reduced to a less-than-significant level.

Table S-1
Summary of Environmental Effects and Mitigation Measures Identified in EIR

Topic	Impact	Level of Significance Prior to Mitigation	Mitigation	Level of Significance After Mitigation
Land Use	LU-1 The project would not divide an established community.	LTS	None required.	NA
	LU-2 The project would not conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect.	LTS	None required.	NA
	LU-3 The project would not have a substantial adverse impact on the existing character of the vicinity.	LTS	None required.	NA
	C-LU-1 The proposed project, in combination with other past, present, and reasonably foreseeable future projects, would not result in cumulative land use impacts.	LTS	None required.	NA
Aesthetics	AE-1 The project would not have a substantial adverse impact on scenic vistas.	LTS	None required.	NA
	AE-2 The project would not have a substantial adverse impact on scenic resources.	LTS	None required.	NA
	AE-3 The project would not have a substantial adverse impact on visual character.	LTS	None required.	NA
	C-AE-1 The proposed project, in combination with other past, present, and reasonably foreseeable future projects, would not result in cumulative aesthetic impacts.	LTS	None required.	NA

S = Significant	LTS = Less Than Significant	LTS/MM = Less Than Significant with Mitigation Measure	SU/MM = Significant and Unavoidable with Mitigation Measure	NI = No Impact	NA = Not Applicable

Table S-1
Summary of Environmental Effects and Mitigation Measures Identified in EIR

Topic	Impact	Level of Significance Prior to Mitigation	Mitigation	Level of Significance After Mitigation
Transportation and Circulation	TR-1 The proposed project would not conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation, nor would the proposed project conflict with an applicable congestion management program, including but not limited to level of service standards and travel demand measures.	LTS	None required.	NA
	TR-2 The proposed project would not substantially increase hazards due to a design feature or incompatible uses.	LTS	None required.	NA
	TR-3 The proposed project would not result in inadequate emergency access.	LTS	None required.	NA
	TR-4 The proposed project would not conflict with adopted policies, plans, or programs regarding public transit, bicycle or pedestrian facilities, or otherwise decrease the performance or safety of such features.	LTS	None required.	NA
	C-TR-1 The proposed project, in combination with other past, present, and reasonably foreseeable future projects, would not have significant cumulative transportation impacts.	LTS	None required.	NA
Air Quality	AQ-1 Construction of the proposed project would not result in significant fugitive dust emissions.	LTS	None required.	NA

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Topic	Impact	Level of Significance Prior to Mitigation	Mitigation	Level of Significance After Mitigation
	AQ-2 Construction-related vehicle use would not generate substantial emissions of criteria air pollutants.	LTS	None required.	NA
	AQ-3 Project construction activities would emit toxic air contaminants that could expose sensitive receptors to substantial pollutant concentrations.	S	M-AQ-3 *Construction Emissions Minimization*. To reduce the health risk resulting from project construction activities, the project sponsor shall reduce construction emissions by a minimum of 87% as compared to that estimated in the Air Quality Technical Report (ENVIRON International Corporation, San Francisco, *Air Quality Technical Report for San Francisco Overlook Development, San Francisco, CA, Health Risk Assessment*, January 2012). This may be accomplished through the following requirements: 1. All equipment must meet Tier 2 emissions standards or higher, and 2. All equipment must utilize a California Air Resources Board (CARB) certified level 3 Verified Emissions Control Device. 3. The project sponsor shall ensure that the above requirements are written into contract specifications including the requirement for the contractor to submit a comprehensive inventory of all off-road diesel equipment including each piece of equipment's license plate number, horsepower rating, engine production year, and confirmation that the	LTS/MM

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			equipment contains a Level 3 abatement device verified by CARB. Should the project sponsor choose to comply with this mitigation measure through any means other than the requirements listed above, the project sponsor shall prepare a Construction Emissions Minimization Plan demonstrating an equivalent emissions reduction. The Construction Emissions Minimization plan shall be submitted to the Environmental Review Officer (ERO) for review and approval by an Environmental Planning Air Quality Specialist prior to the commencement of construction activities.	
	AQ-4 The proposed project would not contribute to an air quality violation or result in a considerable net increase in regional criteria air pollutants.	LTS	None required.	NA
	AQ-5 The proposed project would not contribute to carbon monoxide (CO) emissions that would result in a cumulatively considerable increase in criteria air pollutants or result in CO hot spots.	LTS	None required.	NA
	AQ-6 The proposed project would not expose sensitive receptors to substantial pollutant concentrations.	LTS	None required.	NA

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	AQ-7 The proposed project would not conflict with the *2010 Clean Air Plan,* the applicable air quality plan.	LTS	None required.	NA
	C-AQ-1 The proposed project, in combination with other past, present, and reasonably foreseeable future projects, would not result in cumulatively considerable air quality impacts.	LTS	None required.	NA
Greenhouse Gas Emissions	C-GG-1 The proposed project would be consistent with the City's GHG Reduction Plan and the AB 32 Scoping Plan, and would therefore not result in cumulatively considerable greenhouse gas (GHG) emissions.	LTS	None required.	NA
Geology and Soils	GE-1 Construction of the project would expose people and structures to substantial seismic-related hazards including the risk of loss, injury, or death involving strong seismic ground shaking.	S	M-GE-1a *Seismic Design Parameters.* The following parameters for seismic design from the 2010 *California Building Code* shall be used in calculations for the final project design:[2] • Site Location: Latitude = 37.75889 degrees; Longitude = -122.46131 degrees, in order for the project design to be appropriate to its location; • Site Class = C, in order for the project design to be appropriate to its region;	LTS/MM

2 Alan Kropp, Principal Engineer, Alan Kropp & Associates, letter to Gary Testa, San Francisco Overlook Development LLC, *RE: Geotechnical Update San Francisco Overlook Project*, *San Francisco California*, December 7, 2010. This report is on file and available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, San Francisco, as part of Case No. 2004.0093E.

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			• Mapped Spectral Acceleration for Short Period (SS, Site Class B) = 1.658g, in order to incorporate mapped short-period earthquake forces that are anticipated; • Mapped Spectral Acceleration for 1-Second Period (S1, Site Class B) = 0.842g, in order to incorporate mapped one-second earthquake forces that are anticipated; • Maximum Considered Earthquake Spectral Response Acceleration for Short Period (SMS, Site Class C) = 1.658g, in order to incorporate maximum anticipated short-period earthquake forces; • Maximum Considered Earthquake Spectral Response Acceleration for 1-Second Period (SM1, Site Class C) = 1.094g, in order to incorporate maximum anticipated one-second earthquake forces; • Design Spectral Response Acceleration for Short Period (SDS, Site Class C) = 1.106g, in order to incorporate anticipated short-period earthquake forces adjusted for design purpose; and • Design Spectral Response Acceleration for 1-Second Period (SD1, Site Class C) = 0.730g, in	

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Topic	Impact	Level of Significance Prior to Mitigation	Mitigation	Level of Significance After Mitigation
			order to incorporate anticipated one-second earthquake forces adjusted for design purposes. Seismic design criteria for the project also shall comply with the recommendations in Section 5.07, on pages 53–54 of the geotechnical investigation). M-GE-1b *Detailed Design Plans*. Prior to the issuance of a building permit for the project site, the project sponsor shall: 1. Submit to the Department of Building Inspection (DBI) a site-specific, design-level geotechnical investigation prepared for the proposed project by a registered geotechnical engineer. The investigation shall comply with all applicable state and local code requirements and: a) Include an analysis of the expected ground motions at the site from known active faults using accepted methodologies; b) Determine structural design requirements as prescribed by the most current version of the *California Building Code*, including applicable City amendments, to ensure that structures can withstand ground accelerations expected from known active faults; and c) Determine the final design parameters for walls, foundations, foundation slabs, utilities,	

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			roadways, parking lots, sidewalks, and other surrounding related improvements. 2. Project plans for foundation design, earthwork, and site preparation shall incorporate all of the mitigations in the site-specific investigations. 3. The project structural engineer shall review the site-specific investigations, provide any additional necessary mitigation to meet Building Code requirements, incorporate all applicable mitigations from the investigation in the structural design plans, and ensure that all structural plans for the project meet current Building Code requirements. 4. The DBI-registered geotechnical engineer or third-party registered engineer retained to review the geotechnical reports shall review each site-specific geotechnical investigation, approve the final report, and require compliance with all geotechnical mitigations contained in the investigation in the plans submitted for the grading, foundation, structural, infrastructure and all other relevant construction permits. 5. The DBI shall review all project plans for grading, foundations, structural, infrastructure and all other relevant construction permits to ensure compliance with the applicable	

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			geotechnical investigation and other applicable Code requirements.	
	GE-2 Construction of the project would expose people and structures to substantial adverse effects, including the risk of loss, injury, or death involving landslides.	S	M-GE-2a *Protection of Private Road From Existing Landslides*. To protect the proposed private road and new residences, a qualified geotechnical engineer shall determine and design appropriate protective measures, after the grading in this area has been better defined during the final design stage. Potential measures could include removal and recompaction of the existing fills beneath the new private road in accordance with Mitigation Measure M-GE-2e (Existing Fill) (see page S-19), installation of a retaining wall along the downslope (north) portion of the new private road, and a deepened drilled pier foundation system for the road's retaining wall, the depth of which shall be determined once grading is better defined. The design of measure(s) for protecting the new private road shall be subject to the review of the project geotechnical consultant, DBI, and a geotechnical study peer review panel (consisting of a structural engineer, a geologist, and a geotechnical engineer, as required by Section 106A.4.1.3 of the *San Francisco Building Code* for sites located within the Northwest Mount Sutro Slope Protection Area), and shall be completed before issuance of a building permit for the project.	LTS/MM

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Topic	Impact	Level of Significance Prior to Mitigation	Mitigation	Level of Significance After Mitigation
			M-GE-2b *Stitch Piers.* As noted in the project description, the project includes stitch piers[3] to minimize fill instabilities. Stitch piers shall be installed near the property lines in accordance with the recommendations of the project's geotechnical investigation. The stitch piers shall be designed to resist the soil loads due to shallow instabilities that result in lateral pressure on the piers. Stitch piers shall be installed along the west property line and along the west portion of the north property line in the vicinity of the previous quarry activities to mitigate soil loss on the project site due to off-site sloughing and raveling. Re-entrant stitch piers[4] shall be installed on the south portion of the site to protect against undermining the west property line stitch piers by potential on-site soil movements. Stitch piers shall be installed near the northeast corner of the site in order to help deflect slide movements, and prevent encroachment of potential slide debris onto the project site, from the existing landslide area northeast and uphill of the site. Where appropriate,	

3 *Stitch piers:* Closely spaced, below-grade, drilled piers designed to resist lateral loads such as those associated with sloughing/raveling and landslide movements. *Loads, loading*: Weight or pressure on soil, as from overlying structures or earth movement.

4 *Re-entrant stitch piers*: A stitch pier wall that follows the property line of the site.

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			lagging[5] shall be installed from the upslope side of the stitch piers. If slope materials move over time, which would expose the stitch piers, additional lagging shall be installed to provide continued containment. Long-term maintenance for the site shall include observations of the slope conditions below the stitch piers, as stipulated in Mitigation Measure M-GE-2g (Maintenance), described previously on page S-21 and described on page 218. To provide the best overall performance, stitch piers shall be placed as close as possible to the property line while conforming to criteria established by Section J108 of the 2010 *California Building Code* (which is the basis for the *San Francisco Building Code*) and/or other governing codes and regulations requiring improvements to be offset from the property line.[6]	

[5] *Lagging:* A common earth retention system. Wooden piers (or soldier piers) are driven into the ground at even intervals, deep enough to reach bedrock or a soil layer that is competent (not unstable and able to provide resistance to soil movement above), and wooden planks are bolted across them to form an earth retaining wall.

[6] Section J108 of the 2010 *California Building Code* (which is the basis for the *San Francisco Building Code*) provides for setbacks of graded slopes from property lines. Although the intent of a stitch pier wall is to protect a property from encroachment by adjacent properties and the code section applies to the reverse situation (i.e., where the property in question would encroach on or impact adjacent properties), some jurisdictions have included stitch piers walls within the same constraints as graded slopes.

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			All stitch piers shall be designed and installed in conformance with the recommendations in Section 5.03.3 Stitch Piers, on page 48 of the geotechnical investigation. M-GE-2c *Debris Walls.* As noted in the project description, the project includes installation of a debris wall in combination with stitch piers to protect the project site from the shallow soil instabilities and ongoing sloughing/raveling near the western property line and along the western portion of the north property line, which could undermine the project site. This is in accordance with Mitigation Measure M-GE-2b (Stitch Piers), described previously on page S-14 and described on page 214. The debris wall shall be installed near the upslope edge of the new private road. In the portion of the new private road located below documented landslides, the debris wall shall be taller and stronger than other project debris walls in order to resist the potentially larger landslide debris loads. In addition, an access path shall be constructed behind the wall to allow for collection and removal of accumulated debris from the area behind the wall. Because of the steep slopes, the access path uphill from the debris wall shall be as narrow as practical while still allowing for access to remove	

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			accumulated debris. If necessary, the access path shall include installation of a retaining wall along the upslope edge of the path in order to maintain a path that has sufficient width to allow for access for clearing operations. Methods for clearing the debris shall be considered in the design of the access path. The locations and lengths of debris walls, including the debris wall near the downslope property line stipulated in Mitigation Measure M-GE-2f (Creep and Sloughing of Native Soils), described on page S-20 and described on page 218, shall be determined and designed by a qualified geotechnical engineer, in accordance with the recommendations of the project's geotechnical investigation report and applicable California and San Francisco Building codes and regulations, after the final site plan and building and improvement/maintenance layout are determined. The design of the debris walls shall be reviewed by the project geotechnical consultant, DBI, and a geotechnical study peer review panel (consisting of a structural engineer, a geologist, and a geotechnical engineer, as required by Section 106A.4.1.3 of the *San Francisco Building Code* for sites located within the Northwest Mount Sutro Slope Protection Area), and shall be completed before issuance of a building permit for the project.	

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			All debris walls shall be designed and installed in conformance with the recommendations in Section 4.04.2.02, Footings, on page 39, Section 4.04.3, Retaining Walls, on pages 39–40, and Section 5.04.2 Debris Walls, on pages 50–51 of the geotechnical investigation. M-GE-2d *Drainage and Erosion Control.* The following drainage and erosion control measures shall be installed to maintain slope stability and to reduce the risk of downslope migration of slope debris: • Concrete v-ditches[7] for the collection and routing of surface water flows; • Swales[8] and catch basins[9] for the collection and direction of the flow of surface water; • Collection of water on roofs using downspout connected to a system of pipes that would extend into a drainage system in the new private road or a v-ditch located on the project site downstream of the structures; and	

7 *V-ditch:* A vee-shaped ditch.

8 *Swale:* A wide shallow depression in the ground to form a channel for storm water drainage, which may provide some groundwater recharge.

9 *Catch basin:* (1) A receptacle at the entrance to a drainage system designed to keep out large or obstructive matter, or (2) a reservoir for collecting surface drainage or runoff.

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			• Subdrains[10] located uphill from and behind proposed retaining walls and debris walls. Erosion-resistant vegetation shall be planted on the finished slopes, and, if the construction period spans the rainy season, the vegetation shall also be planted on temporary slopes. Erosion control for temporary slopes shall include, as determined to be appropriate by a qualified geotechnical engineer: grading to prevent water from flowing over the top of any slope; planting vegetation, including quick-growing native grasses and plants; and installing netting, hay wattles, and silt fences. Erosion control for finished slopes shall consist of vegetation that is deeply rooted, has dense growth at or near ground surface, and requires minimum irrigation. Drainage and erosion control measures shall include, and shall be designed and installed in conformance with, the recommendations in Sections 5.06.1 Subsurface Drainage, 5.06.2 Surface Drainage, and 5.06.3 Erosion Control, on pages 52–53 of the geotechnical investigation. M-GE-2e *Existing Fill*. Where there is existing fill beneath the proposed new private road, the fill shall be removed and recompacted. For the fill below the east portion of the new private road, the	

10 *Subdrain:* A perforated or plain underground drain.

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			boundary for fill removal and recompaction may be dictated by the limits of the grading activities for project development, as determined by a qualified geotechnical engineer. Where fills are located beneath proposed new structures, such as the proposed buildings and retaining walls, drilled pier foundations extending through the fill soils into competent[11] underlying bedrock materials shall be installed. Due to the potential for downward creep of the fill, the piers shall be designed to resist a substantial creep load[12] in addition to the creep load from native soils. M-GE-2f *Creep and Sloughing of Native Soils.* Deep drilled pier[13] foundations that extend well below the anticipated depth of creep movement and into the zone of passive resistance[14] shall be installed. The depth shall be determined by a qualified geotechnical engineer. Drilled piers for the proposed residential buildings shall have a wider diameter than typically used (a minimum of 16	

11 *Competent:* Stable and able to provide resistance to soil movement above.

12 *Creep, substantial creep*: Creep is movement of soil and subsoil downslope that is invisible to the naked eye. Substantial creep is creep that causes sloughing, or soil stability failure.

13 *Piers, drilled piers*: Columns placed into the ground to provide soil and slope stability. The pier shaft is excavated and the pier material poured in or installed.

14 *Passive resistance:* The force of soil and slope pushing against each other due to gravity (as opposed to active means such as a retaining wall).

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			inches) in order to provide sufficient reinforcement to resist the anticipated lateral loading. Drilled piers into competent bedrock materials underlying the native soils shall be installed to protect the proposed structures from the potential creep and/or sloughing of the native soils. Erosion control measures, such as the installation of netting and erosion-resistant vegetation on the slope, shall be used to reduce the risk of sloughing, in accordance with Mitigation Measure M-GE-2d (Drainage and Erosion Control) described previously on page S-18 and described on page 216, and city ordinances which are discussed in Chapter III. Plans and Policies beginning on page 53 and Section IV.H. CEQA Checklist Update beginning on page 233. A debris wall shall be constructed, in accordance with the requirements of Mitigation Measure M-GE-2c (Debris Walls), described previously on page S-16 and described on page 215, near the downslope north property line to prevent movement of potential slough material onto the adjacent downslope properties, where more significant sloughing could occur. M-GE-2g *Maintenance.* The project sponsor shall provide for the ongoing maintenance of elements of the final geotechnical and structural design by including in the project's Declaration of Covenants,	

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			Conditions and Restrictions (CC&Rs) an obligation for the future homeowners association (or for the Mount Sutro Woods Homeowners Association should the project be annexed to that association) to maintain such elements as a common area maintenance obligation of the association.[15] Prior to the first issuance of a final subdivision map or temporary or final certificate of occupancy, the project sponsor shall record a deed restriction against the title to the property committing all owners of the property to participating in a homeowners association that contains this obligation. If for any reason the property is developed but not subdivided, all owners shall be responsible for the maintenance obligation. Such maintenance obligations shall include: • Monitoring and clearing of drain outlets, v-ditches, catch basins, and above-grade piping; • Monitoring and clearing of subdrain outlet pipes and cleanouts;	

15 *Declaration of Covenants, Conditions, and Restrictions (CC&Rs)*: A CC&R is the declaration of private covenants, conditions, and restrictions that control a condominium or planned development, and is required of all condominiums. Once completed, they are recorded with the county and become a part of public record. Each CC&R is different depending on the owners and the properties involved. Generally, CC&Rs address issues such as boundaries, definition of common areas, responsibilities, and processes required of each owner, and protocol for property usage, building rules and regulations, and communication and resolution of problems and disputes.

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			• If downslope sloughing/raveling exposes stitch piers, installation of lagging (piers installed with planks bolted across them) to prevent loss or movement of soil upslope from the stitch piers; • Monitoring and clearing of debris from debris walls; • If ground/soil/debris material moves away from a debris wall, installation of lagging as needed; • Monitoring of the slope conditions below the stitch piers; and • Repairs and partial to full replacement of any of the above items as needed. Post-construction maintenance shall comply with the recommendations in Section 5.10 Post Construction Maintenance, on page 56 of the geotechnical investigation. M-GE-1b (Detailed Design Plans) described previously on page S-11 and described on page 212.	
	GE-3 Construction of the project would expose people or structures to substantial adverse impacts, including the risk of loss, injury, or death involving on- and off-site geologic instability, including shallow sloughing/raveling	S	M-GE-3a *Slope Stability*. The proposed conceptual design of the project structures shall incorporate the factors of safety identified in Section 4.03, Slope Stability, on page 33 in the project's geotechnical investigation. (The factor of safety is the ratio of	LTS/MM

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	of soils, debris and erosion.		the strength of the hillside resisting land sliding, divided by the forces—colluvial[16] and alluvial[17]—that would destabilize the hillside.) M-GE-3b *Soil Nails.* After site clearing has been completed, a geotechnical analysis shall be performed by a qualified geotechnical engineer, in accordance with the recommendations of the project's geotechnical investigation, to determine if installation of soil nails would be required to provide stabilization of localized areas of adverse bedding conditions.[18] If soil nails would be required, their installation shall be based on the locations of the slope repair, the exposed adverse bedding conditions, and the inclination of the finished slope. Where appropriate, the design shall consist of rows of soil nails extending down into the slope, with a slope facing consisting of wire mesh and gunite that would cover the slope area, and installation of drains behind the slope facing. The design of the soils nails shall be completed before initiation of construction of the project structures.	

16 *Colluvium:* Soil deposited at the base of a slope by gravity.

17 *Alluvium:* Soil deposited at the base of a slope by water movement.

18 *Bedding, bedding attitude, adverse bedding conditions:* The strata of soil and layered rock and their orientation (e.g. flat, vertical, 45 degree slope, etc.). When the orientation of the bedding is at steep slope and therefore prone to earth movement, it is called adverse bedding.

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			M-GE-3c *Design of Retaining Walls.* The design of all retaining walls (including those stipulated in Mitigation Measure M-GE-2a (Protection of Private Road From Existing Landslides), described previously on page S-13 and described on page 214, and Mitigation Measure M-GE-2c (Debris Walls), described previously on page S-16 and described on page 215, shall incorporate the recommendations of the project's geotechnical investigation (Sections 4.04.2.02, Footings, and 4.04.3, Retaining Walls). Where debris walls are constructed on top of retaining walls, the retaining walls shall be designed to resist the impact loads associated with the debris wall. All retaining walls shall be designed and installed in conformance with the recommendations in Section 5.04.1 Retaining Walls, on pages 48–50 of the geotechnical investigation. M-GE-3d *Construction on Steep Slopes.* The amount of grading for temporary access shall be minimized in order to reduce disturbance to the hillside. All grading activities shall conform to the recommendations in the geotechnical investigation, including Section 5.02.8 slopes, on page 45 of the geotechnical investigation, and the geotechnical consultant shall provide guidance and recommendations regarding grading of	

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			finished slopes, which may include fill placement and compaction. M-GE-1b (Detailed Design Plans) described previously on page S-11 and described on page 212. M-GE-2a (Protection of Private Road From Existing Landslides) described previously on page S-13 and described on page 214. M-GE-2b (Stitch Piers) described previously on page S-14 and described on page 214. M-GE-2c (Debris Walls) described previously on page S-16 and described on page 215. M-GE-2d (Drainage and Erosion Control) described previously on page S-18 and described on page 216. M-GE-2f (Creep and Sloughing of Native Soils) described previously on page S-20 and described on page 218.	
	GE-4 Existing fill at the site would not provide acceptable ground support for the proposed project, which would expose people or	S	M-GE-1b (Detailed Design Plans) described previously on page S-11 and described on page 212.	LTS/MM

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	structures to substantial adverse effects, including the risk of loss, injury, or death.		M-GE-2e (Existing Fill) described previously on page S-19 and described on page 217.	
	GE-5 Existing native soils at the site have the potential for creep and sloughing, which would expose people or structures to substantial adverse effects, including the risk of loss, injury, or death.	S	M-GE-1b (Detailed Design Plans) described previously on page S-11 and described on page 212. M-GE-2c (Debris Walls) described previously on page S-16 and described on page 215. M-GE-2d (Drainage and Erosion Control) described previously on page S-18 and described on page 216. M-GE-2f (Creep and Sloughing of Native Soils) described previously on page S-20 and described on page 218.	LTS/MM
	GE-6 The foundations of the proposed project would be adversely affected by downslope or lateral soil and/or rock movements, which would expose people or structures to substantial adverse effects, including the risk of loss, injury, or death.	S	M-GE-6a *Foundations.* The project building's foundations shall consist of deep-drilled pier foundations, drilled into competent bedrock materials underlying the native soils, and designed to resist the additional pressure induced by downslope or lateral soil and/or rock movements, in accordance with the geotechnical investigation report (Section 4.04.2.01, Drilled Pier and Grade Beams, on page 37). As determined by a qualified geotechnical engineer, deep-drilled pier foundations shall extend well below the anticipated depth of creep movement and into the	LTS/MM

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Table S-1
Summary of Environmental Effects and Mitigation Measures Identified in EIR

Topic	Impact	Level of Significance Prior to Mitigation	Mitigation	Level of Significance After Mitigation
			zone of passive resistance, to compensate for creep loading and reduced lateral resistance at the project site.[19] Drilled piers shall also have a wider diameter than typically used (a minimum of 16 inches) in order to provide sufficient reinforcement to resist the anticipated lateral loading. The unsupported portion of the buildings' foundations shall be designed as freestanding columns. Because drilled piers installed on a steep slope such as the project site have significantly reduced passive resistance, the upper portion of drilled piers shall be not be included for passive resistance calculations. To strengthen the ability of drilled pier foundations to resist lateral loads, the slide debris within the northeast corner of the project site shall be excavated and recompacted. Subdrains also shall be installed to enhance drainage of water from uphill areas and the project site in order to reduce the lateral load on the piers.	

[19] *Creep loading:* Creep is movement of soil and subsoil downslope that is invisible to the naked eye. Loading is weight or pressure on soil, as from overlying structures or earth movement.

Resistance, active or passive: Soil, slope, and structure push against each other (see loading). Passive resistance relies on gravity to hold a retaining wall in place; the upslope soil presses on the foot of the retaining wall. In active resistance, the retaining wall has other means, such as bracing or being tied into the slope, to resist the lateral, downward pressure provided by the retained slope.

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			Design and installation of drilled piers and grade beams shall conform to the recommendations in the geotechnical investigation, including Section 5.03.1 Drilled Pier and Grade Beams, on page 45 of the geotechnical investigation. Design and installation of footing foundations (which may be used as an alternative to drilled piers in areas where site excavations have removed the surficial soils and exposed underlying non-expansive bedrock) shall conform to the recommendations in the geotechnical investigation, including Section 5.03.2, Footing Foundations, on page 47 of the geotechnical investigation.	
			M-GE-1b (Detailed Design Plans) described previously on page S-11 and described on page 212.	
			M-GE-2a (Protection of Private Road From Existing Landslides) described previously on page S-13 and described on page 214.	
			M-GE-2e (Existing Fill) described previously on page S-19 and described on page 217.	

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Topic	Impact	Level of Significance Prior to Mitigation	Mitigation	Level of Significance After Mitigation
	GE-7 The proposed project would adversely affect drainage or result in substantial soil erosion or loss of topsoil.	S	M-GE-1b (Detailed Design Plans) described previously on page S-11 and described on page 212. M-GE-2d (Drainage and Erosion Control) described previously on page S-18 and described on page 216.	LTS/MM
	GE-8 The proposed project would not have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.	NI	None required.	NA
	GE-9 The proposed project would not have a substantial adverse effect on topography or unique geologic features.	LTS	None required.	NA
	GE-10 Adverse geology and soils impact on the project site and adjacent project area would result from inadequate project design, construction, and maintenance of the project.	S	M-GE-10a *Design, Construction and Maintenance Recommendations.* The design and construction of the project shall incorporate all design and construction recommendations of the project's geotechnical investigation (Section 5.00, Preliminary Recommendations, on pages 42–56), including, but not limited to, the recommendations for: • Site clearing and grubbing[20] (see page 42 of the geotechnical investigation);	LTS/MM

[20] *Grubbing:* Digging up and removing all plants (roots and stem or trunk) in order to clear the land.

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Topic	Impact	Level of Significance Prior to Mitigation	Mitigation	Level of Significance After Mitigation
			• Fill placement on slopes (see page 43 of the geotechnical investigation); • Excavations (see page 43 of the geotechnical investigation); • Specification of fill materials (see page 44 of the geotechnical investigation); • Subgrade preparation (see page 44 of the geotechnical investigation); • Placement and compaction of fill (see page 44 of the geotechnical investigation); • Trench backfill (see page 44 of the geotechnical investigation); • Grading, and drainage and erosion control, for new cut or fill slopes (see page 45 of the geotechnical investigation); • Design and installation of any exterior slabs-on-grade[21] (and garage slabs as applicable) (see page 51 of the geotechnical investigation); • Design and installation of pavement (see page 52 of the geotechnical investigation); • Plan review (see page 54 of the geotechnical investigation);	

21 *Slab on grade:* A reinforced concrete slab placed directly on the ground to provide the foundation for the superstructure (the part of a building above its foundation.).

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Topic	Impact	Level of Significance Prior to Mitigation	Mitigation	Level of Significance After Mitigation
			• Construction observation and testing (see page 54 of the geotechnical investigation); • Wet weather construction (see page 55 of the geotechnical investigation); • Cost contingencies (see page 55 of the geotechnical investigation); and • Informing future owners and residents of their responsibilities for proper maintenance of on-site drainage measures to reduce the risk of landslides (see page 56 of the geotechnical investigation). M-GE-2g (Maintenance) described previously on page S-21 and described on page 218.	
	C-GE-1 The proposed project, in combination with other past, present, and reasonably foreseeable future projects, could result in cumulatively considerable impacts on geology and soils.	S	M-GE-1a (Seismic Design Parameters) described previously on page S-9 and described on page 210. M-GE-1b (Detailed Design Plans) described previously on page S-11 and described on page 212. M-GE-2a (Protection of Private Road From Existing Landslides) described previously on page S-13 and described on page 214.	LTS/MM

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Table S-1
Summary of Environmental Effects and Mitigation Measures Identified in EIR

Topic	Impact	Level of Significance Prior to Mitigation	Mitigation	Level of Significance After Mitigation
			M-GE-2b (Stitch Piers) described previously on page S-14 and described on page 214. M-GE-2c (Debris Walls) described previously on page S-16 and described on page 215. M-GE-2d (Drainage and Erosion Control) described previously on page S-18 and described on page 216. M-GE-2e (Existing Fill) described previously on page S-19 and described on page 217. M-GE-2f (Creep and Sloughing of Native Soils) described previously on page S-20 and described on page 218. M-GE-2g (Maintenance) described previously on page S-21 and described on page 218. M-GE-3a (Slope Stability) described previously on page S-23 and described on page 220. M-GE-3b (Soil Nails) described previously on page S-24 and described on page 220.	

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Topic	Impact	Level of Significance Prior to Mitigation	Mitigation	Level of Significance After Mitigation
			M-GE-3c (Design of Retaining Walls) described previously on page S-25 and described on page 221. M-GE-3d (Construction on Steep Slopes) described previously on page S-25 and described on page 221.	
Emergency Access	HZ-1 The project would not result in substantial adverse impacts on emergency access.	LTS	None required.	NA
	C-HZ-1 The proposed project, in combination with other past, present, and reasonably foreseeable future projects, would not result in cumulatively considerable impacts on emergency access.	LTS	None required.	NA
Cultural and Paleontological Resources	CP-1 The excavation associated with the proposed project may destroy, directly or indirectly, a unique paleontological resource or site or unique geologic feature.	S	M-CP-1 *Paleontological Assessment.* In the event that any project soils-disturbing activities reveal evidence of a paleontological resource (fossilized vertebrate, invertebrate, and plant remains or the trace or imprint of such remains), the project sponsor shall contact the ERO and a qualified paleontologist[22] to undertake an appropriate assessment of the discovery and, if warranted, further field evaluation, data recovery, documentation, recordation, and curation in accordance with the Standard Guidelines for the	LTS/MM

[22] Qualified Paleontologist: A paleontologist meeting the professional qualifications standards of the Society of Vertebrate Paleontology.

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Topic	Impact	Level of Significance Prior to Mitigation	Mitigation	Level of Significance After Mitigation
			Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontological Resources of the Society of Vertebrate Paleontology (SVP).	
	CP-2 The excavation associated with the proposed project may disturb buried human remains.	S	M-CP-2 *Buried Human Remains*. The treatment of human remains and of associated or unassociated funerary objects discovered during any soils disturbing activity shall comply with applicable State and Federal laws. This shall include immediate notification of the Coroner of the City and County of San Francisco and in the event of the Coroner's determination that the human remains are Native American remains, notification of the California State Native American Heritage Commission (NAHC) who shall appoint a Most Likely Descendant (MLD) (Pub. Res. Code Sec. 5097.98). The archeological consultant, project sponsor, and MLD shall make all reasonable efforts to develop an agreement for the treatment of, with appropriate dignity, human remains and associated or unassociated funerary objects (CEQA Guidelines. Sec. 15064.5(d)). The agreement should take into consideration the appropriate excavation, removal, recordation, analysis, custodianship, curation, and final disposition of the human remains and associated or unassociated funerary objects.	LTS/MM
	C-CP-1 The proposed project, in combination with past, present, and reasonably foreseeable	LTS	None required.	NA

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Topic	Impact	Level of Significance Prior to Mitigation	Mitigation	Level of Significance After Mitigation
	future projects, would not result in cumulatively considerable impacts to cultural or paleontological resources.			
Noise	NO-1 Construction of the proposed project would not generate excessive groundborne vibration or groundborne noise levels.	LTS	None required.	NA
	NO-2 Construction activities of the proposed project could generate noise in excess of applicable construction noise standards.	S	As discussed in Section IV.H. CEQA Checklist Update, on page 236, Mitigation Measure 1 (Construction Noise) is identified in the Initial Study (see Table S-2, page S-43).	LTS/MM
	NO-3 The proposed project would not expose people to excessive airport noise levels.	LTS	None required.	NA
	C-NO-1 The proposed project, in combination with past, present, and reasonably foreseeable future projects, would not result in a cumulatively considerable noise impact.	LTS	None required.	NA
Recreation	RE-1 Development of the proposed project would not increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facilities would occur or be accelerated.	LTS	None required.	NA
	RE-2 Development of the proposed project would not include the construction of recreational facilities nor require the expansion of existing recreational facilities.	NI	None required.	NA

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	RE-3 The proposed project would not physically degrade existing recreational resources.	LTS	None required.	NA
	C-RE-1 The proposed project, in combination with past, present, and reasonably foreseeable future projects, would not result in a cumulatively considerable impact to recreational facilities.	LTS	None required.	NA
Utilities and Service Systems	UT-1 Implementation of the proposed project would not exceed wastewater treatment requirements of the Regional Water Quality Control Board.	LTS	None required.	NA
	UT-2 The proposed project would comply with federal, state, and local statutes and regulations related to solid waste.	NI	None required.	NA
	C-UT-1 The proposed project, in combination with past, present, and reasonably foreseeable future projects, would not result in a cumulatively considerable impact to utilities and service systems.	LTS	None required.	NA
Public Services	PS-1 The proposed project would not result in substantial, adverse physical impacts associated with the provision of or the need for new or physically altered governmental facilities such as fire and police protection, schools, parks, or other services.	LTS	None required.	NA
	C-PS-1 The proposed project, in combination with other past, present, or reasonably	LTS	None required.	NA

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Summary of Environmental Effects and Mitigation Measures Identified in EIR

Topic	Impact	Level of Significance Prior to Mitigation	Mitigation	Level of Significance After Mitigation
	foreseeable future projects, would not result in cumulatively considerable public services impacts.			
Biological Resources	BI-1 The proposed project would not conflict with an adopted habitat conservation plan.	NA	None required.	NA
	C-BI-1 The proposed project, in combination with other past, present, or reasonably foreseeable future projects would not result in a cumulatively considerable impact to biological resources.	LTS	None required.	NA
Hydrology and Water Quality	HY-1 The proposed project would not violate any water quality standards or waste discharge requirements.	LTS	None required.	NA
	HY-2 The proposed project would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level.	LTS	None required.	NA
	HY-3 The proposed project could substantially alter the existing drainage pattern of the site or area in a manner which would result in substantial erosion or siltation on- or off-site.	S	M-GE-2d (Drainage and Erosion Control) described previously on page S-18 and described on page 216. M-GE-2g (Maintenance) described previously on page S-21 and described on page 218.	LTS/MM

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Topic	Impact	Level of Significance Prior to Mitigation	Mitigation	Level of Significance After Mitigation
	HY-4 The proposed project could substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site.	S	M-GE-2d (Drainage and Erosion Control) described previously on page S-18 and described on page 216. M-GE-2g (Maintenance) described previously on page S-21 and described on page 218.	LTS/MM
	HY-5 The proposed project would not create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.	LTS	None required.	NA
	HY-6 The proposed project would not otherwise substantially degrade water quality.	LTS	None required.	NA
	HY-7 The proposed project would not place housing within a 100-year flood hazard area.	NI	None required.	NA
	HY-8 The proposed project would not place structures within a 100-year flood hazard area that would impede or redirect flood flows.	NI	None required.	NA
	HY-9 The proposed project would not expose people or structures to risk of flooding, including flooding as a result of the failure of a levee or dam.	NI	None required.	NA
	HY-10 The proposed project could expose people or structures to risk of inundation by seiche, tsunami, or mudflow.	S	M-GE-1b (Detailed Design Plans) described previously on page S-11 and described on page 212.	LTS/MM

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Topic	Impact	Level of Significance Prior to Mitigation	Mitigation	Level of Significance After Mitigation
			M-GE-2a (Protection of Private Road From Existing Landslides) described previously on page S-13 and described on page 214. M-GE-2b (Stitch Piers) described previously on page S-14 and described on page 214. M-GE-2c (Debris Walls) described previously on page S-16 and described on page 215. M-GE-2d (Drainage and Erosion Control) described previously on page S-18 and described on page 216. M-GE-2e (Existing Fill) described previously on page S-19 and described on page 217. M-GE-2f (Creep and Sloughing of Native Soils) described previously on page S-20 and described on page 218. M-GE-2g (Maintenance) described previously on page S-21 and described on page 218.	
	C-HY-1 The proposed project, in combination with other past, present, or reasonably foreseeable future projects, could result in cumulatively considerable hydrology impacts.	S	M-GE-2d (Drainage and Erosion Control) described previously on page S-18 and described on page 216.	LTS/MM

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			M-GE-2g (Maintenance) described previously on page S-21 and described on page 218.	
Hazards and Hazardous Materials	HZ-3 The proposed project would not generate hazardous emissions or handle hazardous materials in the vicinity of a school.	LTS	None required.	NA
	HZ-4 The proposed project site is not included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5.	NI	None required.	NA
	HZ-5 The proposed project site would not expose people to airport-related safety hazards.	NI	None required.	NA
	C-HZ-1 The proposed project, in combination with other past, present, or reasonably foreseeable future projects, would not result in significant hazards and hazardous materials impacts.	LTS	None required.	NA
Mineral and Energy Resources	ME-1 The proposed project would not result in the loss of availability of a known mineral resource or a locally important mineral resource recovery site.	NI	None required.	NA
	C-ME-1 The proposed project, in combination with other past, present or reasonably foreseeable future projects, would not result in cumulatively considerable impacts to mineral and energy resources.	NI	None required.	NA

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Agriculture and Forest Resources	AF-1 The proposed project would not result in the conversion of farmland or forestland to non-farm or non-forest use, nor would the proposed project conflict with existing agricultural or forest use or zoning.	NI	None required.	NA
	C-AF-1 The proposed project, in combination with other past, present or reasonably foreseeable future projects, would not result in cumulatively considerable impacts to agriculture and forest resources.	NI	None required.	NA

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Table S-2
Summary of Significant Environmental Effects and Mitigation Measures Identified in Initial Study

Topic	Impact	Level of Significance Prior to Mitigation	Mitigation	Level of Significance After Mitigation
Noise	Construction activities of the proposed project could generate noise in excess of applicable construction noise standards.	S	1 *Construction Noise.* The project sponsor shall implement the following construction control measures and adhere to the City's noise ordinance to reduce construction noise to a less-than-significant level. • Equip all internal combustion engine driven equipment with intake and exhaust mufflers which are in good condition and appropriate for the equipment. • Locate stationary noise generating equipment as far as possible from sensitive receptors when sensitive receptors adjoin or are near a construction project area. • Utilize "quiet" air compressors and other stationary noise sources where technology exists. • The contractor shall prepare a detailed construction plan identifying the schedule for major noise-generating construction activities. The construction plan shall identify a procedure for coordination with the adjacent noise sensitive facilities so that construction activities can be scheduled to minimize noise disturbance. • Designate a "noise disturbance coordinator" who would be responsible for responding to any local complaints about construction noise. The disturbance coordinator would determine the	LTS/MM

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Topic	Impact	Level of Significance Prior to Mitigation	Mitigation	Level of Significance After Mitigation
			cause of the noise complaint (e.g., starting too early, bad muffler, etc.) and would require that reasonable measures warranted to correct the problem be implemented. The project sponsor would conspicuously post a telephone number for the disturbance coordinator at the construction site and include it in the notice sent to neighbors regarding the construction schedule. • The contractor shall stage large trucks in a non-residential area off-site (yet to be determined) and prohibit large trucks from accessing the construction site prior to 7:00 AM.	
Air Quality	Construction of the proposed project could generate fugitive dust emissions.	LTS	As discussed in Section IV.D. Air Quality, on page 145, the following mitigation measure is identified in the Initial Study. After the Initial Study was prepared, enactment of the Construction Dust Control Ordinance effectively codified the measures included in this mitigation measure. Thus, it is no longer necessary to identify this mitigation measure for the proposed project, because it is required by law for all projects. 2 *Construction Air Quality*. The project sponsor shall require the construction contractor(s) to spray the project site with water during demolition, excavation, grading, and site preparation activities; spray unpaved construction areas with water at	NA

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			least twice per day; cover stockpiles of soil, sand, and other such material; cover trucks hauling debris, soils, sand or other such material; and sweep surrounding streets during these periods at least once per day to reduce particulate emissions. Ordinance 175-91, passed by the Board of Supervisors on May 6, 1991, requires that non-potable water be used for dust control activities. Therefore, the project sponsor shall require the construction contractor(s) to obtain reclaimed water from the Clean Water Program for this purpose. The project sponsor shall require the project contractor(s) to maintain and operate construction equipment so as to minimize exhaust emissions of particulates and other pollutants, by such means as prohibiting idling motors when equipment is not in use or when trucks are waiting in queues, and implementing specific maintenance programs to reduce emissions for equipment that would be in frequent use for much of the construction period.	
Biological Resources	Construction of the proposed project could harm or kill nesting raptors or migratory birds.	S	3 *Pre-Construction Nest Survey*: If construction is scheduled during the nesting season (February 15 to July 31), a pre-construction field survey of the eucalyptus trees shall be conducted by a qualified biologist no earlier than 45 days and no later than 20 days prior to the proposed construction within the 40,500-square-foot project zone and near the	LTS/MM

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Topic	Impact	Level of Significance Prior to Mitigation	Mitigation	Level of Significance After Mitigation
			zone within the larger 1.45-acre parcel. Should the surveys find nesting birds, disruptive construction activity shall be postponed through the end of the nesting season in consultation with the California Department of Fish and Game (CDFG). Each identified nesting tree shall be monitored by a qualified biologist for bird egg-incubation, including: • Incubation behavior (e.g., regular periods of "disappearance" into the nest structure followed by short, secretive flights to forage). • Extreme distress and alarm calls when in close vicinity of the nesting tree. • Observation of food carried in the beak or claws to the nest. If incubation behavior is detected, the following measures shall be incorporated to protect the nest location: • Establishment of a buffer using orange construction fencing around the tree in accordance with CDFG recommendations until the young have fledged. The nesting tree shall be monitored by a qualified biologist a minimum of once per week to confirm that the young have fledged and that no new nesting pairs are present before the buffer is removed. Construction shall not occur within 150 feet of	

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			an active nest until the nest is vacated or juveniles have fledged. • If it is not feasible to stop or modify construction activities around the tree, the CDFG shall be contacted to discuss alternative buffer options. If there is no sign of active bird use based on the qualified biologist's pre-construction field survey, or if construction is planned between August 1 and February 1, such construction and associated tree removal could proceed as scheduled.	
Cultural Resources	Construction of the proposed project could damage or disturb unknown subsurface archeological resources.	S	4 *Archeological Resources*. The following mitigation measure shall be required to avoid any adverse effect from the proposed project on accidentally discovered buried or submerged historical resources as defined in CEQA Guidelines Section 15064.5(a)(c). The project sponsor shall distribute the Planning Department archeological resource "ALERT" sheet to the project prime contractor; to any project subcontractor (including demolition, excavation, grading, foundation, pier drilling, etc. firms); or utilities firm involved in soils disturbing activities within the project site. Prior to any soils disturbing activities being undertaken, each contractor shall be responsible for ensuring that the "ALERT" sheet is circulated to all field personnel including, machine operators, field	LTS/MM

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			crew, pier drilling crew, supervisory personnel, etc. The project sponsor shall provide the Environmental Review Officer (ERO) with a signed affidavit from the responsible parties (prime contractor, subcontractor(s), and utilities firm) to the ERO confirming that all field personnel have received copies of the Alert Sheet. Should any indication of an archeological resource be encountered during any soils disturbing activity of the project, the project Head Foreman and/or project sponsor shall immediately notify the ERO and shall immediately suspend any soils disturbing activities in the vicinity of the discovery until the ERO has determined what additional measures should be undertaken. If the ERO determines that an archeological resource may be present within the project site, the project sponsor shall retain the services of a qualified archeological consultant. The archeological consultant shall advise the ERO as to whether the discovery is an archeological resource, retains sufficient integrity, and is of scientific/historical/cultural significance. If an archeological resource is present, the archeological consultant shall identify and evaluate the archeological resource. The archeological consultant shall make a recommendation as to what action, if any, is warranted. Based on this	

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Summary of Significant Environmental Effects and Mitigation Measures Identified in Initial Study

Topic	Impact	Level of Significance Prior to Mitigation	Mitigation	Level of Significance After Mitigation
			information, the ERO may require, if warranted, specific additional measures to be implemented by the project sponsor. Measures might include: preservation in situ of the archeological resource; an archeological monitoring program; or an archeological testing program. If an archeological monitoring program or archeological testing program is required, it shall be consistent with the Environmental Planning (EP) division guidelines for such programs. The ERO may also require that the project sponsor immediately implement a site security program if the archeological resource is at risk from vandalism, looting, or other damaging actions. The project archeological consultant shall submit a Final Archeological Resources Report (FARR) to the ERO that evaluates the historical significance of any discovered archeological resource and describes the archeological and historical research methods employed in the archeological monitoring/data recovery program(s) undertaken. Information that may put at risk any archeological resource shall be provided in a separate removable insert within the final report. Copies of the Draft FARR shall be sent to the ERO for review and approval. Once approved by the ERO, copies of the FARR shall be distributed as	

S = Significant; LTS = Less Than Significant; LTS/MM = Less Than Significant with Mitigation Measure; SU/MM = Significant and Unavoidable with Mitigation Measure; NI = No Impact; NA = Not Applicable

Table S-2
Summary of Significant Environmental Effects and Mitigation Measures Identified in Initial Study

Topic	Impact	Level of Significance Prior to Mitigation	Mitigation	Level of Significance After Mitigation
			follows: California Archeological Site Survey Northwest Information Center (NWIC) shall receive one (1) copy and the ERO shall receive a copy of the transmittal of the FARR to the NWIC. The Major Environmental Analysis division of the Planning Department shall receive three copies of the FARR along with copies of any formal site recordation forms (CA DPR 523 series) and/or documentation for nomination to the National Register of Historic Places/California Register of Historical Resources. In instances of high public interest or interpretive value, the ERO may require a different final report content, format, and distribution than that presented above.	

S = Significant; LTS = Less Than Significant; LTS/MM = Less Than Significant with Mitigation Measure; SU/MM = Significant and Unavoidable with Mitigation Measure; NI = No Impact; NA = Not Applicable

C. SUMMARY OF PROJECT ALTERNATIVES

Three alternatives are evaluated in this EIR: Alternative A: No Project Alternative, Alternative B: Reduced Project Alternative, and Alternative C: Reduced Foundations Alternative. Alternatives B and C were formulated to reduce the transportation, air quality, greenhouse gas, noise, or geologic impacts of the proposed project, even though these alternatives reduce impacts only to a small degree. Table S-3, beginning on page S-54, summarizes the comparison of effects between the alternatives and the proposed project.

1. NO PROJECT ALTERNATIVE

Alternative A, the No Project Alternative, would not entail changes to the project site. The property, with its dirt road, would remain undeveloped, and the proposed 13 four-story structures with 34 dwelling units and 60 residential parking spaces, eight visitor parking spaces, and new paved private street would not be constructed. This alternative would not preclude future proposals for development of the project site.

In the No Project Alternative, none of the proposed project's impacts discussed in Chapter IV, Environmental Setting and Impacts would occur; and thus, none of the mitigation measures would be required.

The No Project Alternative would not meet any of the objectives of the project sponsor, the San Francisco Overlook Development, LLC.

2. REDUCED PROJECT ALTERNATIVE

Alternative B, the Reduced Project Alternative, would involve construction of 16 single-family residential units, in a layout generally similar to the proposed project. This alternative would provide 32 parking spaces within garages (two spaces per dwelling unit), and six additional off-street, unenclosed guest parking spaces. Altogether, there would be 38 off-street parking spaces in this alternative, compared with 68 spaces in the proposed project. The Reduced Project Alternative would require all the same approvals as the proposed project.

The new dwelling units of this alternative, like those of the proposed project, would not be considered a significant addition to the housing stock in the City. The Reduced Project Alternative would have similar effects on visual quality, urban design, and views as the proposed project. The less-than-significant impacts of the Reduced Project Alternative on transportation, operational air quality, and greenhouse gas emissions would be less than those of the proposed project. The impacts of this alternative on geology and soils would be slightly less than those of the proposed project, but implementation of the same geotechnical mitigation measures as the proposed project would be required to reduce the geologic impacts of this alternative to less-than-significant levels. Impacts of the Reduced Project Alternative on construction air quality, and archeological, paleontological, and biological resources, would be similar to those of the proposed project, and would be significant and would be reduced to less-than-significant levels by implementation of mitigation measures identified in this EIR.

The Reduced Project Alternative would not meet San Francisco Overlook Development, LLC's objectives to produce a sufficient return on investment for the project sponsor and its investors to implement necessary hillside stabilization measures and provide or upgrade deficient site infrastructure (including a new access roadway, utilities, and fire hydrants).

3. REDUCED FOUNDATIONS ALTERNATIVE

Alternative C, the Reduced Foundations Alternative, would involve construction of two buildings containing a total of 34 multi-family residential units, in a layout generally similar to the proposed project. This alternative would provide 51 garage parking spaces, and no off-street, unenclosed guest parking space, compared with 68 spaces in the proposed project. The Reduced Foundations Alternative would require the same approvals as the proposed project, except for the subdivision of Lot 25 into 13 parcels.

The new residential units of this alternative, like those of the proposed project, would not be considered a significant addition to the housing stock in the City. The Reduced Foundations Alternative would have greater effects on view obstruction, visual quality, urban design, and views than the proposed project, although, like the proposed project, the visual impacts of Alternative C would not be considered significant. The less-than-significant impacts of the Reduced Foundations Alternative on transportation, air quality, and greenhouse gas emissions would be similar to those of the proposed project. The geologic impacts of the Reduced Foundations Alternative would be slightly less than those of the proposed project, but implementation of the same mitigation measures as the proposed project would be required to reduce the geologic impacts of this alternative to less-than-significant levels. Impacts of this alternative on shadow would be greater than those of the proposed project, but would be less than significant. Impacts of the Reduced Foundations Alternative on archeological, paleontological, and biological resources would be similar to those of the proposed project, and would be significant but would be reduced to less-than-significant levels by implementation of mitigation measures identified in this EIR.

The Reduced Foundations Alternative would not meet San Francisco Overlook Development, LLC's objective to develop a project that is considerate of the views of existing houses in the neighborhood.

The Reduced Project Alternative, Alternative B, would be the environmentally superior alternative due to its reduced transportation and operational air quality impacts, and its slightly reduced geotechnical impacts.

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Table S-3

Comparison of Significant Impacts of the Proposed Project to Alternatives B and C

	Proposed Project	Alternative A: No Project	Alternative B: Reduced Project Alternative	Alternative C: Reduced Foundations Alternative
Description	34 dwelling units/ 65,750 sf -- residential uses 68 parking spaces/ 13,620 sf -- private paved street Building heights from 16 to 40 ft above the new street grade 4 stories (1 to 4 stories above street level)	No change to the undeveloped site with its trees, vegetation, and dirt road	16 single-family dwelling units/ 57,600 to 73,600 sf -- residential uses 38 parking spaces/ 13,620 net sf -- private paved street Building heights from 16 to 40 ft above the new street grade 4 stories (1 to 4 stories above street level)	34 dwelling units/ 56,100 to 62,900 sf -- residential uses 51 parking spaces/ 13,620 net sf -- private paved street Building heights from 30 to 40 ft above the new street grade 4 stories (3 to 4 stories above street level)
		Impacts		
Land Use	No significant effect.	No impact.	No significant effect.	No significant effect.
Aesthetics	No significant effect.	No impact.	No significant effect.	No significant effect.
Transportation	No significant effect.	No impact.	No significant effect.	No significant effect.
Air Quality	AQ-3: Project construction activities would emit toxic air contaminants that could expose sensitive receptors to substantial pollutant concentrations Avoidable with Mitigation Measure M-AQ-3.	No impact.	AQ-3: Alternative B construction activities would expose sensitive receptors to substantial pollutant concentrations. Avoidable with Mitigation Measure M-AQ-3.	AQ-3: Alternative C construction activities would expose sensitive receptors to substantial pollutant concentrations. Avoidable with Mitigation Measure M-AQ-3.
Greenhouse Gas Emissions	No significant effect.	No impact.	No significant effect.	No significant effect.
Geology and Soils	GE-1: Construction of the project would expose people and structures to substantial seismic-related hazards including the risk of loss, injury, or death involving strong	No impact.	GE-1: Construction of Alternative B would expose people and structures to substantial seismic-related hazards including the risk of loss, injury, or death involving	GE-1: Construction of Alternative C would expose people and structures to substantial seismic-related hazards including the risk of loss, injury, or death involving

Table S-3

Comparison of Significant Impacts of the Proposed Project to Alternatives B and C

	Proposed Project	Alternative A: No Project	Alternative B: Reduced Project Alternative	Alternative C: Reduced Foundations Alternative
	seismic ground shaking. Avoidable with Mitigation Measures M-GE-1a and M-GE-1b.		strong seismic ground shaking. Avoidable with Mitigation Measures M-GE-1a and M-GE-1b.	strong seismic ground shaking. Avoidable with Mitigation Measures M-GE-1a and M-GE-1b.
	GE-2: Construction of the project would expose people and structures to substantial adverse effects, including the risk of loss, injury, or death involving landslides. Avoidable with Mitigation Measures M-GE-1b, M-GE-2a, M-GE-2b, M-GE-2c, M-GE-2d, M-GE-2e, M-GE-2f, and M-GE-2g.	No impact.	GE-2: Construction of Alternative B would expose people and structures to substantial adverse effects, including the risk of loss, injury, or death involving landslides. Avoidable with Mitigation Measures M-GE-1b, M-GE-2a, M-GE-2b, M-GE-2c, M-GE-2d, M-GE-2e, M-GE-2f, and M-GE-2g.	GE-2: Construction of Alternative C would expose people and structures to substantial adverse effects, including the risk of loss, injury, or death involving landslides. Avoidable with Mitigation Measures M-GE-1b, M-GE-2a, M-GE-2b, M-GE-2c, M-GE-2d, M-GE-2e, M-GE-2f, and M-GE-2g.
	GE-3: Construction of the project would expose people or structures to substantial adverse impacts, including the risk of loss, injury, or death involving on- and off-site geologic instability, including shallow sloughing/raveling of soils, debris and erosion. Avoidable with Mitigation Measures M-GE-3a, M-GE-3b, M-GE-3c, M-GE-3d, M-GE-2a, M-GE-2b, M-GE-2c, M-GE-2d, M-GE-2f, and M-GE-1b.	No impact.	GE-3: Construction of Alternative B would expose people or structures to substantial adverse impacts, including the risk of loss, injury, or death involving on- and off-site geologic instability, including shallow sloughing/ raveling of soils, debris and erosion. Avoidable with Mitigation Measures M-GE-3a, M-GE-3b, M-GE-3c, M-GE-3d, M-GE-2a, M-GE-2b, M-GE-2c, M-GE-2d, M-GE-2f, and M-GE-1b.	GE-3: Construction of Alternative C would expose people or structures to substantial adverse impacts, including the risk of loss, injury, or death involving on- and off-site geologic instability, including shallow sloughing/ raveling of soils, debris and erosion. Avoidable with Mitigation Measures M-GE-3a, M-GE-3b, M-GE-3c, M-GE-3d, M-GE-2a, M-GE-2b, M-GE-2c, M-GE-2d, M-GE-2f, and M-GE-1b.

Table S-3

Comparison of Significant Impacts of the Proposed Project to Alternatives B and C

Proposed Project	Alternative A: No Project	Alternative B: Reduced Project Alternative	Alternative C: Reduced Foundations Alternative
GE-4: Existing fill at the site would not provide acceptable ground support for the proposed project, which would expose people or structures to substantial adverse effects, including the risk of loss, injury, or death. Avoidable with Mitigation Measures M-GE-2e and M-GE-1b.	No impact.	GE-4: Existing fill at the site would not provide acceptable ground support for Alternative B, which would expose people or structures to substantial adverse effects, including the risk of loss, injury, or death. Avoidable with Mitigation Measures M-GE-2e and M-GE-1b.	GE-4: Existing fill at the site would not provide acceptable ground support for Alternative C, which would expose people or structures to substantial adverse effects, including the risk of loss, injury, or death. Avoidable with Mitigation Measures M-GE-2e and M-GE-1b.
GE-5: Existing native soils at the site have the potential for creep and sloughing, which would expose people or structures to substantial adverse effects, including the risk of loss, injury, or death. Avoidable with Mitigation Measures M-GE-2c, M-GE-2d, M-GE-2f, and M-GE-1b.	No impact.	GE-5: Existing native soils at the site have the potential for creep and sloughing, which would expose people or structures to substantial adverse effects, including the risk of loss, injury, or death. Avoidable with Mitigation Measures M-GE-2c, M-GE-2d, M-GE-2f, and M-GE-1b.	GE-5: Existing native soils at the site have the potential for creep and sloughing, which would expose people or structures to substantial adverse effects, including the risk of loss, injury, or death. Avoidable with Mitigation Measures M-GE-2c, M-GE-2d, M-GE-2f, and M-GE-1b.
GE-6: The foundations of the proposed project would be adversely affected by downslope or lateral soil and/or rock movements, which would expose people or structures to substantial adverse effects, including the risk of loss, injury, or death.	No impact.	GE-6: The foundations of Alternative B would be adversely affected by downslope or lateral soil and/or rock movements, which would expose people or structures to substantial adverse effects, including the risk of loss, injury, or death.	GE-6: The foundations of Alternative C would be adversely affected by downslope or lateral soil and/or rock movements, which would expose people or structures to substantial adverse effects, including the risk of loss, injury, or death.

Table S-3

Comparison of Significant Impacts of the Proposed Project to Alternatives B and C

Proposed Project	Alternative A: No Project	Alternative B: Reduced Project Alternative	Alternative C: Reduced Foundations Alternative
Avoidable with Mitigation Measures M-GE-6a, M-GE-2a, M-GE-2e, and M-GE-1b.		Avoidable with Mitigation Measures M-GE-6a, M-GE-2a, M-GE-2e, and M-GE-1b.	Avoidable with Mitigation Measures M-GE-6a, M-GE-2a, M-GE-2e, and M-GE-1b.
GE-7: The proposed project would adversely affect drainage or result in substantial soil erosion or loss of topsoil.	No impact.	GE-7: Alternative B would adversely affect drainage or result in substantial soil erosion or loss of topsoil.	GE-7: Alternative C would adversely affect drainage or result in substantial soil erosion or loss of topsoil.
Avoidable with Mitigation Measures M-GE-2d and M-GE-1b.		Avoidable with Mitigation Measures M-GE-2d and M-GE-1b.	Avoidable with Mitigation Measures M-GE-2d and M-GE-1b.
GE-10: Adverse geology and soils impact on the project site and adjacent project area would result from inadequate project design, construction, and maintenance of the project.	No impact.	GE-10: Adverse geology and soils impact on the project site and adjacent project area would result from inadequate project design, construction, and maintenance of Alternative B.	GE-10: Adverse geology and soils impact on the project site and adjacent project area would result from inadequate project design, construction, and maintenance of the Alternative B.
Avoidable with Mitigation Measures M-GE-10a and M-GE-2g.		Avoidable with Mitigation Measures M-GE-10a and M-GE-2g.	Avoidable with Mitigation Measures M-GE-10a and M-GE-2g.
C-GE-1: The proposed project, in combination with other past, present, and reasonably foreseeable future projects, could result in cumulatively considerable impacts on geology and soils.	No impact.	C-GE-1: Alternative B, in combination with other past, present, and reasonably foreseeable future projects, could result in cumulatively considerable impacts on geology and soils.	C-GE-1: Alternative C, in combination with other past, present, and reasonably foreseeable future projects, could result in cumulatively considerable impacts on geology and soils.
Avoidable with Mitigation Measures M-GE-1a, M-GE-1b, M-GE-2a, M-GE-2b, M-GE-2c, M-GE-2d, M-GE-2e, M-GE-2f, M-		Avoidable with Mitigation Measures M-GE-1a, M-GE-1b, M-GE-2a, M-GE-2b, M-GE-2c, M-GE-2d, M-GE-2e, M-GE-2f, M-	Avoidable with Mitigation Measures M-GE-1a, M-GE-1b, M-GE-2a, M-GE-2b, M-GE-2c, M-GE-2d, M-GE-2e, M-GE-2f, M-

Table S-3

Comparison of Significant Impacts of the Proposed Project to Alternatives B and C

	Proposed Project	Alternative A: No Project	Alternative B: Reduced Project Alternative	Alternative C: Reduced Foundations Alternative
	GE-2g, M-GE-3a, M-GE-3b, M-GE-3c, and M-GE-3d.		GE-2g, M-GE-3a, M-GE-3b, M-GE-3c, and M-GE-3d.	GE-2g, M-GE-3a, M-GE-3b, M-GE-3c, and M-GE-3d.
Emergency Access	No significant effect.	No impact.	No significant effect.	No significant effect.
CEQA Checklist Update Issues	Impacts on cultural resources are discussed below under Cultural and Paleontological Resources. Impacts on erosion, flooding, and mudflow discussed under Hydrology and Water Quality. No other significant effect.	No impact.	Impacts on cultural resources are discussed below under Cultural and Paleontological Resources and Noise. No other significant effect.	Impacts on cultural resources are discussed below under Cultural and Paleontological Resources. No other significant effect.
Population and Housing	No significant effect.	No impact.	No significant effect.	No significant effect.
Cultural and Paleontological Resources	No impact on historical resources. CP-1: The excavation associated with the proposed project may destroy, directly or indirectly, a unique paleontological resource or site or unique geologic feature. Avoidable with Mitigation Measure M-CP-1. CP-2: Excavation associated with the proposed may disturb buried human remains. Avoidable with Mitigation Measure M-CP-2. Construction of the proposed project could damage or disturb unknown subsurface	No impact.	No impact on historical resources. CP-1: The excavation associated with Alternative B may destroy, directly or indirectly, a unique paleontological resource or site or unique geologic feature. Avoidable with Mitigation Measure M-CP-1. CP-2: The excavation associated with Alternative B may disturb buried human remains. Avoidable with Mitigation Measure M-CP-2. Construction of Alternative B could damage or disturb unknown subsurface	No impact on historical resources. CP-1: The excavation associated with Alternative C may destroy, directly or indirectly, a unique paleontological resource or site or unique geologic feature. Avoidable with Mitigation Measure M-CP-1. CP-2: The excavation associated with Alternative B may disturb buried human remains. Avoidable with Mitigation Measure M-CP-2. Construction of Alternative B could damage or disturb unknown subsurface

Table S-3

Comparison of Significant Impacts of the Proposed Project to Alternatives B and C

	Proposed Project	Alternative A: No Project	Alternative B: Reduced Project Alternative	Alternative C: Reduced Foundations Alternative
	archeological resources. Avoidable with Mitigation Measure 3 identified in the Initial Study.		archeological resources. Avoidable with Mitigation Measure 3 identified in the Initial Study.	archeological resources. Avoidable with Mitigation Measure 3 identified in the Initial Study.
Noise	No significant effect.	No impact.	No significant effect.	No significant effect.
Wind and Shadow	No significant effect.	No impact.	No significant effect.	No significant effect.
Recreation	No significant effect.	No impact.	No significant effect.	No significant effect.
Utilities and Service Systems	No significant effect.	No impact.	No significant effect.	No significant effect.
Public Services	No significant effect.	No impact.	No significant effect.	No significant effect.
Biological Resources	B1-3: Construction of the proposed project could harm or kill nesting raptors or migratory birds. Avoidable with Mitigation Measure 3 identified in the Initial Study.	No impact.	B1-3: Construction of the proposed project could harm or kill nesting raptors or migratory birds. Avoidable with Mitigation Measure 3 identified in the Initial Study.	B1-3: Construction of the proposed project could harm or kill nesting raptors or migratory birds. Avoidable with Mitigation Measure 3 identified in the Initial Study.
Hydrology and Water Quality	HY-3: The proposed project could substantially alter the existing drainage pattern of the site or area in a manner which would result in substantial erosion or siltation on- or off-site. Avoidable with implementation of Mitigation Measures M-GE-2d, page 216; and M-GE-2g, page 218.	No impact.	Impact HY-3: Alternative B could substantially alter the existing drainage pattern of the site or area in a manner which would result in substantial erosion or siltation on- or off-site. Avoidable with implementation of Mitigation Measures M-GE-2d, page 216; and M-GE-2g, page 218.	Impact HY-3: Alternative C could substantially alter the existing drainage pattern of the site or area in a manner which would result in substantial erosion or siltation on- or off-site. Avoidable with implementation of Mitigation Measures M-GE-2d, page 216; and M-GE-2g, page 218.

Table S-3

Comparison of Significant Impacts of the Proposed Project to Alternatives B and C

	Proposed Project	Alternative A: No Project	Alternative B: Reduced Project Alternative	Alternative C: Reduced Foundations Alternative
	HY-4: The proposed project could substantially alter the existing drainage pattern of the site or area, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site. Avoidable with Mitigation Measures M-GE-2d, page 216; and M-GE-2g, page 218.	No impact.	HY-4: Alternative B could substantially alter the existing drainage pattern of the site or area, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site. Avoidable with Mitigation Measures M-GE-2d, page 216; and M-GE-2g, page 218.	HY-4: Alternative C could substantially alter the existing drainage pattern of the site or area, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site. Avoidable with Mitigation Measures M-GE-2d, page 216; and M-GE-2g, page 218.
	HY-10: The proposed project could expose people or structures to risk of inundation by seiche, tsunami, or mudflow. Avoidable with implementation of Mitigation Measures M-GE-1b, page 212; M-GE-2a, page 214; M-GE-2b, page 214; M-GE-2c, page 215; M-GE-2d, page 216; M-GE-2e, page 217; M-GE-2f, page 218; and M-GE-2g, page 218.	No impact.	HY-10: Alternative B could expose people or structures to risk of inundation by seiche, tsunami, or mudflow. Avoidable with implementation of Mitigation Measures M-GE-1b, page 212; M-GE-2a, page 214; M-GE-2b, page 214; M-GE-2c, page 215; M-GE-2d, page 216; M-GE-2e, page 217; M-GE-2f, page 218; and M-GE-2g, page 218.	HY-10: Alternative C could expose people or structures to risk of inundation by seiche, tsunami, or mudflow. Avoidable with implementation of Mitigation Measures M-GE-1b, page 212; M-GE-2a, page 214; M-GE-2b, page 214; M-GE-2c, page 215; M-GE-2d, page 216; M-GE-2e, page 217; M-GE-2f, page 218; and M-GE-2g, page 218.
	C-HY-1: The proposed project, in combination with other past, present, or reasonably foreseeable future projects, could result in cumulatively considerable hydrology impacts. Avoidable with implementation of Measures	No impact.	C-HY-1: Alternative B, in combination with other past, present, or reasonably foreseeable future projects, could result in cumulatively considerable hydrology impacts. Avoidable with implementation of Measures	C-HY-1: Alternative B, in combination with other past, present, or reasonably foreseeable future projects, could result in cumulatively considerable hydrology impacts. Avoidable with implementation of Measures

Table S-3

Comparison of Significant Impacts of the Proposed Project to Alternatives B and C

	Proposed Project	Alternative A: No Project	Alternative B: Reduced Project Alternative	Alternative C: Reduced Foundations Alternative
	M-GE-2d, page 216; and M-GE-2g, page 218.		M-GE-2d, page 216; and M-GE-2g, page 218.	M-GE-2d, page 216; and M-GE-2g, page 218.
Hazards and Hazardous Materials	No significant effect.	No impact.	No significant effect.	No significant effect.
Mineral and Energy Resources	No significant effect.	No impact.	No significant effect.	No significant effect.
Agricultural and Forest Resources	No significant effect.	No impact.	No significant effect.	No significant effect.

Source: During Associates, 2012.

D. AREAS OF CONTROVERSY AND ISSUES TO BE RESOLVED

On June 23, 2004, the Planning Department distributed a Notice of Project Receiving Environmental Review. Individuals and agencies that received these notices included owners of properties within 300 feet of the project site, tenants of properties adjacent to the project site, and other potentially interested parties, including various regional and state agencies. The Planning Department distributed a Notice of Preparation of an Environmental Impact Report (NOP) on May 27, 2006, announcing its intent to prepare and publish an EIR. On the basis of public comments on Notice of Project Receiving Environmental Review, and the NOP and the Initial Study, potential areas of controversy and unresolved issues for this project include: changes in land use and neighborhood character, proposed project density, and proximity to adjacent residences; visual impacts, including scenic views; impacts on recreation and recreational space; geologic issues, including seismic safety, landslides, and slope stability near adjacent residences during construction; and impacts on fire safety and emergency access. More details on the issues raised and how the EIR addresses those issues are found in Section V.C. Areas of Controversy and Issues to Be Resolved, beginning on page 257.

The Notice of Preparation and Initial Study are included in this EIR as Appendix A.

I. INTRODUCTION

A. PROJECT SUMMARY

The project sponsor, San Francisco Overlook Development, LLC, proposes to construct the San Francisco Overlook Development Residential project. The proposed project includes 12 two-unit buildings and one ten-unit townhome building, for a total of 34 dwelling units (65,750 total gross square feet), 68 parking spaces, and a new paved, approximately 700-foot-long private street, on an approximately 63,890-square-foot, steeply-sloped site (Lots 25 and 28, in Assessor's Block 2636) located west and north of Crestmont Drive on the northwest slope of Mount Sutro. The proposed heights of the buildings would range between approximately 16 to 40 feet high above the new street grade.

B. PURPOSE OF THIS ENVIRONMENTAL IMPACT REPORT

This Environmental Impact Report (EIR) has been prepared by the City and County of San Francisco Planning Department, the lead agency for the proposed project, in conformance with the provisions of the California Environmental Quality Act (CEQA) and CEQA Guidelines as amended.[23] The lead agency is the public agency that has the principal responsibility for carrying out or approving a project. This EIR assesses significant impacts on the environment including, but not limited to, those concerning aesthetics, transportation and circulation, air quality, greenhouse gas emissions, and geology and soils. In addition, this EIR includes discussions of land use and emergency access for informational purposes, although these impacts have been determined to be less than significant in the Initial Study (discussed in C. Environmental Review Process, below, and included in Appendix A of this EIR). As defined in the CEQA Guidelines Section 15382, a "significant effect on the environment" is:

> "…a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals,

[23] CEQA, California Environmental Quality Act and CEQA Guidelines, Guidelines as amended March 18, 2010, published by the Governor's Office of Planning and Research.

> flora, fauna, ambient noise, and objects of historic or aesthetic significance. An economic or social change by itself shall not be considered a significant effect on the environment. A social or economic change related to a physical change may be considered in determining whether the physical change is significant."

As stated in the CEQA Guidelines, an EIR is an "informational document" intended to inform governmental decision-makers and the public of significant environmental impacts of a project, identify possible ways to minimize or avoid the significant impacts, and describe reasonable alternatives to the project which would avoid or reduce significant environmental impacts to less-than-significant levels. Although this EIR does not recommend a decision on the proposed project, the City and County of San Francisco (City) must consider the information in this EIR and each significant impact identified in this EIR. Before making a decision on the proposed project, the City must certify that the EIR accurately and completely evaluates the environmental effects of the project. The City will then use the certified EIR, along with other information and public processes, to determine whether to approve, modify, or disapprove the proposed project, and to specify any applicable environmental conditions as part of project approvals. The purpose of this EIR is to provide the City, public agencies and the public with detailed information about the environmental effects of implementing the proposed project, to identify methods of mitigating any adverse environmental impacts should the project be approved, and to consider alternatives to the proposed project. If the EIR is certified, no further environmental review would be required under CEQA unless the proposed project were to change substantially or environmental conditions were to change substantially prior to project construction.

CEQA provides that public agencies should not approve projects until all feasible means available have been employed to lessen the significant environmental impacts of such projects to less-than-significant levels. "Feasible" means capable of being accomplished in a successful manner within a reasonable period of time taking into account economic, environmental, social, and technological factors.[24]

C. ENVIRONMENTAL REVIEW PROCESS

An Environmental Evaluation application (EE application) was submitted to the Planning Department on January 27, 2004.[25] The filing of the EE application initiated the environmental review process as outlined below.

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24 Public Resources Code Section 21061.1.

25 At the time the EE application was filed, the project was owned by Crestmont Hills, LLC, which sold the project to San Francisco Family Homes, LLC on April 30, 2007. In turn, San Francisco Family Homes, LLC sold the project to the current owner and sponsor, San Francisco Overlook Development, LLC on November 12, 2010.

NOTICE OF PROJECT RECEIVING ENVIRONMENTAL REVIEW

On June 23, 2004, the Planning Department mailed a Notice of Project Receiving Environmental Review, for a variation of the proposed project (then known as "Crestmont Hills"), to property owners within 300 feet of the San Francisco Overlook Development project site, tenants adjacent to the site, and other potentially interested parties. A number of groups and individuals commented and expressed concerns regarding effects of the proposed project on its surroundings.

Private groups and individuals commented on the issues listed below. Impacts to the physical environment identified in public comments have been addressed in the Initial Study (discussed below under "Notice of Preparation") or are assessed in this EIR as noted.

- Changes in land use and neighborhood character, proposed project density, and proximity to adjacent residences (addressed in this EIR in Section IV.A. Land Use and Land Use Planning, beginning on page 61, and in the Initial Study in Topic 1. Land Use, on pages 13–14, in Appendix A of this EIR);
- Visual impacts, including scenic views (addressed in this EIR in Section IV.B. Aesthetics, beginning on page 75; see also the Initial Study, Topic 2. Visual Quality, on pages 14-16, in Appendix A of this EIR);
- Increased population (addressed in the Initial Study in Topic 3. Population, on pages 16-17, in Appendix A of this EIR);
- Increased traffic, adequacy of parking near the project site, and pedestrian safety (addressed in this EIR in Section IV.C. Transportation and Circulation, beginning on page 93; see also the Initial Study, Topic 4. Transportation/Circulation, on page 18, in Appendix A of this EIR);
- Construction Phase Noise and Project Occupation Noise (addressed in the Initial Study in Topic 5. Noise, on pages 18–22, in Appendix A of this EIR, and in this EIR beginning on page 236);
- The effect on air quality from project construction (addressed in the Initial Study in Topic 6. Air Quality/Climate, Construction Emissions, on pages 22–23, in Appendix A of this EIR, and in this EIR, beginning on page 143);
- Change in wind effects on nearby residences (addressed in the Initial Study in Topic 6. Air Quality/Climate, Wind, on pages 24–26, in Appendix A of this EIR);
- Impacts on water and sewer service (addressed in the Initial Study in Topic 7. Utilities/Public Services, Sewage and Stormwater, on pages 27–29, in Appendix A of this EIR, and in this EIR on pages 240–242 and 244–250);
- The impact on biological resources, including purported sighting of a San Francisco garter snake, and tree removal (addressed in the Initial Study in Topic 8. Biology, on pages 33–40, in Appendix A of this EIR, and Mitigation Measure 3, on pages 51–52, and in this EIR on beginning on pages S-45 and 243);

- Geologic issues, including seismic safety, landslides, and slope stability near adjacent residences during construction (addressed in this EIR in Section IV.F. Geology and Soils, beginning on page 179; see also the Initial Study, Topic 9. Geology/Topography, on pages 41–42, in Appendix A of this EIR); and
- Impacts on fire safety and emergency access (addressed in this EIR in Section IV.G. Emergency Access, beginning on page 229; see also the Initial Study, Topic 12. Hazards, on pages 45–46, in Appendix A of this EIR).

NOTICE OF PREPARATION AND INITIAL STUDY

Based on the comments on the Notice of Project Receiving Environmental Review, the Planning Department determined that an EIR is required. The Planning Department distributed a Notice of Preparation and Initial Study (NOP/IS) on May 27, 2006, announcing its intent to prepare and distribute an EIR. A number of groups and individuals commented and expressed concerns regarding effects of the proposed project on its surroundings. Copies of the NOP and Initial Study are included in this Draft EIR in Appendix A.

After the Initial Study was distributed on May 27, 2006, the project was acquired by its current owner, San Francisco Overlook Development, LLC. The current owner and project sponsor submitted a slightly revised project design to the Planning Department on December 9, 2010. The revised project involves a new architectural design and 13 residential buildings instead of 17 buildings, but does not change the proposed number of dwelling units or other fundamental project characteristics, and has a similar overall building footprint to the initially proposed buildings. Therefore, the evaluation of impacts on population, noise, utilities/public services, biology, water, energy/natural resources, hazards, and cultural resources in the Initial Study that was prepared for the original version of the project remains valid for the currently proposed project. The revised project may have different impacts than the previously-proposed project in the areas of land use and land use planning, aesthetics, transportation and circulation, air quality, geology and soils, emergency access. In addition, CEQA now requires evaluation of greenhouse gas emissions resulting from proposed projects. These topics are evaluated in this EIR for the currently-proposed version of the project.

In response to the NOP/IS, concerns were expressed regarding the following environmental issues:

LAND USE AND LAND USE PLANNING

Effects on Neighborhood Character

This topic is addressed in this EIR, in Section IV.A. Land Use and Land Use Planning, on pages 71–72, and in the Initial Study in Topic 1. Land Use, on pages 13–14, in Appendix A of this EIR.

Increased Density in Project Vicinity

This topic is addressed in this EIR, in Section IV.A. Land Use and Land Use Planning, on pages 69–73, and in the Initial Study in Topic 1. Land Use, on pages 13–14, in Appendix A of this EIR.

Compliance with Planned Unit Development (PUD) Criteria

This topic is addressed in this EIR, in Section IV.A. Land Use and Land Use Planning, under Project Approvals on page 69, and in the Initial Study in Topic 1. Land Use, on pages 11–12, in Appendix A of this EIR.

Provision of Usable Open Space

Open space and rear yard requirements are addressed in this EIR, in IV.H. CEQA Checklist Update, on page 239, and Section IV.A. Land Use and Land Use Planning, on page 67, respectively.

Loss of "Publicly Accessible" Open Space and Children's Play Area

The project would convert the project site from undeveloped, wooded and vegetated land to a residential development. Although the privately owned site is used on an informal basis by the public, including nearby residents, it is not a City-designated public open space or park. As discussed in Section II.C. Project Characteristics, on page 43, the private road of the proposed project would not be gated, and the public would have access for recreational purposes (such as dog walking), similar to the access now afforded on the dirt road on the project site. Thus, the project would not result in loss of public open space. As noted in the Initial Study in Topic 13. Cultural Resources, on page 47, in Appendix A of this EIR, the project would not conflict with established recreational uses of the area. As discussed in Section IV.H. CEQA Checklist Update, on pages 238–240, the project would not substantially increase use of neighborhood or city parks, because the residents of the project would not substantially increase demand for or use of Mount Sutro Open Space Reserve, or citywide park facilities and public open space, such as Golden Gate Park, to the extent that substantial physical deterioration would occur. Therefore, the project would have a less-than-significant effect on recreation and open space.

Density and Massing Of Project

This topic is addressed in this EIR, in Section IV.A. Land Use and Land Use Planning, on pages 69–73, in Section IV.B. Aesthetics, on pages 86–91, and in the Initial Study in Topic 1. Land Use, on pages 13–14, in Appendix A of this EIR.

Compliance with *San Francisco Planning Code* Section 136 Regarding Limitation on Height of Retaining Walls

As discussed in this EIR, in Section II.C. Project Description, on page 28, the project evaluated in this EIR differs slightly from that evaluated in the Initial Study, which included rear yard retaining walls. The project evaluated in this EIR would not include rear yard retaining walls; thus, the comment regarding compliance with *Planning Code* height limitation for retaining walls is not applicable to the proposed project.

Compliance with *San Francisco Planning Code* Section 304d (Planned Unit Developments)

This topic is addressed in this EIR, in Section IV.A. Land Use and Land Use Planning, on pages 62–63 and 69.

Consistency with Proposition M, The Accountable Planning Initiative (*Planning Code* Section 101.1) Regarding Protection Of Neighborhood Character, Discouragement of Commuter Vehicles, Earthquake Preparedness, and Protection Of Open Space

This topic is addressed in this EIR, in Section IV.A. Land Use and Land Use Planning, on page 67, and in the Initial Study under Section II.A. Compatibility With Zoning, Plans, and Policies, on pages 11–12, in Appendix A of this EIR.

Consistency with Architectural Guidelines of Mount Sutro Woods Homeowners Association in Planning Commission Resolution 5632 of February 7, 1963

Planning Commission Resolution 5632 makes no reference to any architectural guidelines. The Architectural Guidelines of the Mount Sutro Woods Homeowners Association are private association guidelines that, would not be enforced by any City department or agency.

Addition of Multiple-Family Residential Development to the Neighborhood

This topic is addressed in this EIR, in Section IV.A. Land Use and Land Use Planning, on pages 61 and 70–72.

Size of Project

This topic is addressed in this EIR, in Section IV.A. Land Use and Land Use Planning, on pages 70–72, and in the Initial Study in Topic 1. Land Use, on pages 13–14, in Appendix A of this EIR.

AESTHETICS

Effects on Views From Lawton Avenue and Golden Gate Park

This topic is addressed in this EIR, in Section IV.B. Aesthetics, on pages 89–90.

Effects on Views, Including Views From Nearby Residences

This topic is addressed in this EIR, in Section IV.B. Aesthetics, on pages 77–90. The proposed project would change the site's visual character from an undeveloped, wooded and vegetated area to an urban, landscaped residential development, but would not have a substantial adverse impact on scenic vistas, scenic resources, or the visual character of the area, or have a significant cumulative aesthetic impact.

Buffering of Light from Areas Below That Is Provided by Existing Trees on the Project Site

As discussed in the Initial Study, in Topic 2. Visual Quality, on pages 15–16, in Appendix A of this EIR, the project would have exterior lighting typical of residential buildings in the project vicinity, which would be similar in magnitude to and consistent with the exterior lighting of nearby residential buildings. The project would comply with Planning Commission Resolution 9212, which prohibits the use of mirrored or reflective glass. Although the project would remove the existing trees on the site, it would not generate obtrusive light or glare that would substantially impact other properties for the reasons noted above; and thus, this impact would be less than significant.

Light and Glare Effects of Street Lights on the Private Road

As discussed in the Initial Study, in Topic 2. Visual Quality, on pages 15–16, in Appendix A of this EIR, the project's street lights on the private road would be typical of residential areas in the project vicinity, and would be similar in magnitude to and consistent with typical street lighting. The project would not generate obtrusive light or glare that would substantially impact other properties; and thus, this impact would be less than significant.

POPULATION

Growth Inducement

This topic is addressed in this EIR, in Section V.A. Growth Inducing Impacts, on pages 255–256, and in the Initial Study in Topic 3. Population, on pages 16–17, in Appendix A of this EIR.

Increase in Population

This topic is addressed in this EIR, in Section V.A. Growth Inducing Impacts, on pages 255–256, and in the Initial Study in Topic 3. Population, on pages 16–17, in Appendix A of this EIR.

Potential for Additional Development on Adjacent Lot 27

The growth-inducing potential of the project, including the potential for development on the adjacent Lot 27, is addressed in this EIR in Section V.A. Growth Inducing Impacts, on pages 255–256.

Potential Dislocation of Tenants Due To Project

While the construction of the proposed project may induce some project area residents to relocate, the extent to which this could occur, if at all, is speculative. The environmental impacts of the proposed project are addressed in the relevant sections and chapters of this EIR and in the Initial Study (Appendix A of this EIR). All environmental impacts would be reduced to a less-than-significant level with the incorporation of mitigation measures identified in this EIR and the Initial Study. Any relocation of project area residents that may occur would not change the conclusions of the environmental analysis.

TRANSPORTATION/CIRCULATION

Increased Traffic Levels

This topic is addressed in this EIR in Section IV.C. Transportation and Circulation, beginning on page 93.

Construction Traffic

This topic is addressed in this EIR in Section IV.C. Transportation and Circulation, on pages 112–114.

Effects on Parking

This topic is addressed in this EIR in Section IV.C. Transportation and Circulation, on pages 117–118.

Safety Hazards Due To Speeding and Failure to Observe Stop Signs

The proposed project would add traffic to project area roads, as discussed in this EIR in Section IV.C. Transportation and Circulation, on pages 107–110. The additional traffic that would be generated by the project is not anticipated to substantially affect compliance with California motor vehicle traffic laws, and the consequent degree of traffic safety. The San Francisco Police Department is responsible for enforcement of traffic laws and maintenance of traffic safety. This responsibility would not be affected by the proposed project. The issue of enforcement of traffic laws does not alter the environmental impacts analysis of the proposed project, as evaluated in this EIR and the Initial Study in Appendix A of this EIR, and enforcement of traffic laws is outside of the scope of the CEQA-required environmental analysis.

Safety During Construction

Construction impacts are addressed in this EIR in Section IV.C. Transportation and Circulation, on pages 112–113.

Safety of Pedestrians and Children

Project effects on pedestrians are addressed in this EIR in Section IV.C. Transportation and Circulation, on pages 111–112.

Visibility Along Crestmont Drive

Traffic conditions on Crestmont Drive, including vehicle pass-by maneuvers, are addressed in this EIR in Section IV.C. Transportation and Circulation, on pages 98–99.

Width of Crestmont Drive

This topic is addressed in this EIR in Section IV.C. Transportation and Circulation, on page 99.

Crestmont Drive's Characteristic of Being a Cul-de-Sac

This topic is addressed in this EIR in Section IV.C. Transportation and Circulation, on page 98.

Effects on Circulation in Project Vicinity

Traffic conditions on Crestmont Drive, including vehicle pass-by maneuvers, are addressed in this EIR in Section IV.C. Transportation and Circulation, on pages 99 and 108–110.

Access to Public Transportation

This topic is addressed in this EIR in Section IV.C. Transportation and Circulation, on pages 99–101 and 110.

NOISE

Construction Noise

As discussed in the Initial Study in Topic 5. Noise, on pages 19–20, in Appendix A of this EIR, construction of the project would generate noise, primarily during the stages of ground clearing, excavation, drilling and shoring, and construction of the buildings. Due to the relatively low ambient noise levels in the project vicinity, construction noise would be clearly noticeable to nearby residents. As discussed in this EIR, on page 236, adherence to the City's noise ordinance would reduce construction noise to a less-than-significant level.

Operational Noise

As discussed in the Initial Study in Topic 5. Noise, on page 19, in Appendix A of this EIR, substantial increases in the ambient noise level due to the proposed 34 dwelling units' occupancy, equipment, and operation noise are not anticipated. Traffic is the main noise source that makes the greatest contribution to ambient noise levels throughout most of San Francisco, including the project area; however, the increase in noise from traffic on Crestmont Drive generated by the proposed residences would cause the overall daytime and nighttime average noise levels to change by less than one dBA. This would not be a significant change, and the impact of the project's operational noise would be less than significant.

Construction Vibration Affecting Existing Buildings and Their Foundations

As discussed in the Initial Study in Topic 5. Noise, on pages 21–22, in Appendix A of this EIR, construction-related vibration generated by the project, including use of bulldozers and caisson-drilling[26] and large loaded trucks on Crestmont Drive, may be perceptible from nearby homes. However, no damage to nearby buildings and their foundations (which are considered to be normal or modern construction), or to the stability of the slope would occur as a result of this vibration.

Construction Vibration, Storm Water, and Seismic Event Affecting Nearby Structures

As discussed in this EIR, in Section IV.F. Geology and Soils, beginning on page 179, there is no mapped active or inactive fault in the immediate proximity of the site, and the likelihood of fault rupture is remote. The risk of earthquake-induced landslides is low with the exception of the landslide area northeast of the project site. Implementation of Mitigation Measures M-GE-1a, on page 210, M-GE-2a, page 214, M-GE-2b, on page 214, M-GE-2c, on page 215, M-GE-2d, on page 216, M-GE-2e, on page 217, M-GE-2f, on page 218, and M-GE-2g, on page 218 would reduce the significant impacts of landslides and seismic ground shaking to less-than-significant levels. As discussed in this EIR, in Section IV.F. Geology and Soils, on page 224, implementation of Mitigation Measure M-GE-2d, delineated on page 216, would reduce the significant impact of erosion to a less-than-significant level. The mitigation measures for landslides and ground shaking would reduce impacts of these events under all conditions, including periods of heavy storm flows. Although rainfall is not a seismic event, water-saturated soils can increase the effects of landslides and ground shaking.

As discussed in the Initial Study, in Topic 5. Noise, on pages 21–22, in Appendix A of this EIR, vibration generated by project construction would be below the level at which Caltrans reports that there is virtually no risk of "architectural" damage to normal buildings, according to the California Department of Transportation's report on earthborne vibrations, which contains the accepted standards. Although it is unlikely that vibration-generating construction activities would occur during periods of heavy rainfall, the vibration caused by construction would not substantially add to the effect of a seismic event on nearby structures, should heavy rainfall, construction vibration, and a seismic event all occur simultaneously.

Loss of Noise Buffer Provided By Existing Trees on the Project Site

The existing trees at the site, which would be removed for project construction, would not have an effect on the transmission of sound. As discussed in this EIR, on page 236, adherence to the City's noise

[26] *Caisson-drill:* An auger-like machine (or an attachment for a crane) used in foundation work to cut a vertical or inclined circular shaft in the earth for a building footing which is placed in solid material below ground surface. Used for piers/stitch piers.

ordinance would reduce construction noise to a less-than-significant level. In addition, as discussed in the Initial Study, in Topic 5. Noise, on page 19, in Appendix A of this EIR, substantial increases in the ambient noise level due to the proposed 34 dwelling units' occupancy, equipment, and operation noise are not likely to occur.

Echoes at Site

The local topography and configuration of structures can affect transmission and reflection of sound in the project vicinity. As discussed in this EIR, on pages 236–237, adherence to the City's noise ordinance would reduce construction noise to a less-than-significant level. In addition, as discussed in the Initial Study, in Topic 5. Noise, on page 19, in Appendix A of this EIR, substantial increases in the ambient noise level due to the proposed 34 dwelling units' occupancy, equipment, and operational noise are not likely to occur.

AIR QUALITY/CLIMATE

Additional Air Emissions

This topic is discussed on pages 119–153 of this EIR.

Loss of Buffer to Airborne Particulate Matter Provided By Existing Trees On-Site

This topic is discussed on page 145 of this EIR.

Wind-Fallen Trees Across Crestmont Drive On Existing Homes

The existing trees on the site are not located such that there could be damage to existing residences if the trees were to be blown down. Therefore, any trees that would remain on the site after project construction would not create a hazard of wind-fallen trees on existing homes in the site vicinity.

Loss of Wind Buffer for Remaining Trees

Existing trees on the site (that are proposed to be removed by the project) may provide a small wind buffer for the other trees in the project vicinity that would remain. As discussed in the Initial Study, in Topic 6. Air Quality/Climate, on page 26, in Appendix A of this EIR, the proposed project would not cause significant changes to the wind environment. Therefore, removal of the trees on the site would not cause significant wind impacts for those trees that remain in the site vicinity.

UTILITIES/PUBLIC SERVICES

Additional Demands on Utility Systems, Police, and Fire

The project's impacts on solid waste disposal, storm water and sewage collection and treatment, police and fire protection, schools, power and communications facilities, and water supply are evaluated individually in the Initial Study, in Topic 7. Utilities/Public Services, on pages 27–33, in Appendix A of this EIR. Impacts of the project on all of these services and utility systems would be less than significant.

Impact on Recreation and Recreational Space

As discussed in IV.H. CEQA Checklist Update, on pages 238–240 of this EIR, the project would not substantially increase demand for or use of neighborhood or citywide parks and public open space, or conflict with established recreational uses of the area.

The proposed project would convert the privately owned project site from undeveloped, vegetated and wooded land to a residential development. Although the project site is used on an informal basis by the public, including nearby residents, it is not a City-designated public open space. As discussed in Section II.C. Project Characteristics, on page 43 of this EIR, the private road of the proposed project would not be gated, and the public would have access for recreational purposes (such as dog walking), similar to the access now afforded on the dirt road on the site. The project would not result in loss of any public open space, and would not affect the large open space of the Mount Sutro Open Space Reserve of the University of California, San Francisco, located on the east side of Crestmont Drive.

The impact of the project on recreation and recreational space would be less than significant.

Provision of Recreational Open Space

The proposed project is required by the *Planning Code* to include usable open space and rear yards, the requirements for which are identified in this EIR in Section IV.A. Land Use and Land Use Planning, on page 61 of this EIR. As discussed on pages 50, 65, and 68–69, the proposed project would require Conditional Use Authorization by the Planning Commission for a PUD in order to modify the rear yard requirement.

Effects on Recreation in Space Between 495 and 505 Crestmont Drive

The project would convert the privately owned project site, including the space between 495 and 505 Crestmont Drive, from undeveloped, wooded and vegetated land to a residential development. Although the privately owned site is used on an informal basis by the public, including nearby residents, it is not a City-designated public open space. As noted in Section II.C. Project Characteristics, on page 43 of this EIR, the private road of the proposed project would not be gated, and the public would have access for recreational purposes (such as dog walking), similar to the access now afforded on the dirt road on the site. Thus, the project would not result in loss of access to open space between 495 and 505 Crestmont Drive.

Areas Dedicated To Open Space by SFPC Resolution 7504; Effect on Adjacent Open Area of Mount Sutro Woods Homeowners Association

As discussed in more detail under Use and Height and Bulk Districts, on page 62, San Francisco Planning Commission Resolution (SFPC) 7504 granted approval of the units developed as part of a PUD on the project site and adjoining parcels, totaling approximately 6 acres. The project site would consist of Lot 25 which is 49,558 square feet and would be developed with the proposed residential buildings, and a portion of the adjoining Lot 28 which is 14,332 square feet and would be developed with the proposed private street. Lot 25 does not include any City-designated public open space. The project would not occupy or alter any of the adjacent dedicated open space of the Mount Sutro Woods Homeowners Association. The project does not include any part of the Mount Sutro Woods Homeowners Association open space, and does not rely on this open space for meeting the project's open space requirements.

BIOLOGY

Loss of Trees and Vegetation and Effect on Wildlife Including One Resident Hawk

As discussed in the Initial Study, in Topic 8. Biology, on pages 33–40, in Appendix A of this EIR, no special-status plant or animal species were observed on the site during three field visits by a qualified biologist. The project would not result in the removal of sensitive habitat, although it would include the removal of approximately 880 non-native eucalyptus and acacia trees. Eucalyptus is important as roosts, perches, and nest sites for a number of bird species, particularly raptors. Nests were not found in the trees on the project site during the three field visits (the latest was conducted on January 19, 2006); however, raptors or migratory birds could establish new nests in the site's trees before construction proceeds on the project site. When in active use, these newly established nests would be subject to protection under the federal Migratory Bird Treaty Act. The removal of trees containing raptor or migratory bird nests would be a significant impact. Implementation of Mitigation Measure 3 on pages S-45–S-47 of this EIR, and on pages 51–52 of the Initial Study, in Appendix A of this EIR, which calls for a pre-construction survey, nest monitoring, and installation of protective fencing near a nest tree, would avoid or minimize the disruption of raptor or migratory bird breeding activity, thereby reducing the impact on special-status birds to a less-than-significant level. Therefore, the impact of the project on biological resources, including trees, vegetation, and raptors, would be less than significant.

Red-Tail Hawks Observed in the Neighborhood

As discussed in the Initial Study in Topic 8. Biology, on page 39, in Appendix A of this EIR, eucalyptus is important as roosts, perches, and nest sites for a number of bird species, particularly raptors. Characteristic species of eucalyptus habitat include the red-tail hawk. Implementation of Mitigation Measure 3 on pages S-45–S-47 of this EIR, and on pages 51–52 of the Initial Study, in Appendix A of this EIR, which calls for a pre-construction survey, nest monitoring, and installation of protective fencing near a nest tree, would avoid or minimize the disruption of raptor or migratory bird breeding activity, thereby reducing the impact to special-status birds to a less-than-significant level. Therefore, the impact of the project on biological resources, including red-tail hawks, would be less than significant.

Impacts on Special Status ("Endangered") Plants and Wildlife

As discussed in the Initial Study in Topic 8. Biology, on pages 33–40, in Appendix A of this EIR, the proposed project would not directly or indirectly affect a candidate, or listed threatened or endangered species. The project, with implementation of Mitigation Measure 3 on pages S-45–S-47 of this EIR, and on pages 51–52 of the Initial Study, in Appendix A of this EIR, would not interfere substantially with the movement of any resident or migratory wildlife species. The proposed project would not substantially reduce the habitat of an endangered or threatened wildlife or plant species or cause a species to drop below self-sustaining levels. Therefore, the project would not have a significant impact on special status plant and wildlife species.

GEOLOGY AND SOILS

Existing Slope Stability and Effect of the Project On Slope Stability

This topic is addressed in this EIR in Section IV.F. Geology and Soils, on pages 184–186, 188, and 192–195, 201, and 213–221.

Erosion, Including Erosion on the Dirt Access Road, and Effects on Intermittent Streams Along Fifth Avenue

This topic is addressed in this EIR in Section IV.F. Geology and Soils, on pages 190–193.

Landslide and Mudslide

This topic is addressed in this EIR, in Section IV.F. Geology and Soils, beginning on page 184.

Seismic Hazards

This topic is addressed in this EIR, in Section IV.F. Geology and Soils, on pages 210–212.

Inclusion of Boring Logs in Appendix of Geotechnical investigation

The project's geotechnical investigation (dated September 29, 2006), on which the geology and soils evaluation is based, includes boring logs in an appendix of the geotechnical investigation. The text of this report is included in Appendix C of the EIR; and the full report with appendices, including boring logs, is on file and available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, San Francisco, as part of Case No. 2004.0093E: San Francisco Overlook Development Residential Project.

Location of Referenced Slide Scarp

The location of the slide scarp[27] that is referred to in Section 5.02.1 of the geotechnical investigation is identified in Section 4.02.3.02, Existing Landslide Features, of the geotechnical investigation (dated September 29, 2006), and in this EIR, in Section IV.F. Geology and Soils, History of Site and Vicinity, on pages 179–183 and 184–186. The text of the geotechnical investigation is included in this EIR as Appendix C. The full geotechnical report, including appendices, is on file and available for public review at the San Francisco Planning Department, 1650 Mission Street, Fourth Floor, San Francisco, as part of Case No. 2004.0093E: San Francisco Overlook Development Residential Project.

New Site Reconnaissance After Wet Winter (of 2005/2006)

During an October 2, 2006 site visit, the geotechnical consultant noted that new slides had occurred on the steep slopes, downhill of the home at 391 Crestmont Drive. The materials deposited by the slides appear to be within the open space area controlled by the Mount Sutro Woods Homeowners Association, uphill of the San Francisco Overlook Development project site. This area of the slides is similar to the soil movement downhill of the home at 375 Crestmont Drive, which is included in the discussion in this EIR in Section IV.F. Geology and Soils, Miscellaneous Landslides, beginning on page 184. The proposed debris wall would be constructed along the uphill edge of the San Francisco Overlook Development private street. Mitigation Measure M-GE-2c, on pages 215–216, would reduce the likelihood of landslide material sliding onto the San Francisco Overlook Development property and causing a road obstruction.

During the October 2, 2006 site visit, the geotechnical consultant also noted a second area with significant additional ground movement. This area is within the raveling rockslide scar discussed in this EIR, in Section IV.F. Geology and Soils, on page 184. As discussed on pages 214–216, implementation of Mitigation Measure M-GE-2b: Stitch Piers, and Mitigation Measure M-GE-2c: Debris Walls would reduce the significant impacts of shallow soil/ground instabilities and ongoing sloughing/raveling to less-than-significant levels.

[27] A slide scarp is a steeply cut slope.

Effect of Ruptured Drain Line on Project and Existing Facilities

The geotechnical consultant observed during an October 2, 2006 site visit that the ruptured drain line downhill of the units at 465-467 and 475-477 Crestmont Drive had been repaired. Flowing water was not heard. Apparently, some excavations had been performed in the area in order to repair the drain line.

Construction of Retaining Wall Not Noted In Geotechnical Investigation

As noted in Section 3.01.10, Warren Drive Landslide, in the project's geotechnical investigation, and in this EIR in Section IV.F. Geology and Soils, Warren Drive Landslide, on page 186, the retaining wall mentioned in the comment has been constructed.

Effects of Project Grading On Slope Stability of Uphill Properties of Mount Sutro Woods Homeowners Association

As discussed in the geotechnical investigation and in this EIR in Section IV.F. Geology and Soils, the slope stability analysis evaluated overall hillside stability, including the Mount Sutro Woods Homeowners Association property. The geotechnical consultant concluded that the overall hillside area would be stable, even with the construction of the proposed San Francisco Overlook Development project. However, the area of the slope immediately uphill of the San Francisco Overlook Development project site will remain unstable. Therefore, the geotechnical consultant recommended that a continuous debris wall be built along the uphill side of the project's private street in order to collect slide materials (see Mitigation Measure M-GE-2c: Debris Walls, on pages 215–216), and to use the factors of safety specified in Mitigation Measure M-GE-3a: Slope Stability, on page 220. Implementation of these mitigation measures would reduce impacts on slope stability to less-than-significant levels.

Impact of the Landslide Downhill From 505-507 Crestmont Drive

The majority of the landslide impacting the building at 505-507 Crestmont Drive is located outside the San Francisco Overlook Development project site. Effects of the landslide located outside the San Francisco Overlook Development project site on the building at 505-507 Crestmont Drive are not an impact of the proposed project. Subsurface exploration outside the San Francisco Overlook Development project site, and recommendations for remedial work for that area outside of the project site, are outside the scope of this EIR.

Identification of Work Scope and Areas of Cut and Fill For Installation and Removal of Temporary Facilities in the Construction Staging Plan

The planning and staging of temporary construction roads, excavation, and stockpiles would be carefully conducted to minimize creating ground instabilities, and conditions in construction staging areas would be restored to a stable condition at the completion of work. An EIR is not required to contain a design-level description of the project; a conceptual description of the project components is sufficient as long as the description contains sufficient detail to enable decision-makers and the public to understand the environmental impacts of the proposed project.[28] The geotechnical investigation, and the analysis in Section IV.F. Geology and Soils, beginning on page 179 of this EIR, address geotechnical issues, including excavation and slope stability in compliance with CEQA. The level of detail in an identification of construction work scope and areas of cut and fill for installation and removal of temporary facilities in the construction staging plan is outside the scope of the CEQA-required environmental analysis.

Work Moratorium During Winter Months, Preceded by a "Winterization" Plan

Any earthwork or grading operations performed during the winter months would be conducted with care to minimize earth movement danger and damage. Winterization plans for the site would be developed and implemented to minimize water runoff and soil/ground erosion. Mitigation Measure M-GE-2d: Drainage and Erosion Control, on pages 216–217 of this EIR, includes provisions for erosion control during the rainy season. Although the Planning Commission, or the Board of Supervisors on appeal, may choose to impose a moratorium during winter months, such a moratorium is not required to reduce project impacts to less-than-significant levels, as discussed in this EIR in Section IV.F. Geology and Soils, beginning on page 179.

Geotechnical Investigation of Upslope Property

While upslope property owners may allow access to their properties to the project geotechnical consultant to perform an on-site investigation on these properties, such an investigation is not required to provide sufficient detail on geologic issues and to determine the geotechnical feasibility of the project, to enable decision-makers and the public to understand the environmental impacts of the proposed project.[29]

Effects on Storm Water Runoff and Storm Drains, Including Loss of Existing Trees

This topic is addressed in the Initial Study, in Topic 10. Water, on pages 42–43, in Appendix A of this EIR.

Methodology of Peer Review of Project Geotechnical Investigation

This topic is addressed in this EIR in Section IV.F. Geotechnical Investigation for the San Francisco Overlook Project, on pages 205–207.

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28 Dry Creek Citizens Coalition v. County of Tulare (1999) 70 CA4th 20, 82 CR2d 398.

29 *Geotechnical Investigation, Crestmont Drive Project, San Francisco, California,* September 29, 2006, updated on December 7, 2010, prepared by Alan Kropp & Associates. This report is on file and available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, San Francisco, as part of Case No. 2004.0093E.

EMERGENCY ACCESS

Effect of Crestmont Drive Cul-de-sac On Emergency Vehicle Access

As discussed in this EIR, in Section IV.C. Transportation and Circulation, on pages 98–99, vehicle traffic operations on Crestmont Drive, which is a long and winding cul-de-sac, currently have minimal delays for drivers, due to the low traffic volumes on the street. Similar vehicle maneuvering and circulation on narrow two-way streets are characteristic of many residential streets in hillside neighborhoods. As discussed in this EIR in Section IV.C. Transportation and Circulation, on page 108, the addition of project-generated traffic would be small, and traffic volumes on Crestmont Drive would remain low. Therefore, impacts on emergency vehicle access on Crestmont Drive would be less than significant.

Effect of Narrow Streets on Emergency Vehicle Access

As discussed in this EIR in Section IV.C. Transportation and Circulation, on page 99, the width of Crestmont Drive varies from 26 to 28 feet. Due to the low traffic volume on the street, vehicle pass-by maneuvers are not a frequent occurrence. Similar vehicle maneuvering and circulation on narrow two-way streets are characteristic of many residential streets in hillside neighborhoods. As discussed in this EIR in Section IV.C. Transportation and Circulation, on page 108, traffic volumes on Crestmont Drive would remain low. Therefore, the effect on vehicle operations, including emergency vehicles, would be less than significant.

Effect of Vehicles Parked on Project Area Streets on Emergency Vehicle Access

As noted in this EIR, in Section IV.C. Transportation and Circulation, on page 117, the proposed project would supply a total of 68 parking spaces, which would exceed the project's parking demand of 51 spaces. For this reason, the project likely would not generate substantial numbers of vehicles that would park on Crestmont Drive, which could affect the ability of emergency vehicles to access the area. As discussed in this EIR in Section IV.G. Emergency Access, on pages 230–231, on-street parking would not be permitted on the new private road, which would be enforced through the project's Declaration of Covenants, Conditions, and Restrictions (CC&Rs) or those of the Mount Sutro Woods Homeowners Association should the project be annexed to that association,. The road would have a 20-foot road width, which the SFFD has determined, in a letter dated August 4, 2005, to be in compliance with the SFFD's standards with respect to emergency vehicle access and could accommodate their largest vehicles and provide adequate access for emergency vehicles and personnel (see Section IV.G. Emergency Access, on page 230, for discussion of the SFFD's letter). The SFFD has determined that the proposed project would conform to the fire safety provisions of the Building Code and the Fire Code. Therefore, the impact of the proposed project on emergency access would be less than significant.

Effect of Curves on Crestmont Drive on Emergency Vehicle Access

As discussed in this EIR, in Section IV.G. Emergency Access, on page 230, the SFFD, in a letter dated August 4, 2005, has determined that emergency vehicle access to the project site from Crestmont Drive would be adequate.

Effects of Fog on Visibility

The proposed project would not change the intensity or frequency of fog in the project vicinity. Visibility on Crestmont Drive would not be affected by fog more than on other roads in the area. As discussed in this EIR, in Section IV.G. Emergency Access, on page 230, the SFFD, in a letter dated August 4, 2005, has determined that emergency vehicle access to the project site from Crestmont Drive would be adequate.

Ability of Emergency Vehicles to Maneuver

The proposed project would not affect the configuration or width of Crestmont Drive or other project area streets. As noted in this EIR, in Section IV.C. Transportation and Circulation, on page 108, the estimated project traffic volumes on Crestmont Drive would be low, and impacts on traffic flow, including emergency vehicle maneuvers, would be less than significant. As discussed in this EIR in Section IV.G. Emergency Access, on page 230, the SFFD, in a letter dated August 4, 2005, has determined that the project design of the 20-foot-wide private cul-de-sac road is in compliance with the SFFD's standards with respect to emergency vehicle access, and that the new road could accommodate their largest vehicles and provide adequate emergency vehicle access.

Obstruction of Access or Reduced Maneuverability Caused By Fallen Trees or Simultaneous Responses By Two or More Emergency and/or Service Vehicles

The proposed project would not affect the likelihood that trees would fall and block project area streets. By removing trees from the site, the project could reduce the likelihood of trees falling and obstructing emergency service vehicles. As discussed in this EIR, in Section IV.G. Emergency Access, on page 230, the SFFD, in a letter dated August 4, 2005, has determined that emergency vehicles' and personnel's access to the project site from Crestmont Drive would be adequate.

Increased Emergency Service Calls Due To Project

Although the project could increase the number of emergency service calls received from the area, the increase would not be substantial in light of the existing demand for emergency service calls on the west slope of Mount Sutro. As noted in this EIR, in Section IV.C. Transportation and Circulation, on page 108, traffic volumes on Crestmont Drive would remain low, even with the addition of project traffic. In addition, the SFFD, in a letter dated August 4, 2005, has determined that emergency vehicle access to the project site from Crestmont Drive would be adequate (see Section IV.G. Emergency Access, on page 230).

Effect of Construction Trucks on Emergency Vehicle Access During Construction Activity

As discussed in this EIR, in Section IV.C. Transportation and Circulation, on pages 112–114, the effects of project construction traffic would be similar to, or less than, those associated with the project when occupied by residents, which would be small and are discussed in this EIR in Section IV.C. Transportation and Circulation, on page 108. As discussed in this EIR in Section IV.G. Emergency Access, on page 230, the SFFD, in a letter dated August 4, 2005, has determined that emergency vehicle access to the project site from Crestmont Drive would be adequate.

Fire Danger Due To Eucalyptus Trees Near Project Site

The fire danger posed by eucalyptus trees in the project vicinity is an existing condition that would remain with or without the project. To the extent that the project would remove eucalyptus trees from the site, this hazard would be reduced. As discussed in this EIR, in Section IV.G. Emergency Access, on page 230, and in the Initial Study in Topic 12. Hazards, on pages 45–46, in Appendix A of this EIR, the project design is in compliance with the SFFD's standards with respect to emergency vehicle access. The impact of the project on fire hazards would be less than significant.

PROJECT ALTERNATIVES

Project Alternative with Access from Fifth Avenue

Alternatives to the proposed project are identified and discussed in this EIR, in Chapter VI. Alternatives to the Proposed Project, on pages 271–287. The reasonable range of alternatives discussed in this EIR (including the No Project Alternative, in which the project site would remain in its existing condition as an undeveloped site; a Reduced Project Alternative consisting of 16 single-family dwellings and a total of 38 parking spaces; and a Reduced Foundations Alternative consisting of 34 multi-family dwelling units in two buildings with a total of 51 parking spaces), were identified on the basis of having reduced transportation, air quality, greenhouse gas, noise, and geologic effects compared to the proposed project, and the environmental impacts associated with each alternative are described. An alternative providing access from Fifth Avenue was determined not to be feasible because the project sponsor's property has no frontage on Fifth Avenue or any easement rights to gain access to Fifth Avenue. Instead of the proposed project, decision-makers could adopt the No Project Alternative, the Reduced Project Alternative, or the Reduced Foundations Alternative if these alternatives would reduce substantially or avoid significant environmental impacts of the project and are determined to be feasible and would attain most of the basic objectives of the project.

Lower Density Project Alternative With Fewer Residential Units and/or Single-Family Detached Homes, and Two or More Parking Spaces Per Unit

As discussed in this EIR, in Chapter VI. Alternatives to the Proposed Project, on pages 271–287, the Reduced Project Alternative includes fewer residential units, single-family detached homes, and more than two parking spaces per unit.

In addition to the environmental issues identified above, comments on the Notice of Preparation of an Environmental Impact Report were expressed regarding the following non-environmental issues:

PLANNING COMMISSION PURVIEW

Potential for Rezoning To Allow Fewer Residential Units and/or a Maximum of Six Single-Family Detached Dwelling Units

This comment regarding potential rezoning does not relate to the adequacy or deficiency of the evaluation of environmental impacts of the proposed project in this EIR. Rezoning may be discussed at the Planning Commission hearing for project approval, or at a separate hearing. In either case, the issue of rezoning would be independent of the environmental review process.

Appropriateness of Previous Zoning and Modifications

This comment regarding previous zoning does not relate to the adequacy or deficiency of the evaluation of environmental impacts of the proposed project in this EIR. This issue may be discussed at the Planning Commission hearing on the proposed project itself, independent of the environmental review process.

Americans with Disabilities Act (ADA) Access, Including Parking Requirements

This comment regarding Americans with Disabilities Act (ADA) parking requirements does not relate to the adequacy or deficiency of the evaluation of environmental impacts of the proposed project in this EIR. Compliance with ADA requirements would be part of the project application and review of the Conditional Use Authorization for the PUD for the project.

Necessity of Project

The commenter's concern regarding the need for the project does not relate to the adequacy or deficiency of the evaluation of environmental impacts of the proposed project in this EIR. The need for the project may be discussed at the Planning Commission hearing on the Conditional Use Authorization for the PUD for the project.

SOCIOECONOMIC EFFECTS

Effects on Privacy

Effects on privacy do not relate to the environmental impacts of the proposed project, as evaluated in this EIR and the Initial Study. Effects on privacy may be discussed at the Planning Commission hearing on the Conditional Use Authorization for the PUD application for the project.

Effect on Property Values

Effects on property values are economic and social effects that do not relate to the environmental effects of the proposed project, in accordance with CEQA Guidelines Section 15131. Effects on property values may be discussed at the Planning Commission hearing on the Conditional Use Authorization for the PUD for the project.

Affordable Housing

Affordable housing is an economic and social issue that is not related to the environmental impacts of the proposed project, as evaluated in this EIR and the Initial Study, in accordance with CEQA Guidelines Section 15131. Affordable housing issues would be part of the review of the project's Conditional Use Authorization for the PUD application process.

MAINTENANCE AND ENFORCEMENT RESPONSIBILITIES OF CITY AGENCIES AND DEPARTMENTS

Enforcement of On-Street Parking Restrictions on the New Private Road to Maintain Emergency Access

The proposed project would create a new private road, on which enforcement of no-parking restrictions would be required, as discussed in the Initial Study in Topic 12. Hazards, Emergency Response Plans, on page 45, in Appendix A of this EIR; and is also discussed in this EIR, in Section IV.G. Emergency Access, on pages 230–231. The parking restrictions would be enforced through the CC&Rs of the homeowner's association (or for the Mount Sutro Woods Homeowners Association should the project be annexed to that association), which would be created for the project residences, and could be included in the conditions of approval of the proposed project. The issue of enforcement of parking restrictions does not alter the environmental impacts of the proposed project, as evaluated in this EIR and the Initial Study, and is extraneous to the scope of the CEQA-required environmental analysis.

Effects of Construction Debris on Neighboring Properties

The potential for illegal disposal of construction debris on neighboring properties is an enforcement issue that does not relate to the adequacy or deficiency of the evaluation of environmental impacts of the proposed project. This issue does not alter the environmental impacts of the proposed project.

Enforcement of Construction Noise Mitigation Measures

Monitoring of construction noise mitigation measures for the project is the responsibility of the San Francisco Department of Building Inspection (DBI). Enforcement of the City's noise ordinance is the responsibility of the San Francisco Police Department. The issue of enforcement of construction noise mitigation measures does not alter the environmental impacts of the proposed project, as evaluated in this EIR and in the Initial Study.

Enforcement of Construction Air Quality Mitigation Measures

Monitoring of construction air quality mitigation measures for the project is the responsibility of the San Francisco Department of Public Health (DPH) and DBI. Enforcement of construction air quality mitigation measures for the project is the responsibility of the Bay Area Air Quality Management District (BAAQMD) and DPH. The issue of enforcement of air quality mitigation measures does not alter the environmental impacts of the proposed project, as evaluated in this EIR and in the Initial Study.

Damage to Existing Sewer Line at the Project Site

The geotechnical consultant, in the process of their investigation, noted the sewer line and concluded that there was no effect from their investigation. The issue of damage to existing infrastructure, asserted by a commenter to be the result of the project geotechnical consultant's activities, does not relate to the adequacy or deficiency of the evaluation of environmental impacts of the proposed project in this EIR. Resolution of this issue would be independent of the environmental review process.

Potential for Construction Vehicles to Trespass on Open Space Adjacent to the Project Site

As discussed in this EIR, in Section IV.C. Transportation and Circulation, on pages 112–113, construction staging would occur on the site, within the area that would become a new private road. The project sponsor and construction manager would be responsible for keeping construction staging on the project site. The issue of potential trespassing on neighboring private properties is a San Francisco Police Department enforcement issue that does not alter the environmental impacts of the proposed project, as evaluated in this EIR and in the Initial Study, and is extraneous to the scope of the CEQA-required environmental analysis.

Responsibility for Road Maintenance

As a private road, road maintenance would be the responsibility of the project's homeowners association, and would be included in its Declaration of CC&Rs (or those of the Mount Sutro Woods Homeowners Association should the project be annexed to that association). The issue of road maintenance does not relate to the adequacy or deficiency of the evaluation of environmental impacts of the proposed project in this EIR and in the Initial Study.

Provision by Project Sponsor of Insurance or Bond Against Damage To Nearby Buildings

Geologic impacts of the project on nearby buildings, and appropriate mitigation measures, are evaluated in this EIR, in Section IV.F. Geology and Soils, beginning on page 179. Provision of insurance or a bond against damage to nearby buildings is a legal issue that is extraneous to the scope of the CEQA-required environmental analysis.

City Responsibility/Liability for Geologic Damage to Structures Due To Inadequate Project Design

Geologic impacts of the project on nearby buildings, and appropriate mitigation measures, are evaluated in this EIR, in Section IV.F. Geology and Soils, beginning on page 179. City responsibility for geologic damage is a legal issue that is extraneous to the scope of the CEQA-required environmental analysis.

Maintenance of Storm Drains

The issue of maintenance of storm drains is extraneous to the scope of the CEQA-required environmental analysis, and does not alter the environmental impacts of the proposed project, as evaluated in this EIR and in the Initial Study.

Adequacy of Testing the Feasibility of Emergency Vehicle Operations

As discussed in this EIR, in Section IV.G. Emergency Access, on page 230, the SFFD, in a letter dated August 4, 2005, has determined that emergency vehicle access to the project site from Crestmont Drive would be adequate. The adequacy of testing the feasibility of emergency vehicle operations pertains to provision of service, an issue that is extraneous to the scope of the CEQA-required environmental analysis, and does not relate to the adequacy or deficiency of the evaluation of environmental impacts of the proposed project in this EIR. Resolution of this issue would be independent of the environmental review process.

HEALTH EFFECTS

Effect of Construction Air and Dust Emissions on Sensitive Receptors at University of California, San Francisco (UCSF) Medical Facility

This topic is addressed in this EIR in Section IV.D. Air Quality, beginning on page 119.

DRAFT EIR

This Draft EIR is prepared in accordance with CEQA, as amended, and the *CEQA Guidelines*. The EIR is a public informational document intended to disclose to public agency decision-makers and the general public the significant environmental effects of a project and to present mitigation measures and feasible alternatives to avoid or reduce the significant environmental effects of that project. This Draft EIR provides a physical impact analysis for construction and operation of the proposed project.

All documents referenced in this Draft EIR are available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, San Francisco, CA, 94103. The distribution list for the Draft EIR is also available for review at the Planning Department.

Following publication of this Draft EIR, there will be a public hearing before the San Francisco Planning Commission during an approximately 47-day public review and comment period to solicit public comment on the adequacy and accuracy of information presented in this Draft EIR. The comment period will start on May 2, 2012, and end on June 18, 2012. The public hearing on this Draft EIR has been scheduled by the Planning Commission for June 7, 2012 in Room 400 City Hall, Dr. Carlton B. Goodlett Place, beginning at 12:00 p.m. or later (call 558-6422 the week of the hearing for a recorded message giving a more specific time).

In addition, readers are invited to submit written comments on the adequacy of the document, that is, whether this Draft EIR identifies and analyzes the possible environmental impacts and identifies appropriate mitigation measures. Comments are most helpful when they suggest specific alternatives and/or additional measures that would better mitigate significant environmental impacts. CEQA Guidelines Section 15096(d) calls for responsible agencies to provide comments on those project activities within those agencies' areas of expertise and to support those comments with either oral or written documentation.[30]

Written comments should be submitted to:

Bill Wycko, Environmental Review Officer
RE: San Francisco Overlook Development Residential Project Draft EIR
San Francisco Planning Department
1650 Mission Street, Suite 400
San Francisco, CA 94103

or bill.wycko@sfgov.org

FINAL EIR

Following the close of the public review and comment period, the Planning Department will prepare and publish a document titled "Comments and Responses" that will contain all comments on this Draft EIR and the Planning Department's responses to those comments, along with copies of the letters received and a transcript of the Planning Commission public hearing. This Draft EIR, together with the Comments

30 CEQA Section 21069 defines a responsible agency as a public agency, other than the lead agency, which has responsibility for carrying out or approving a project.

and Responses document, will be considered by the Planning Commission in an advertised public meeting, and then certified as a Final EIR if deemed adequate.

II. PROJECT DESCRIPTION

This chapter describes the proposed San Francisco Overlook Development Residential Project (proposed project), which is evaluated in this EIR. A description of the proposed project's regional and local context and objectives is also provided, in addition to required project approvals and entitlements. For the purposes of this EIR, the "project sponsor" and "project developer" are considered to be San Francisco Overlook Development, LLC. As noted previously, the San Francisco Planning Department is the lead agency for this EIR. The project architect is Levy Design Partners.

A. PROJECT SPONSOR'S OBJECTIVES

The objectives of the proposed project include the following:

- Develop the vacant 49,558-square-foot infill lot (Lot 25, in Assessor's Block 2636), located in an RM-1 (Residential, Mixed, Low Density) District, which allows one dwelling unit per 800 square feet of lot area (up to 61 permitted dwelling units) excluding the easement on Lot 28 in Assessor's Block 2636,) with fewer units than the 61 units allowed as of right in order to conform the project to the San Francisco Residential Design Guidelines.
- Create an appropriately scaled residential development of larger multiple-bedroom family-sized dwelling units, implementing the objectives of the *General Plan* to construct new family-sized housing that is consistent with the existing neighborhood character and pattern of development.
- Develop a project that is considerate of the views of existing houses in the neighborhood.
- Given the site's lack of easy transit connections, provide more than the minimum number of on-site parking spaces (one space per unit).
- Comply with the requirements of the Northwest Mount Sutro Slope Protection Area ordinance (Building Code Section 106.4.1.3) and the recommendations of the Geotechnical Investigation, Crestmont Drive Project, San Francisco, California, prepared by Alan Kropp & Associates, dated September 29, 2006, and updated December 7, 2010, in order to remedy the effects of ongoing hillside erosion, past landslides on and near the project site, and improve the stability of the existing site and surrounding area.

- Construct a residential project that would produce a sufficient return on investment for the project sponsor and its investors to implement necessary hillside stabilization measures and provide or upgrade site infrastructure (including a new access roadway, utilities, and fire hydrants).

B. PROJECT BACKGROUND

In 1963, development of 105 dwelling units, a community center, and a parking garage was approved by the Planning Commission as a Planned Unit Development (PUD) on the project site and adjoining parcels, totaling about 6 acres (discussed in more detail in Use Districts, on page 62). In 1976, the Planning Commission approved modifications to the 1963 PUD approval, to delete the community center and its parking garage, and to reduce the approved number of dwelling units to 83 units. Thereafter, 48 of the 83 approved dwelling units were built.

On January 27, 2004, the developer of the project site, which remains undeveloped, submitted to the Planning Department an Environmental Evaluation application for a project slightly different from the version of the project currently proposed. Differences between the original application and the project that is the subject of this EIR are discussed in more detail in the Environmental Review Process section, on page 2.

C. PROJECT LOCATION

The following section describes the project's local and regional context, surrounding land uses, and site characteristics.

1. LOCATION

The project site is located on the northwest slope of Mount Sutro, about 0.25 mile southwest of the University of California San Francisco Medical Center, and approximately 600 feet northwest of the summit of Mount Sutro, in the Mount Sutro/Forest Knolls/Clarendon Heights neighborhood. The undeveloped, partially wooded and vegetated, generally rectangular-shaped site runs east and west off Crestmont Drive, with a hook-shaped area protruding south from the site's western edge (see figures 1, 2, and 3, on pages 30–32). The project site consists of Lot 25 (49,558 square feet) and a portion of Lot 28 (14,332 square feet) in Assessor's Block 2636, and totals 63,890 square feet of site area (approximately 1.47 acre). The southern portion of the site (on Lot 28), over which the project sponsor holds an easement in perpetuity, slopes upward (i.e., south) toward multiple-level residences built into the hill on Crestmont

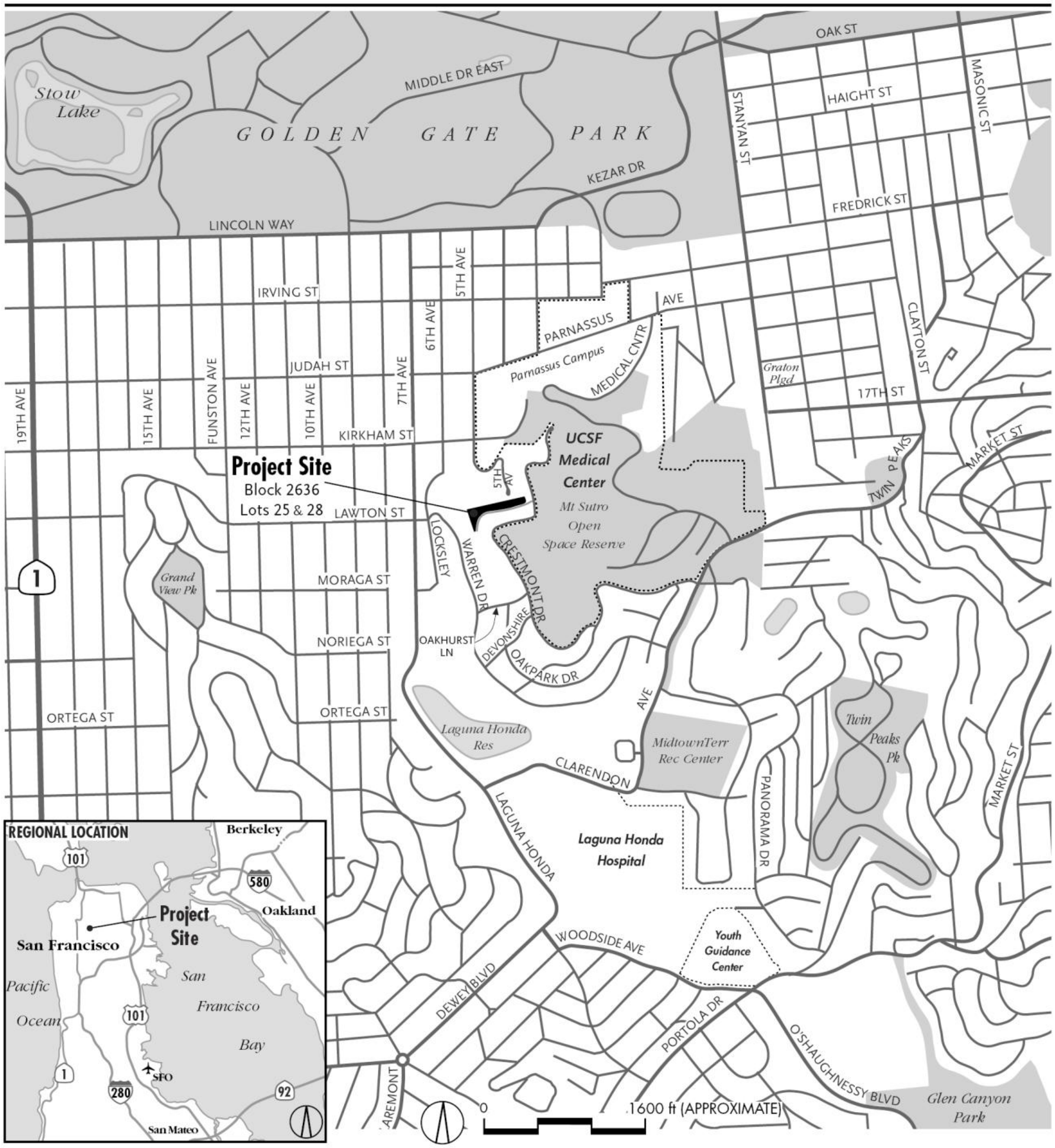
Drive. The site contains a dirt dead-end road that follows the contour of the hill going west from near the north end area of Crestmont Drive. The dirt road is blocked from vehicular access by a chain at the east end of the project site at Crestmont Drive. The site is neither formally designated nor dedicated open space, although some neighbors use the site for recreational purposes, such as for dog walking. The project site's north portion slopes sharply down to an abandoned quarry that is on an adjacent parcel northwest of the project site.

2. SURROUNDING LAND USES

The project site is within an RM-1 (Residential, Mixed, Low Density) District, which allows a residential density of one dwelling unit per 800 square feet of lot area; and is within a 40-X Height and Bulk District (40-foot height limit and no bulk limit).

At the foot of the abandoned quarry northwest of the site, are the two-towered, 11-story Avalon Sunset Towers Apartment complex (8 Locksley Avenue, near Sixth Avenue) and the 86-unit Kirkham Heights Apartments (1530-1555 Fifth Avenue). Two- and three-story apartment buildings and single-family residences are downhill to the west and southwest, along Warren Drive. To the south, uphill from the project site, are two- to four-level single-family and two-family residences built into the hill on Crestmont Drive, and steeply sloped and undeveloped parcels that extend to Oakhurst Lane, a public right-of-way stairway that runs between Crestmont and Warren drives. A two-unit residential building (505-507 Crestmont Drive) is northeast of the project site at the end of Crestmont Drive, and the University of California, San Francisco (UCSF) Parnassus Campus is farther northeast of the project site. UCSF's Mount Sutro Open Space Reserve is to the east, across and uphill from Crestmont Drive.

Uphill, to the south, are single-family and two-family residences within the same RM-1 District. The Kirkham Heights Apartments, located downhill from the project site, to the north, are within an RM-2 (Residential, Mixed, Moderate Density) District, which allows a residential density of one dwelling unit per 600 square feet of lot area. Residential units between Warren Drive and Locksley Avenue, approximately 200 feet west and downhill from the project site, are within an RM-2 District. To the northwest, the zoning district is RM-4 (Residential, Mixed, High Density), which allows a residential density of one dwelling unit per 200 square feet of lot area, within which the Avalon Sunset Towers Apartments are located. To the south, across Oakhurst Lane, is an RH-1(D) (Residential, House, One-Family [Detached Dwellings]) District. UCSF and its open space on Mount Sutro are within a P (Public Use) District. The nearest neighborhood commercial areas, approximately one mile by vehicle from the project site, are the Inner Sunset Neighborhood Commercial District (NCD), generally located along



Source: During Associates

5-31-11

Project Site Location Figure 1

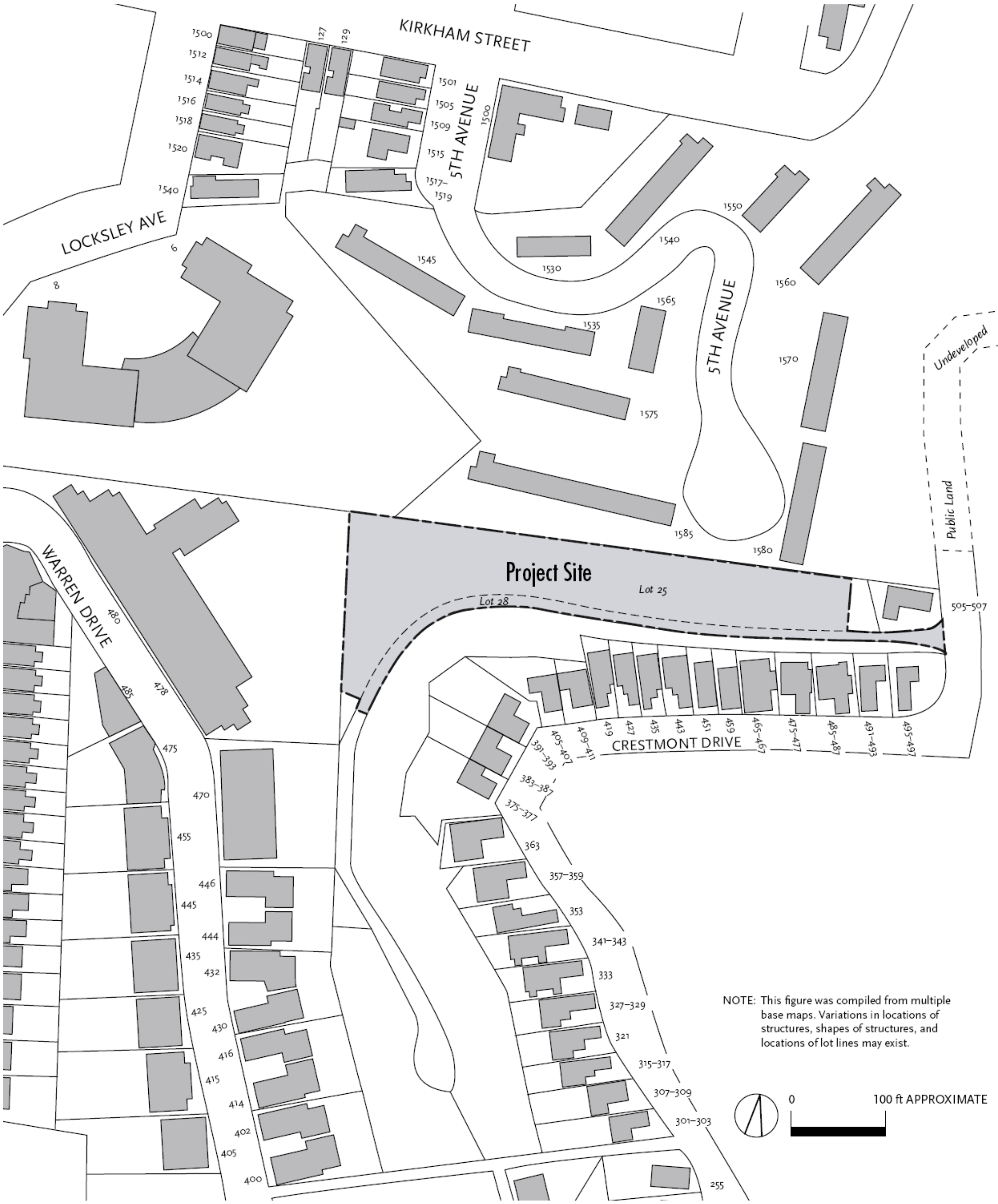
View looking west

View looking east

Source: During Associates

9·12·11

Views of Project Site Figure 2



Source: Alan Kropp & Associates, September 2006

1-11-12

Illustrative Project Site Location Showing Addresses in the Vicinity Figure 3

Irving Street between 5th Avenue and 19th Avenue, 9th Avenue between Lincoln Way and south of Judah Street, and Judah Street between 8th and 10th avenues; and an NC-2 (Neighborhood Commercial, Small-Scale) District, located along Irving Street from 19th Avenue west to 27th Avenue.

Most of the residential area surrounding the project site is within a 40-X Height and Bulk District. The exceptions are: the UCSF campus which is designated 65-D, 130-D, and 220-F (height limits of 65, 130, and 220 feet, and bulk limits of 110 feet in longitudinal dimension and 140 feet in diagonal dimension above 40 feet in the D district, and bulk limits of 110 feet in longitudinal dimension and 140 feet in diagonal dimension above 80 feet in the F district) and UCSF's Mount Sutro Open Space Reserve on Mount Sutro, south and immediately east of the north end of Crestmont Drive, which is designated OS (Open Space; therefore, no structure permitted), and a smaller P District south and west of the project site also designated OS. A small area on the southeast hillside of Mount Sutro and a small area on the northeast side of the mountain are within a 25-X Height and Bulk District (25-foot height limit and no bulk limit).

D. PROJECT CHARACTERISTICS

The proposed project consists of construction of 34 dwelling units on Lot 25 and a new paved, 20-foot-wide, approximately 700-foot-long private street on Lot 28. Table 1 on page 34 summarizes the characteristics of the project. Access to the site would be from the north terminus of Crestmont Drive.

Twenty-four of the 34 units would be constructed as duplexes (a two-story upper unit above a two-story lower unit) in 12 structures. A single building containing ten townhomes would be constructed on the westernmost portion of the project site. Thus, there would be a total of 13 structures with 34 units (figures 4 through 10, on pages 35–41). The duplex buildings would not share walls, and would have independent foundations. The ten-townhome building would have its own foundation. The townhome building and the individual duplex buildings would have firewalls separating them. The ten townhomes in the townhome building would have shared walls.

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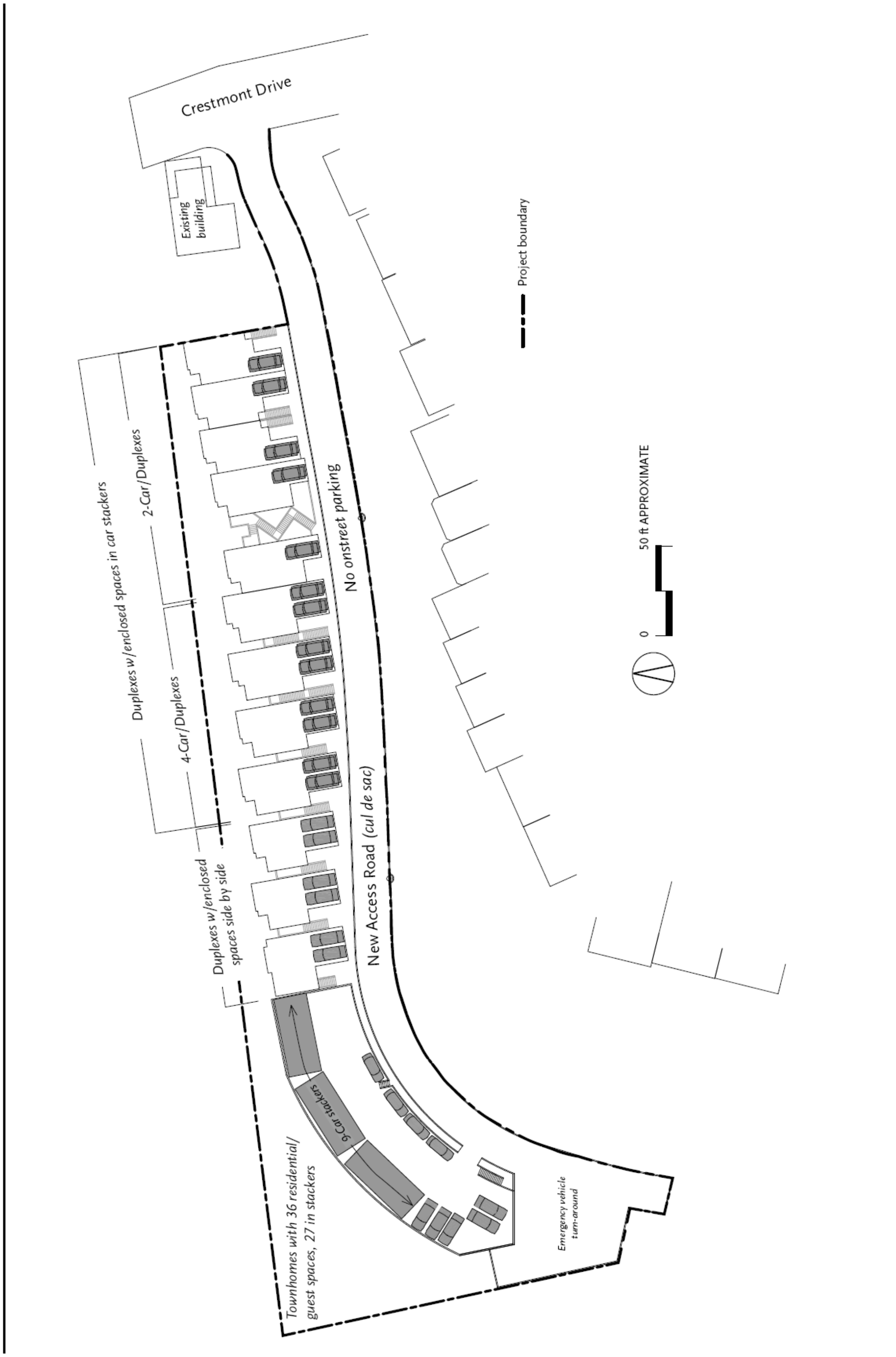
Table 1
Project Characteristics

Uses	Square Feet
Residential	65,750
Total (open space not included)	**65,750**
Building footprints	24,170
Sidewalk and entries	4,330
Private paved street	13,950
Turn-around area	2,940
Undeveloped (except stitch piers and soil nails)	18,500
Private open space (decks)	10,300
Common usable open space	800
Total Site Area	**63,890**
Dwelling units	34 units
Parking spaces	
Private (in structures)	60
Visitor spaces (in townhome building)	8
Total	**68**
Number of buildings (duplexes)	
Duplexes	12
Townhome building	1
Total	**13**
Height of buildings	16 to 40 feet above the new street grade
Number of stories	4 (1 to 4 stories above street level)

Source: Levy Design Partners
4-30-12

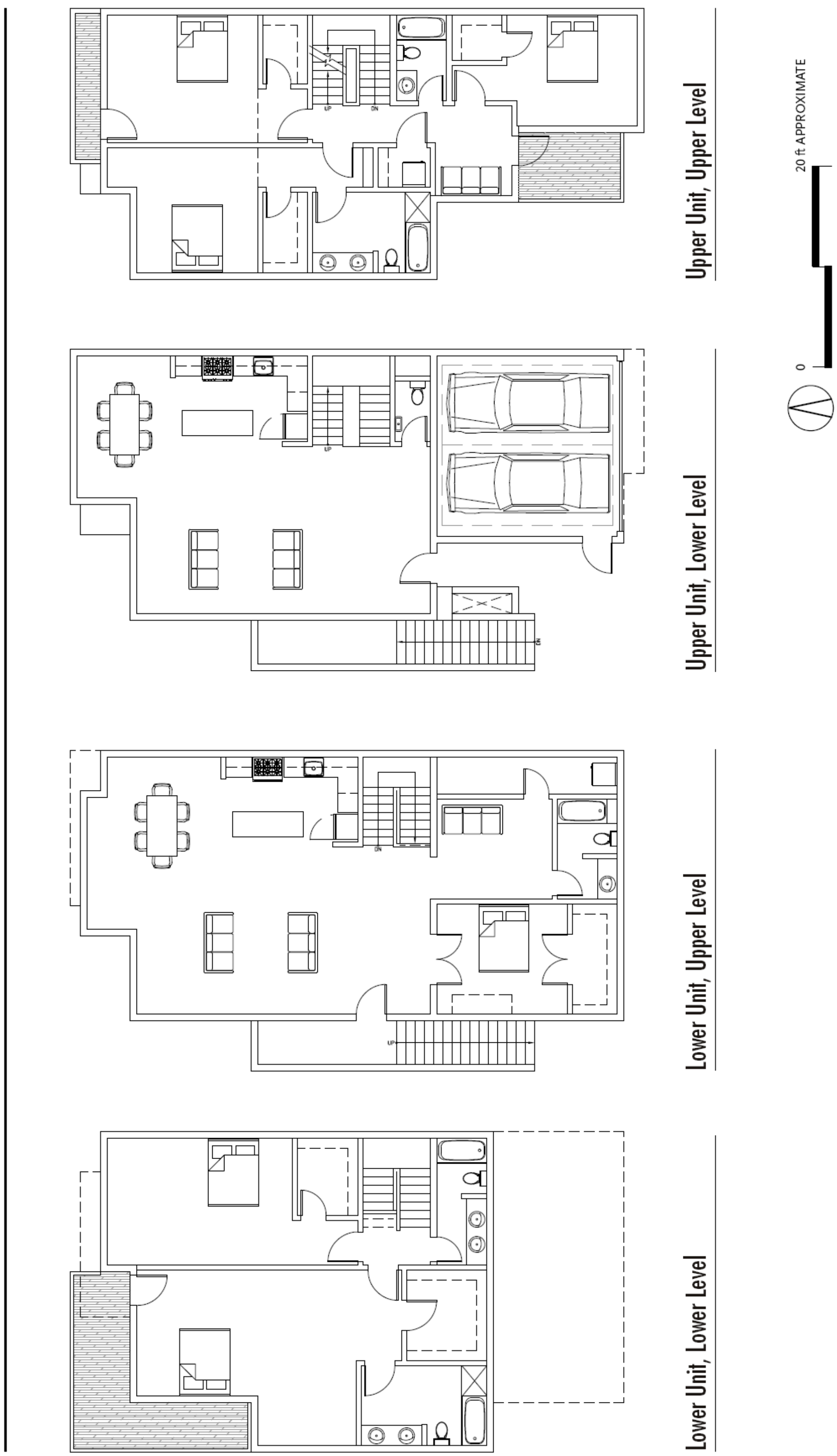
Proposed Project Site Plan Figure 4



Source: Levy Design Partners

4-30-12

Proposed Parking Plan Figure 5



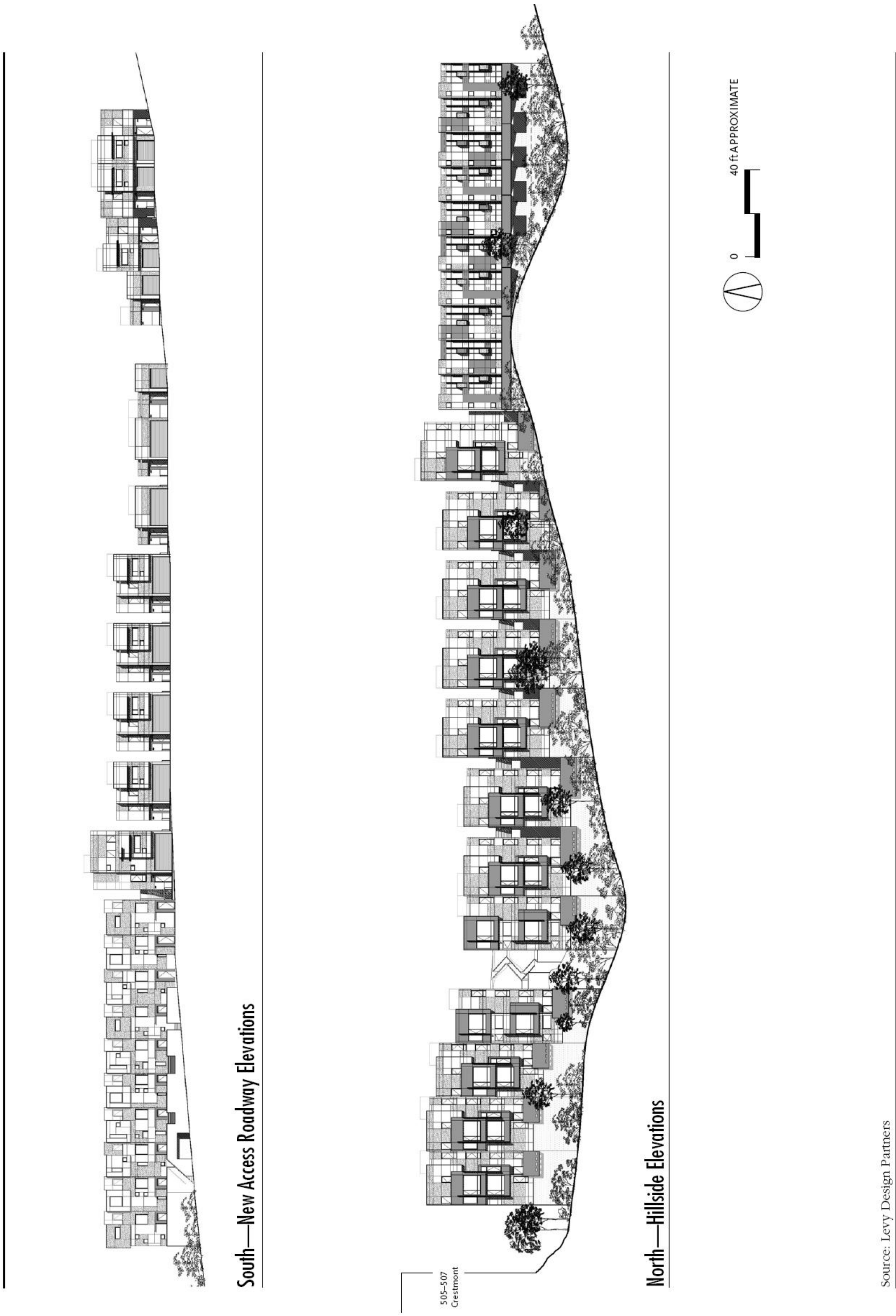
Proposed Typical Duplex Floor Plans
Figure 6

Source: Levy Design Partners
3-19-11

Source: Levy Design Partners

4-30-12

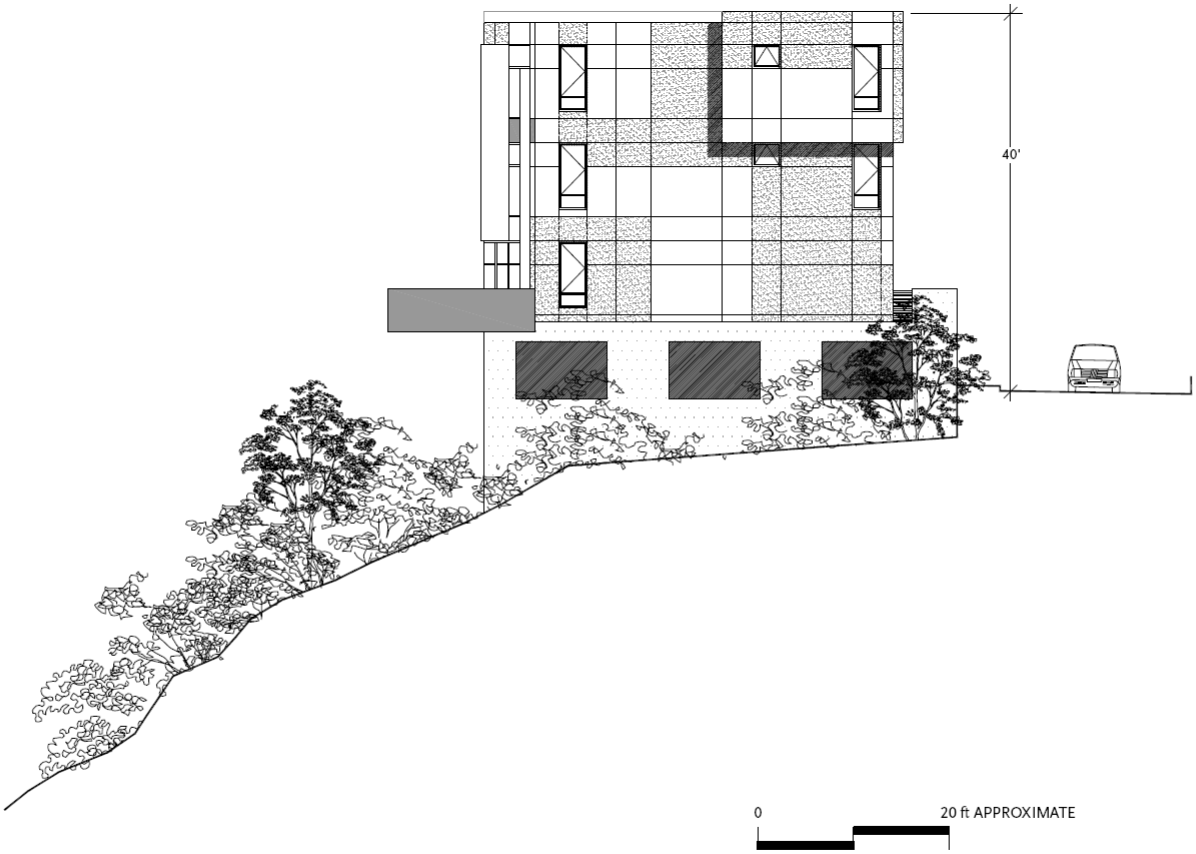
Proposed Typical Townhome Floor Plans Figure 7



Source: Levy Design Partners

6·1·11

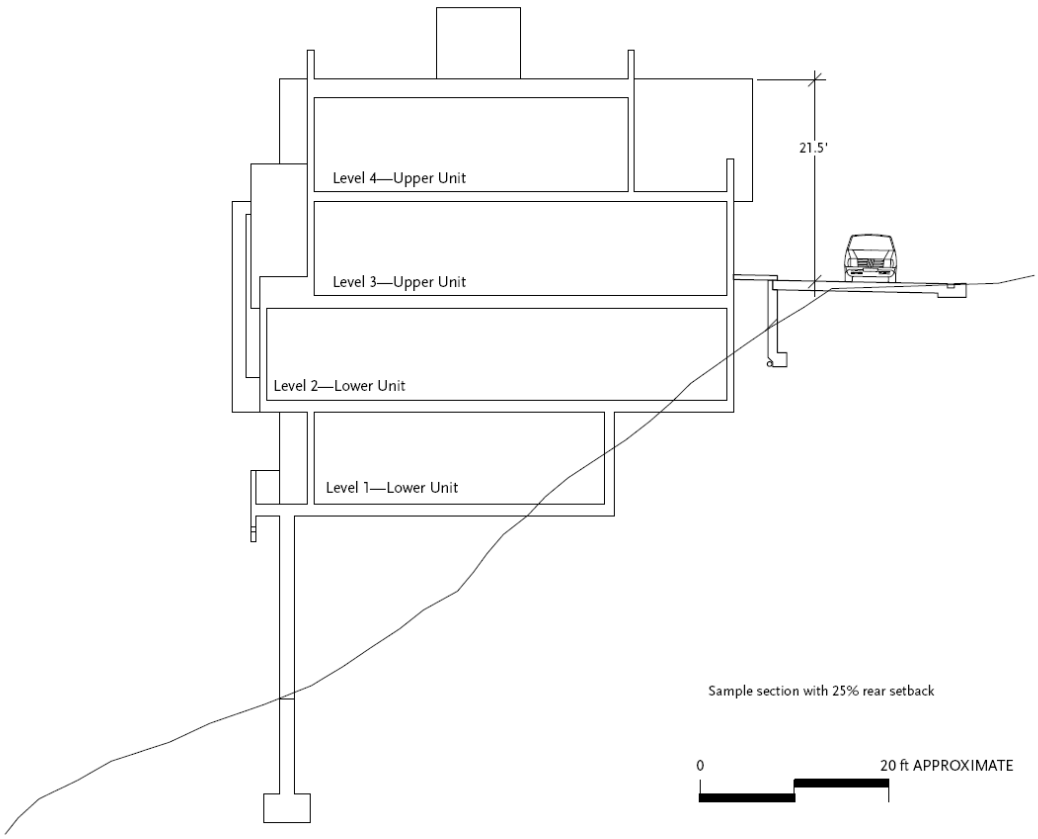
Proposed Site Elevations Figure 8



Source: Levy Design Partners

4-30-12

Proposed Sample Townhome Side Elevation Figure 9



Source: Levy Design Partners

4-30-12

Proposed Sample Duplex Section Figure 10

The project would consist of 30 three-bedroom units and four two-bedroom units. The project sponsor has not determined whether the dwelling units would be for sale or rental; however, a homeowners' association (for owner-occupants or landlords) with a Declaration of Covenants, Conditions, and Restrictions (CC&Rs)[31] would be created for the new residential development. The dwelling units would range in size from 1,650 square feet to 2,550 square feet. At the time that the application for environmental evaluation for the proposed project was filed (January 27, 2004), the Inclusionary Housing Ordinance (*Planning Code*, Sections 315-315.9) required that 12 percent of the units on-site be Below Market Rate (BMR) units distributed throughout the project; or that 17 percent of the units be BMR units if built off-site;[32] or that the project sponsor pay an in lieu fee. The project sponsor would comply with this ordinance.

Three of the duplex buildings would have two enclosed side-by-side parking spaces each, four of the duplex buildings would have four enclosed parking spaces each in the form of two two-car stackers per building, and five of the duplex buildings would have two enclosed parking spaces each in the form of one two-car stacker per building. The townhome building would have 36 spaces in an enclosed parking garage, consisting of three nine-car rotating stackers and nine independently accessible spaces. Thus, there would be 32 spaces in the duplex buildings, and 36 spaces in the townhome building, for a total of 68 spaces. Of these 68 spaces, 60 would be designated for residents (consisting of 32 spaces in the duplex buildings and 28 in the townhome building) and eight would be visitor parking (in the townhome building). No off-street loading space would be provided.

In total, the project would include approximately 65,750 square feet of residential space and 13,950 square feet of private street area on the 63,890 square-foot project site. Approximately 45,390 square feet of the project site would be developed with the new residential buildings, sidewalk and building entries, and new paved private street with turn-around area, while the remaining 18,500 square feet of the project site would be left undeveloped except for installation of some stitch piers and soil nails. Of the undeveloped area, 800 square feet would be common usable open space for six units that would not have private decks

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31 *Declaration of Covenants, Conditions, and Restrictions (CC&Rs):* A CC&R is the declaration of private covenants, conditions, and restrictions that control a condominium or planned development, and is required of all condominiums. Once completed, they are recorded with the county and become a part of public record. Each CC&R is different depending on the owners and the properties involved. Generally, CC&Rs address issues such as boundaries, definition of common areas, responsibilities and processes required of each owner, and protocol for property usage, building rules and regulations, and communication and resolution of problems and disputes.

32 On August 1, 2006, the Board of Supervisors adopted amendments to *Planning Code* Section 315, increasing the percentage of required inclusionary housing units to 15 percent on-site or 20 percent off-site site (the requirements before the amendment were 12 percent and 17 percent, respectively).

or roof decks. The buildings' footprints would total 24,170 square feet, which would cover approximately 38 percent of the project site.

The proposed buildings would range between approximately 16 to 40 feet in height above the new street grade. The buildings would be four stories each, with one to four stories above street level at the front of the buildings, and at the rear, down-sloping portion of the project site, at most two stories below street level. There would be a rear setback from the rear property line, varying from 13 feet at the easternmost duplex to 93 feet at the westernmost townhome. Because of the steep slope of the site and its depth of approximately 70 feet at most locations, a rear yard modification would be required for the project structures to step down the hillside. Additionally, there would be a four-foot-deep front setback to provide a sidewalk.

The new paved 20-foot-wide private cul-de-sac would extend about 700 feet west from near the north end of Crestmont Drive. The new units would be built on the north side of and downhill from the new private road. The private road would not be gated, and the public would have access to it for recreational purposes (such as dog walking), similar to the access now afforded on the existing private dirt road on the site.

Prior to construction, most of the existing vegetation would be removed from the project site, including approximately 880 non-native eucalyptus and acacia trees. After construction of the buildings, the site would be landscaped with native drought-resistant plants and a limited drip-irrigation system.

Development of the site would require excavation to various depths down to approximately 15 feet for footings, foundations, and lower floors of the residential units, as well as placement of fill, using soil excavated from other areas of the site. Much of the volume of excavation would be offset by the required filling, but approximately 1,100 cubic yards of soil would be hauled from the site. The project foundation would consist of drilled piers tied together with grade beams and tie beams.

The project would comply with the Stormwater Management Ordinance, which requires on-site stormwater control measures described in the City's Stormwater Design Guidelines (SDGs) (see Section IV.H. CEQA Checklist Update, on page 245, for additional discussion). In addition, the project would comply with the City's Landscape Ordinance and Efficient Irrigation Ordinance, which both amend Chapter 63 of the City Administrative Code to require submission of landscaping plans, soils reports and irrigation plans for new developments.

Project construction would take approximately 23 months. Assuming construction begins in early 2013, project completion would be in early 2015. The estimated construction cost is $10,750,000. The project sponsor and developer is San Francisco Overlook Development, LLC, and the project architect is Levy Design Partners.

GEOTECHNICAL FEATURES OF PROJECT

The proposed project's geotechnical investigation report prepared in 2006, and updated in 2010,[33,34] contains recommendations for geotechnical engineering features of the project (see Appendix C). As discussed in Section IV.F Geology and Soils, Geologic/Geotechnical Investigations, on page 204, this geotechnical investigation report is a preliminary or "Master Plan" geotechnical investigation conducted to determine the overall engineering feasibility of site development and to inform the project's conceptual design scope. The objective of the preliminary geologic/geotechnical investigation is to compile existing information and develop enough new data to establish a Master Plan of the proposed development. At the Master Plan stage, geotechnical engineers acquire a broad understanding of the site conditions while identifying areas on the site that are especially favorable for development or could be problematic from a soils engineering perspective. The scope of the preliminary geotechnical investigation is intended to inform the CEQA analysis, because its level of detail and information obtained about the project site's and adjacent area's the subsurface conditions effectively evaluates whether geologic or seismic impacts exist and whether mitigation would be required. The preliminary geotechnical investigation also identifies, at a conceptual level, the necessary geotechnical features of the project, which are discussed below. The preliminary geotechnical investigation, while adequate to perform analysis of geologic and seismic impacts in this EIR and to identify necessary geotechnical features of the project at a conceptual level, does not generate the "design-level" data needed to complete final grading or structural designs.[35] The design-level analysis will be conducted, if the project is approved, as specified in the mitigation measures for geologic impacts identified in Section IV.F Geology and Soils, on pages 179–227. The conceptual project geotechnical features below address the same set of project-related geologic issues as the mitigation measures identified in Section IV.F Geology and Soils, but the mitigation measures provide

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33 *Geotechnical Investigation, Crestmont Drive Project, San Francisco, California*, September 29, 2006, prepared by Alan Kropp & Associates. Key portions of this report are included in Appendix C of this EIR. The entire report is on file and available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, San Francisco, as part of Case No. 2004.0093E.

34 Alan Kropp, Principal Engineer, Alan Kropp & Associates, letter report to Gary Testa, San Francisco Overlook Development LLC, *Re: Geotechnical Update, San Francisco Overlook Project, San Francisco, California*, December 7, 2010. This letter is on file and available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, San Francisco, as part of Case No. 2004.0093E.

35 "Design-level" investigations provide seismic and engineering parameters for specific building sites and proposed building footprints. The design-level data and analysis is used by the structural engineer to complete final foundation and structural design.

additional detail and are intended to ensure that adequate design-level geologic mitigation measures are designed and implemented if the project is approved.

The conceptual geotechnical features, described below, are incorporated into the project's conceptual scope. These features comply with the recommendations of the project's geotechnical investigation report. Some of the geotechnical features involve or incorporate elements of other related geotechnical features, which are cross-referenced in the discussions below. The complete final scope of drainage and erosion control improvements ultimately would be detailed in a Site Grading and Drainage Plan, a Drainage Management Plan, and a Sediment and Erosion Control Plan.

In addition, the proposed design would need to satisfy Building Code requirements, which are under the purview of DBI. The impacts of the project on geology and soils, with these geotechnical features incorporated, are discussed in this EIR in Section IV.F. Geology and Soils, on pages 179–227.

Geotechnical Feature 1: Seismic Hazards

The project is based on an "SC" soil profile. An SC soil profile is used for very dense soils and soft bedrock and is one of six soil profiles that can be used in Uniform Building Code-based seismic design, as defined in Section 5.07, 1997 UBC[36] Seismic Design Criteria, of the project geotechnical investigation. The project incorporates recommendations in Section 5.07, 1997 UBC Seismic Design Criteria in the project geotechnical investigation, as well as locational and earthquake force parameters for seismic design from the 2010 (or current) *California Building Code*.

Geotechnical Feature 2: Existing Landslides

The project includes measures to protect the proposed private road and new residences from landslides. The exact measures would be selected as the design process progresses but would include one or more of the following: removal and recompaction of the existing fill beneath the new private road in accordance with Geotechnical Feature 10: Existing Fill (see page 48 of this EIR), installation of a retaining wall along the downslope (north) portion of the new private road, and a deepened drilled pier foundation system for the road's retaining wall, the depth of which would be determined once grading is better defined.

The proposed project includes a debris wall in combination with stitch piers to protect the project site from the shallow soil instabilities and ongoing sloughing/raveling[37] near the western property line and along the western portion of the north property line, which could encroach on the project site. This is in

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36 *UBC:* Uniform Building Code.

37 *Sloughing*: Minor collapse of a hill's face. *Raveling*: Easily fractured rock moving downslope.

accordance with and further explained in Geotechnical Feature 4: Stitch Piers, below, and Geotechnical Feature 5: Debris Walls, below.

Geotechnical Feature 3: Slope Stability

The proposed project structures incorporate the factors of safety identified in Section 4.03, Slope Stability, on page 33 in the project's geotechnical investigation. (The factor of safety is the ratio of the strength of the hillside resisting land sliding, divided by the forces—colluvial[38] and alluvial[39]—that would destabilize the hillside.)

Geotechnical Feature 4: Stitch Piers

To minimize fill instabilities, the project includes stitch piers[40] installed near the property lines, and designed to resist the soil loads due to shallow instabilities that result in lateral pressure on the piers.

Geotechnical Feature 5: Debris Walls

To prevent soils and debris from shallow sloughing/raveling in the northwest corner of the project site from falling beyond the project property limits, the project includes a debris wall installed as close as possible to the property line, on top of the stitch piers identified in Geotechnical Feature 4: Stitch Piers, above. To help prevent encroachment of soil and debris generated off-site and uphill from the project site onto the new private road, the project includes a debris wall installed near the upslope edge of the new private road. A debris wall is an above-grade retaining wall that provides for the collection of soils and debris generated upslope of the wall. Design of the debris walls would comply with *San Francisco Building Code* and *California Building Code* governing codes/regulations.

Geotechnical Feature 6: Soil Nails

There is a possibility that localized areas of adverse bedding conditions[41] may be observed, after site clearing has been completed. In areas where adverse bedding is a concern for soil stability, soil nails[42]

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38 *Colluvium:* Soil deposited at the base of a slope by gravity.

39 *Alluvium:* Soil deposited at the base of a slope by water movement.

40 *Stitch piers:* Closely spaced, below-grade, drilled piers designed to resist lateral loads such as those associated with sloughing/raveling and landslide movements. *Loads, loading*: Weight or pressure on soil, as from overlying structures or earth movement.

41 *Bedding, bedding attitude, adverse bedding conditions:* The strata of soil and layered rock and their orientation (e.g. flat, vertical, 45 degree slope, etc.). When the orientation of the bedding is at steep slope and therefore prone to earth movement, it is called adverse bedding.

42 *Soil nails:* A soil nail slope repair generally consists of placing steel reinforcing bars, called nails, and grout into closely spaced drilled holes in a slope or excavation to reinforce the ground.

may be used to stabilize the adverse shallow bedding conditions. Usually, a construction facing of shotcrete[43] reinforced with welded wire mesh is placed over the nailed area. Some of the larger excavations also may require the use of soil nails for temporary support during retaining wall construction.

Geotechnical Feature 7: Design of Retaining Walls

All retaining walls (including those identified in Geotechnical Feature 2: Existing Landslides, on page 45, and Geotechnical Feature 5: Debris Walls, on page 46) incorporate the recommendations of the project's geotechnical investigation (Sections 4.04.2.02, Footings, and 4.04.3, Retaining Walls), which identified four categories of slope conditions to be used in the design of retaining walls.

Geotechnical Feature 8: Drainage and Erosion Control

The project includes the following drainage and erosion control measures to maintain slope stability and to reduce the risk of downslope migration of slope debris: concrete v-ditches,[44] swales[45] and catch basins,[46] collection of water on roofs using downspout connected to a system of pipes that extend into a drainage system, and subdrains[47] for proposed retaining walls and debris walls.

The project includes erosion-resistant vegetation planted on the finished slopes. Erosion control for temporary slopes may include: grading to prevent water from flowing over the top of any slope; planting vegetation, including quick-growing native grasses and plants; and installing netting, hay wattles,[48] and silt fences.[49]

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43 *Shotcrete:* Concrete pneumatically projected onto a surface at high velocity. It is typically blown through a hand-held nozzle, where water is added to the small aggregate concrete mix just prior to being applied and consolidated. Shotcrete typically costs less and takes less time to complete than a comparable sized cast-in-place concrete project.

44 *V-ditch:* A vee-shaped ditch.

45 *Swale:* A wide shallow depression in the ground to form a channel for storm water drainage, which may provide some groundwater recharge.

46 *Catch basin:* (1) A receptacle at the entrance to a drainage system designed to keep out large or obstructive matter, or (2) a reservoir for collecting surface drainage or runoff.

47 *Subdrain:* A perforated or plain underground drain.

48 *Hay wattle*: Woven mesh netting filled with hay.

49 *Silt fence:* A fence constructed of wood or steel supports and either natural (e.g. burlap) or synthetic fabric stretched across area of non-concentrated flow during site development to trap and retain on-site sediment due to rainfall runoff.

Geotechnical Feature 9: Construction on Steep Slopes

In the proposed project design, the amount of grading for temporary access is minimized in order to reduce disturbance to the hillside.

Geotechnical Feature 10: Existing Fill

Where there is existing fill beneath the proposed new private road, the project includes removal and recompaction of the fill, to provide acceptable supporting conditions for the proposed project. Where fills are located beneath proposed new structures, such as the proposed buildings and retaining walls, the project includes drilled pier foundations extending through the fill soils into competent[50] underlying bedrock materials

Geotechnical Feature 11: Creep and Sloughing of Native Soils

Because of the depth of creep loading[51] and reduced lateral resistance[52] at the project site, the proposed project incorporates deep drilled pier[53] foundations that extend well below the anticipated depth of creep movement and into the zone of passive resistance.[54]

Erosion control measures, such as the installation of netting and erosion-resistant vegetation on the slope, are included in the project to reduce the risk of sloughing, in accordance with Geotechnical Feature 8: Drainage and Erosion Control, on page 47 of this EIR. The project also incorporates a debris wall constructed, in accordance with Geotechnical Feature 5: Debris Walls, on page 46, near the downslope north property line to prevent movement of potential slough material onto the adjacent downslope properties, where more significant sloughing could occur.

Geotechnical Feature 12: Foundations

The proposed project building's foundations consist of deep-drilled pier foundations, drilled into competent bedrock materials underlying the native soils, and configured to resist the additional pressure induced by downslope or lateral soil and/or rock movements.

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50 *Competent:* Stable and able to provide resistance to soil movement above.

51 *Creep:* Creep is movement of soil and subsoil downslope that is invisible to the naked eye. *Loads, loading:* Weight or pressure on soil, as from overlying structures or earth movement.

52 *Resistance:* Soil and slope pushing against each other.

53 *Piers, drilled piers*: Columns placed into the ground to provide soil and slope stability. The pier shaft is excavated and the pier material poured in or installed.

54 *Passive resistance:* The force of soil and slope pushing against each other due to gravity (as opposed to active means such as a retaining wall).

To strengthen the ability of drilled pier foundations to resist lateral loads, the project includes excavation and recompaction of the slide debris within the northeast corner of the project site. The project also includes subdrains to enhance drainage of water from uphill areas and the project site in order to reduce the lateral load on the piers. (See also Geotechnical Feature 2: Existing Landslides, on page 45 of this EIR and Geotechnical Feature 10: Existing Fill, on page 48.)

Geotechnical Feature 13: Maintenance

The project includes ongoing maintenance of elements of the final geotechnical and structural design in the project's CC&Rs, an obligation for the future homeowners association.[55] These elements include drainage, stitch piers, and debris walls.

Geotechnical Feature 14: Design and Construction Recommendations

The project incorporates all design and construction recommendations of the project's geotechnical investigation (contained in Section 5.00, Preliminary Recommendations, on pages 42–56; see Appendix C), including, but not limited to, the recommendations for:

- Site clearing and grubbing[56] (see page 42 of the geotechnical investigation);
- Fill placement on slopes (see page 43 of the geotechnical investigation);
- Excavations (see page 43 of the geotechnical investigation);
- Specification of fill materials (see page 44 of the geotechnical investigation);
- Subgrade preparation (see page 44 of the geotechnical investigation);
- Placement and compaction of fill (see page 44 of the geotechnical investigation);
- Trench backfill (see page 44 of the geotechnical investigation);
- Grading, and drainage and erosion control, for new cut or fill slopes (see page 45 of the geotechnical investigation);
- Design and installation of any exterior slabs-on-grade[57] (and garage slabs as applicable) (see page 51 of the geotechnical investigation);
- Design and installation of pavement (see page 52 of the geotechnical investigation);

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[55] *Declaration of Covenants, Conditions, and Restrictions (CC&Rs)*: A CC&R is the declaration of private covenants, conditions, and restrictions that control a condominium or planned development, and is required of all condominiums. Once completed, they are recorded with the county and become a part of public record. Each CC&R is different depending on the owners and the properties involved. Generally, CC&Rs address issues such as boundaries, definition of common areas, responsibilities and processes required of each owner, and protocol for property usage, building rules and regulations, and communication and resolution of problems and disputes.

[56] *Grubbing:* Digging up and removing all plants (roots and stem or trunk) in order to clear the land.

[57] *Slab on grade:* A reinforced concrete slab placed directly on the ground to provide the foundation for the superstructure (the part of a building above its foundation.).

- Plan review by the geotechnical consultant (see page 54 of the geotechnical investigation);
- Construction observation and testing (see page 54 of the geotechnical investigation);
- Wet weather construction (see page 55 of the geotechnical investigation);
- Cost contingencies (see page 55 of the geotechnical investigation); and
- Informing future owners and residents of their responsibilities for proper maintenance of on-site drainage measures to reduce the risk of landslides (see page 56 of the geotechnical investigation).

E. INTENDED USES OF THIS EIR

This EIR is a project EIR, which evaluates the environmental effects of a specific project, the proposed San Francisco Overlook Development Residential Project. The purpose of this EIR is to provide the City, public agencies and the public in general with detailed information about the environmental effects of implementing the proposed project; to assess and require methods of avoiding or mitigating any adverse environmental impacts to less-than-significant levels should the project be approved; and to describe alternatives to the project that would avoid significant environmental impacts or substantially reduce significant impacts of the proposed project.

The proposed 34 dwelling units on the 49,558-square-foot lot are permitted in the RM-1 District. The proposed project would require the following actions under existing zoning regulations and ordinances, with acting governmental bodies shown in italics. Aside from the certification of the EIR itself, the EIR would be used, in part, for each of the reviews and determinations listed below.

- Certification of the EIR. *Planning Commission approval*[58]
- Adoption of California Environmental Quality Act (CEQA) Findings. *Planning Commission approval*
- Conditional Use Authorization. The proposed project would require review and approval by the Planning Commission of a Conditional Use Authorization for a Planned Unit Development (PUD) in an RM-1 (Residential, Mixed, Low Density) District, including modification of the requirement for minimum rear yard depth (Sections 134, 303, and 304), and *General Plan* and Priority Policies Consistency findings. *Planning Commission approval*

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58 Before discretionary project approval may be granted for the proposed project, the Planning Commission must certify the Final EIR as accurate, objective and complete. The Draft EIR will undergo a 47-day public review and comment period, which ends on June 18, 2012, as noted on the Draft EIR cover, and will include a public hearing before the Planning Commission. Following the public comment period, responses to written and oral comments on the Draft EIR will be prepared and published in a Responses to Comments document. The Draft EIR will be revised as appropriate and, together with the Responses to Comments document, will be presented to the Planning Commission for certification of the Final EIR. The Draft EIR and the Response to Comments document together are considered the Final EIR. No approval or permit may be issued before the Final EIR is certified.

- Subdivision of Lot 25 into 13 parcels, of which 12 would each have a duplex building and one would have a townhome building. *Department of Public Works (DPW) and Planning Department approval*
- Review of permit application for project within the Northwest Mount Sutro Slope Protection Area (Building Code Section 105A.6). *DBI's Structural Advisory Committee review*
- Building permits (including review of the new private cul-de-sac). *DBI approval*[59]
- Connection of the private street to Crestmont Drive, a public right-of-way (San Francisco Fire Code Sections 503.2.1 and 503.2.5). *DPW approval*[60]

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59 DBI and DPW consult with other City departments for confirmation that the permits sought are consistent with all City codes and prior approvals, including: consistent with the Conditional Use Authorization, Fire Code, Public Works Code, Transportation Code, and any applicable regulations such as SFPUC stormwater management ordinances and guidelines.

60 Ibid.

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III. PLANS AND POLICIES

This chapter identifies any inconsistencies the proposed project might have with applicable plans and policies. Project-related policy conflicts and inconsistencies do not, in and of themselves, constitute a significant environmental impact and are considered to be environmental impacts only when they would result in direct physical effects, which this EIR identifies pursuant to CEQA. All associated physical impacts of the proposed project are discussed in this EIR in specific topical sections of the following Chapter IV. Environmental Setting, Impacts, and Mitigation and Improvement Measures, or in the Initial Study (see Appendix A).

Development of the San Francisco Overlook Development Residential Project is subject to the plans, objectives and policies of San Francisco, which include:

- The San Francisco *General Plan* (which provides general policies and objectives to guide land use decisions),
- The San Francisco *Bicycle Plan* (which provides goals and objectives to increase safe bicycle use),
- The San Francisco *Congestion Management Program* (which is the principal policy and technical document that guides congestion management activities and demonstrates conformity with congestion management law),
- The *Better Streets Plan* (which describes design guidelines for pedestrian and streetscape features in the public right-of-way),
- The *Sustainability Plan for the City of San Francisco* (which provides goals and objectives for sustainable development),
- The *Climate Action Plan* (which describes actions to achieve San Francisco's greenhouse gas emissions reduction goal),
- The *San Francisco Planning Code* (zoning ordinance, which provides detailed regulations for land use),
- The *Landscape Ordinance* (192-00, which requires a landscape plan for developments greater than 1,000 square feet),
- The *Efficient Irrigation Ordinance (*301-10, which amends Chapter 63 of the *Administrative Code* requiring the development and maintenance of landscape irrigation controls for specified new construction landscapes),

- *Restriction of Use of Potable Water for Soil Compaction and Dust Control Activities Ordinance (175-91;* which specifies the use of potable water),
- The *Stormwater Management Ordinance* and *Stormwater Design Guidelines (83-10,* requiring the development and maintenance of stormwater management controls for specified activities that disturb 5,000 square feet or more of the ground surface, and
- Other adopted City policies such as Proposition M (the Accountable Planning Initiative), *Planning Code* Section 101.1.

Regional environmental plans and policies that influence or regulate some individual projects or cumulative development in the Bay Area more generally include (1) the Metropolitan Transportation Commission's (MTC) *Regional Transportation Plan (RTP)—Transportation 2030*; (2) the Bay Area Air Quality Management District's (BAAQMD) *CEQA Air Quality Guidelines*; (3) the Association of Bay Area Governments' (ABAG) *2007-2014 Resource Housing Needs Allocations, A Land Use Policy Framework,* and *Projections 2009*; (4) the Regional Water Quality Control Board's (RWQCB) *San Francisco Basin Plan*; and (5) the San Francisco Bay Conservation and Development Commission's (BCDC) *San Francisco Bay Plan*.

The proposed project is construction of a 34-unit residential infill development in an existing urban area. These plans were reviewed, and no inconsistencies between the proposed project and applicable plans and policies were identified. Consistency of the project with site zoning controls is discussed in Land Use and Land Use Planning , Chapter IV. Section A, beginning on page 61.

IV. ENVIRONMENTAL SETTING AND IMPACTS

A. INTRODUCTION

This chapter of the EIR addresses the effects of the proposed San Francisco Overlook Development Residential Project, including mitigation measures required to avoid or reduce significant impacts to less-than-significant levels, and improvement measures to further reduce less-than-significant impacts when feasible. The scope of this chapter was determined by the following described process. An application for environmental evaluation for the proposed Crestmont Hills Development Residential Project (a previous version of the proposed project) was filed on January 27, 2004. On June 23, 2004, the Planning Department mailed a Notice of Project Receiving Environmental Review to property owners within 300 feet of the San Francisco Overlook Development project site, tenants adjacent to the site, and other potentially interested parties. A number of groups and individuals commented and expressed concerns regarding effects of the proposed project on the project site and its surroundings. The San Francisco Planning Department determined that an EIR is required for the proposed project, and a Notice of Preparation of an Environmental Impact Report (NOP) with an Initial Study (IS) was circulated on May 27, 2006 to solicit comments from the public about the scope of the proposed project's EIR. Written comments received on the Notice of Project Receiving Environmental Review and NOP/IS were considered in the preparation of the final scope for this EIR.

As discussed in Notice of Preparation, Initial Study, and Public Comments, on page 4 in this EIR, after the Initial Study was distributed on May 27, 2006, the project site was acquired by its current owner, San Francisco Overlook Development, LLC. The current owner and project sponsor submitted a slightly revised project design to the Planning Department on December 9, 2010. The revised project involves a new architectural design but does not change the proposed number of 34 dwelling units, or other fundamental project characteristics, and has a similar overall building footprint. Therefore, the conceptual evaluation of impacts on population, noise, utilities/public services, biology, water, energy/natural resources, hazards, and cultural resources in the Initial Study that was prepared for the original version of the project remains valid for the currently proposed project. The revised project may have different impacts than the previously-proposed project in the areas of land use and land use planning, aesthetics, transportation and circulation, air quality, greenhouse gas emissions, geology and soils, and emergency access. These topics are evaluated in this EIR for the currently-proposed version of the project.

B. NEW AMENDMENTS TO THE CEQA CHECKLIST

Since the publication of the Initial Study and NOP (Appendix A) on May 27, 2006, the San Francisco Planning Department revised its CEQA Initial Study Checklist. On May 23, 2006, the Board of Supervisors adopted Ordinance 116-06, directing the City to use a CEQA Initial Study Checklist based on Appendix G of the state *CEQA Guidelines*. Accordingly, the Planning Department adopted a new Initial Study Checklist, consistent with Appendix G, but which also incorporates additional questions specific to the urban environment of San Francisco. In addition, the California Natural Resources Agency adopted *CEQA Guideline Amendments*,[61] which became effective on March 18, 2010, subsequent to the publication of the Initial Study and NOP. The state amendments include updates to the sample questions in the Environmental Checklist Form. The checklist updates resulting from both the San Francisco and state revisions are in Section IV.H. CEQA Checklist Update, on page 233, along with a discussion of project impacts associated with the new checklist questions.

Other updates have been added due to requirements related to environmental topics that have been implemented since 2006 and/or revised mitigation measures. For instance, new City requirements include the Stormwater Management Ordinance (2010), which was enacted to require that development resulting in ground disturbance of 5,000 square feet or more incorporate on-site stormwater control measures through the incorporation of elements described in the City's Stormwater Design Guidelines (SDGs). As discussed in Section IV.H. CEQA Checklist Update, on page 245, the project would be able to, and would, comply with the Stormwater Management Ordinance C. Since the 2006 publication of the Initial Study, the Board of Supervisors has approved a series of amendments to the Building and Health Codes generally referred to as the Construction Dust Control Ordinance (Ordinance 176-08, effective July 30, 2008), with the intent of reducing fugitive dust generated during site preparation, demolition and construction work in order to protect the health of the general public and of on-site workers, minimize

[61] California Natural Resources Agency. Adopted Text of the CEQA Guidelines Amendments (Adopted December 30, 2009, Effective March 18, 2010). http://ceres.ca.gov/ceqa/guidelines/

public nuisance complaints, and to avoid orders to stop work by the DBI, which effectively codifies the measures included in Initial Study Mitigation Measure 2 (Construction Air Quality). Therefore it is no longer necessary to identify this mitigation measure for the proposed project, because it is required by law for all projects, and the proposed project's effects on construction air quality would remain less than significant (see Section IV.D Air Quality, Impact AQ-1, on page 143, for additional discussion).

D. FORMAT OF THE ENVIRONMENTAL ANALYSIS

In each environmental topic in Section IV.A. through Section IV.G. of this EIR, the document presents project-level analysis of the proposed project's direct and indirect environmental impacts on the environment. Each section includes an introduction, a description of the environmental setting, impact analysis and proposed mitigation measures, and cumulative impact analysis. The impact sections include project-level analysis of the project as outlined in Chapter II. Project Description.

The organization of Section IV.A. through Section IV.G. follows the outline below.

ENVIRONMENTAL SETTING

As required by Section 15125(a) of the CEQA Guidelines, the Environmental Setting includes a description of the existing conditions at the proposed project site and/or in the vicinity of the proposed project site that provide the "baseline condition" against which project-related impacts are compared. While the baseline condition is generally the physical conditions that existed at the time the Notice of Preparation (NOP) is published, which was issued for this project on May 27, 2006, there may be reasons why a different baseline condition should be used for the analysis. For example, the baseline condition for transportation/traffic, air quality, and noise is the date(s) the traffic counts were taken. Each section describes the baseline condition for that particular analysis.

The Environmental Setting includes a discussion of the regulatory framework of federal, state, and local regulations, plans, policies, and/or laws that are directly relevant to the environmental topic being analyzed.

IMPACTS AND MITIGATION

The impacts and mitigation discussion is divided into the subsections described below.

SIGNIFICANCE THRESHOLDS

The impact significance criteria used in this EIR are based on San Francisco Planning Department Environmental Planning (EP) guidance regarding the environmental effects to be considered significant. This guidance is, in turn, based upon Appendix G to the CEQA Guidelines and EP's Initial Study checklist, with some modifications. The significance criteria used for each environmental topic/resource are presented at the beginning of the impact discussion in each section of Chapter IV of this EIR.

IMPACTS AND MITIGATION MEASURES

This subsection describes the direct and/or indirect environmental impacts of the proposed project and, based on the significance criteria, determines the significance of each environmental impact. This subsection identifies the methodology used to analyze environmental impacts for each environmental topic under the identified significance criteria. Some evaluations (such as for air quality and traffic) are quantitative, while others (such as for visual quality and urban design) are qualitative.

Each impact is summarized in an "impact statement" that is separately numbered, corresponds with the significance criterion, and is followed by a detailed discussion. The impact statement also identifies the level of significance after implementation of all feasible mitigation measures. This format is designed to assist the reader in quickly identifying the subject and conclusion of the impact analyses.

The geographic scope of the impact analyses varies depending upon the specific environmental issue being analyzed. Where the impact analysis identifies significant adverse environmental effects that could be reduced or avoided through implementation of a mitigation measure, the measure is presented after the relevant impact discussion. Mitigation measures identify specific and measurable actions that could be taken to reduce significant environmental impacts. Impacts are also assessed in light of existing regulatory requirements and project design features that could serve to avoid impacts.

Mitigation measures identify the parties responsible for implementation, a timeframe for implementation, and any applicable public agency approval, oversight, or monitoring that may be required. Mitigation measures would usually be implemented by the project sponsor or applicant, with oversight by one or more public agencies, unless indicated otherwise.

This subsection concludes with a statement regarding whether the impact, after implementation of the mitigation measures and/or compliance with existing local, State, and federal laws and regulations, would remain significant or be reduced to a less-than-significant level.

A "significant effect" is defined by Section 15382 of the CEQA Guidelines as "a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance. An economic or social change by itself shall not be considered a significant effect on the environment … [but] may be considered in determining whether the physical change is significant." The EIR uses the following terms to describe the level of significance of impacts identified during the course of the environmental analysis:

- **No Impact –** No adverse changes (or impacts) to the environment are expected.
- **Less-Than-Significant Impact –** Impact that does not exceed the defined significance criteria or would be eliminated or reduced to a less-than-significant level through compliance with existing local, State, and federal laws and regulations.
- **Less-Than-Significant Impact with Mitigation –** Impact that is reduced to a less-than-significant level through implementation of the identified mitigation measures.
- **Significant and Unavoidable Impact –** Impact that exceeds the defined significance criteria and cannot be eliminated or reduced to a less-than-significant level through compliance with existing local, State, and federal laws and regulations, and for which there is no feasible mitigation measure.
- **Significant and Unavoidable Impact with Mitigation –** Impact that exceeds the defined significance criteria and can be reduced through compliance with existing local, State, and federal laws and regulations and/or implementation of all feasible mitigation measures, but cannot be reduced to a less-than-significant level.

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A. LAND USE AND LAND USE PLANNING

The Initial Study (Appendix A) analyzed land use impacts of the proposed project, and concluded that the project would not have any significant impacts. The discussion is included below for informational purposes.

SETTING

LAND USES IN PROJECT VICINITY

The project site is on the northwest slope of Mount Sutro, just west of the north end area of Crestmont Drive, in the Mount Sutro/Forest Knolls/Clarendon Heights neighborhood. Figure 2, on page 31, shows the existing conditions of the project site. As discussed in more detail in B. Project Location, on page 43, the undeveloped site runs west and north from Crestmont Drive, and contains a dirt, dead-end road. The site is neither formally designated nor dedicated open space, although some neighbors use the site informally for recreational purposes, such as for dog walking. Its north portion slopes sharply downward to an abandoned quarry on an adjacent parcel.

Northwest of the quarry and below the northwest end of the project site is the two-towered, 11-story Avalon Sunset Towers Apartment complex (8 Locksley Avenue). The 86-unit, two- to four-story Kirkham Heights Apartments complex (1530-1585 Fifth Avenue) is below the project site's eastern area, to the north of the project site. West and southwest of the site, downhill from the project site, are two- and three-story apartment buildings and single-family residences along Warren Drive. To the south, uphill from the project site, are two- to four-level single-family and two-family homes built into the hill on Crestmont Drive, and steeply sloped and undeveloped parcels that extend to Oakhurst Lane, a public right-of-way stairway that runs between Crestmont Drive and Warren Drive. East of the project site is a two-family residential use near the north end of Crestmont Drive. Across Crestmont Drive on its east and north sides, is the Mount Sutro Open Space Reserve of the University of California, San Francisco. The nearest neighborhood commercial area, approximately one mile by vehicle from the project site, is the Inner Sunset Neighborhood Commercial District (NCD), generally located along Irving Street between 5th Avenue and 19th Avenue, 9th Avenue between Lincoln Way and south of Judah Street, and Judah Street between 8th Avenue and 10th Avenue.

Primary land uses in the project vicinity are residential uses north, west, and south of the project site, and the open space on Mount Sutro, east of the project site. Other land uses include the UCSF campus, about

0.25 mile northeast of the project site, and restaurant, retail, and other commercial uses in the Inner Sunset NCD, mentioned above. The existing character of the project area is residential surrounded by the wooded slopes of Mount Sutro. With the exception of a few mid-rise buildings, such as the two 11-story Avalon Sunset Towers located downhill and northwest of the project site, the low-rise development generally follows the natural topography of the site vicinity. As a result, there is a marked contrast between the wooded open space on Mount Sutro and the surrounding urbanization.

Mount Sutro, the predominant natural, geological and topographical feature in the project vicinity, rises to an elevation of 908 feet. The project vicinity, which is characterized by steep slopes and interspersed developed and undeveloped areas, is located on the northwest slope of Mount Sutro, between the developed areas north and west of the site, and the forested open space of the upper portions of Mount Sutro.

Residential buildings in the project vicinity include single-family homes and duplexes, with heights ranging from one to four stories, and multi-family apartment buildings with heights ranging from two to eleven stories. Buildings in the steeply sloped area along Crestmont Drive, near the project site, range from one to two stories on the uphill street side and three or four stories high (approximately 35 to 50 feet) on the downhill, rear portions of their lots.

USE AND HEIGHT AND BULK DISTRICTS

Use Districts

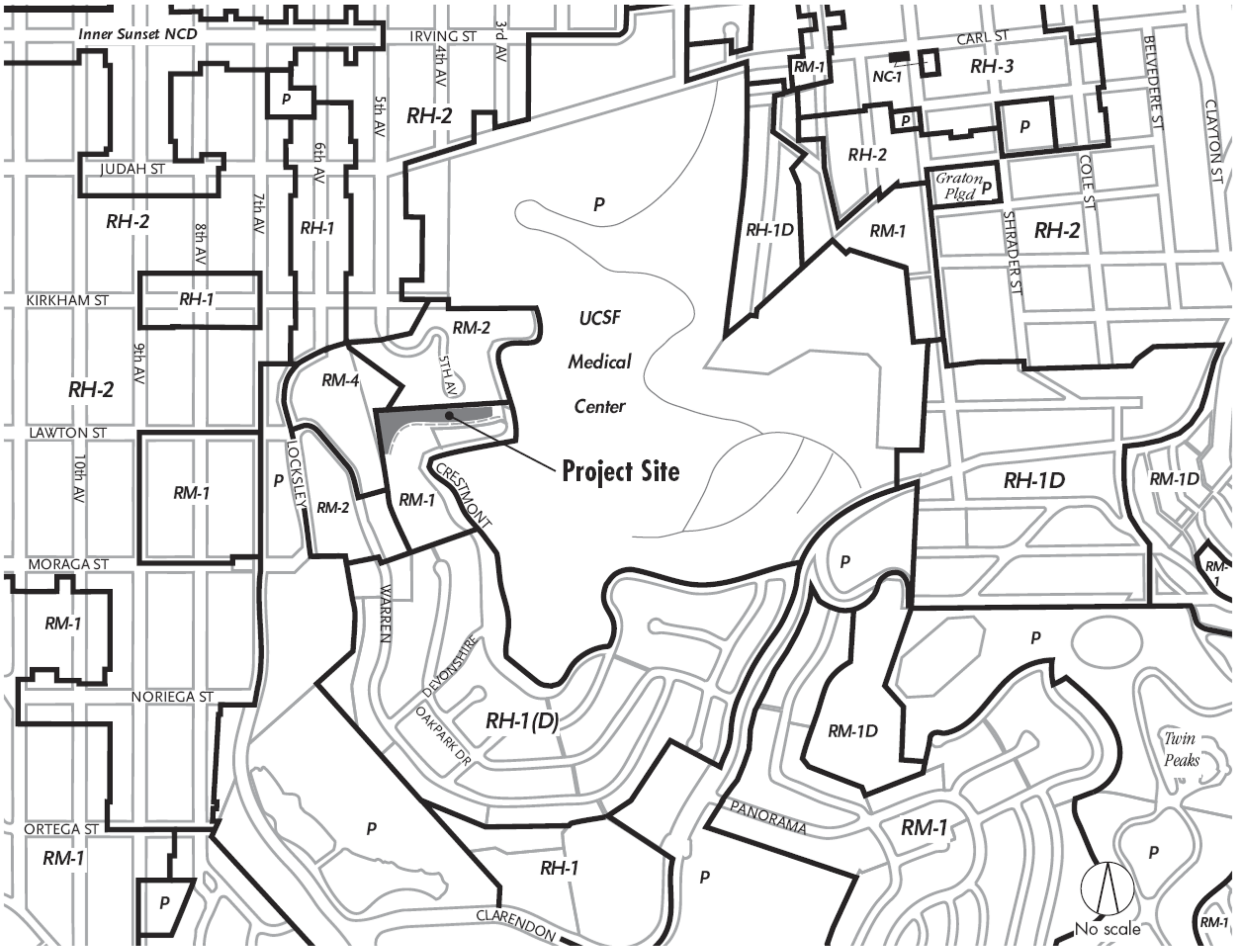
The project site is within an RM-1 (Residential, Mixed, Low Density; one dwelling unit per 800 square feet of lot area) District, which for the project site size allows up to 61 dwelling units as a principal use. In 1963, development of 105 units (five single-family dwellings, 34 two-unit buildings, and one 32-unit building), a community center and a parking garage were approved as a Planned Unit Development (PUD) on the current project site and adjoining parcels (totaling about 6 acres) under (Planning Commission Motion No. 5632. In 1976, the Planning Commission approved requested modifications to the 1963 PUD approval in order to substitute five two-unit buildings for the previously approved 32-unit building and to eliminate the community center and its parking garage, for a total of 83 approved units under Planning Commission Motion No. 7504. Forty-eight of the 83 approved single-family and duplex units were built. The currently proposed project, consisting of 12 two-unit duplex buildings and a ten-unit townhome building (a total of 13 buildings and 34 units) and a private, approximately 700-foot-long cul-de-sac on approximately 63,890 square feet (almost 1.5 acres) of the original six-acre PUD site would require PUD/Conditional Use Authorization by the Planning Commission, pursuant to Sections 303 and 304 of the *Planning Code*.

Zoning districts of nearby areas include RM-1; RM-2 (Residential, Mixed, Moderate Density; one dwelling unit per 600 square feet of lot size); RM-4 (Residential, Mixed, High Density; one dwelling unit per 200 square feet of lot area); P (Public Use); and Inner Sunset NCD (one unit per 800 square feet of lot area). The single- and two-family residences uphill to the south of the project site are within the same RM-1 District as the project. The Kirkham Heights Apartments downhill to the north of the project site, and the residential units to the west, are within an RM-2 (Residential, Mixed, Moderate Density; one dwelling unit per 600 square feet of lot area) District. To the northwest is an RM-4 (Residential, Mixed, High Density) District, within which the Avalon Sunset Towers Apartment complex is located. To the south, across Oakhurst Lane, is an RH-1 (D) (Residential, One-Family, Detached Dwellings, one dwelling per lot with side yards) District. The UCSF campus and UCSF's Mount Sutro Open Space Reserve are zoned P for Public Use. The commercial district along Irving Street and 9th Avenue is within the Inner Sunset Neighborhood Commercial District. Figure 11 on the following page depicts use districts in the area.

RM-1 Residential, Mixed, Low Density District

RM-1 (Residential, Mixed, Low Density) Districts, as defined by the *San Francisco Planning Code*, contain a mixture of the dwelling types found in RH Districts, but in addition have a number of lower density apartment buildings that broaden the range of unit sizes and the variety of structures. A pattern of 25-foot to 35-foot building widths is retained, however, and structures rarely exceed 40 feet in height. The overall density of units remains low, buildings are moderately scaled and segmented, and units or groups of units have separate entrances. Outdoor space is available at ground and upper levels regardless of the age and form of structures. Shopping facilities and transit lines may be found within a short distance of the typical RM-1 districts. Nonresidential uses are often present to provide for the needs of residents.

RM-1 zoning allows dwellings at a density ratio not exceeding one dwelling unit for each 800 square feet of lot area. Principally permitted uses in the RM-1 District include single-family dwellings, multi-family residential (one unit per 800 square feet of lot area), group housing with a maximum of one bedroom for each 275 square feet of lot area, senior and physically disabled housing at a density ratio or number of dwelling units not exceeding twice the number of dwelling units otherwise permitted as a principal use,



Source: San Francisco Planning Department, During Associates

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Use Districts in the Project Vicinity Figure 11 residential care for six or fewer persons, childcare for 12 or fewer children, non-industrial public structures and uses, and open space use for horticultural or passive recreational purposes.

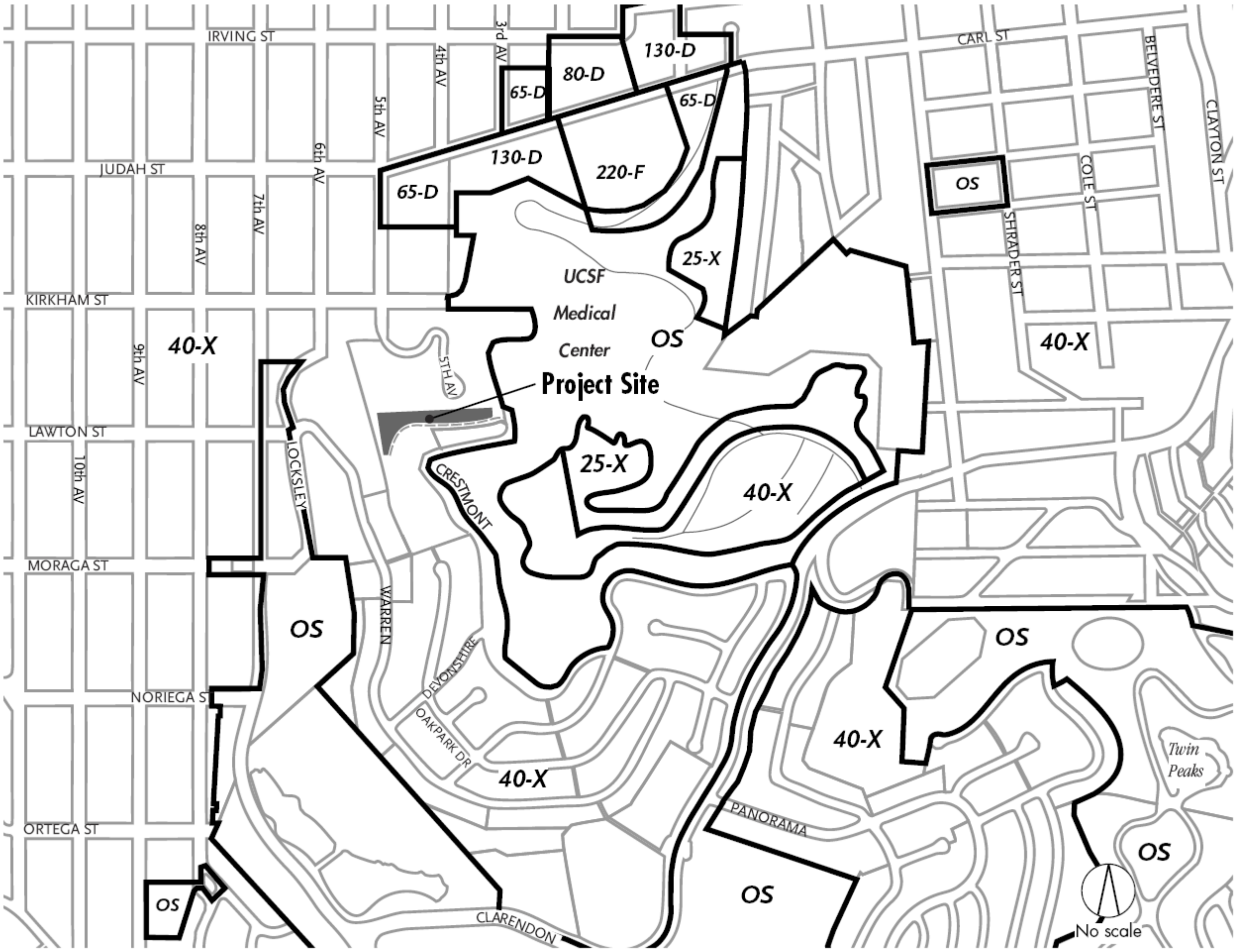
Conditional uses (requiring Conditional Use Authorization) include PUDs, group housing for medical or educational institutions, hotels with no more than five rooms, medical facilities, residential care for seven or more persons, childcare for 13 or more children, schools, religious institutions, community facilities, open recreation areas, greenhouses and nurseries, utility installations, community garages, access driveways, and mortuaries and columbaria. Generally, a minimum of one off-street parking space for each dwelling unit is required.

Rear yards are required in RM-1 Districts equal to 45 percent of the total depth of the lot, but may be reduced pursuant to Section 134(c) of the *Planning Code* such that the rear building line is an average of the rear building lines of adjacent properties. In this project's case, the required rear yard would be 35 percent of the total lot depth. Required private usable open space is 100 square feet for each dwelling unit. Common usable open space for each residential unit may be substituted for private open space at the rate of 133 percent of the amount of required private open space. The rear yard and useable open space requirements may be allowed to vary or to be modified through PUD and Conditional Use Authorization by the San Francisco Planning Commission for project sites 0.5 acre or larger.

Height and Bulk Districts

The project site is within a 40-X Height and Bulk District. This height district allows development up to a maximum height of 40 feet with no bulk limitations.

Most of the surrounding residential areas are also within a 40-X Height and Bulk District. The exceptions are: the UCSF campus which is within 65-D, 130-D, and 220-F Height and Bulk districts (height limits of 65, 130 and 220 feet and bulk limits of 110 feet in longitudinal dimension and 140 feet in diagonal dimension above 40 feet in the D district, and bulk limits of 110 feet in longitudinal dimension and 140 feet in diagonal dimension above 80 feet in the F district) and UCSF's Mount Sutro Open Space Reserve, south and immediately east of the north end of Crestmont Drive, which is designated OS (Open Space), and a smaller P (Public Use) District south and west of the project site which is also designated OS; and a small area to the southeast of the project site on the southwest slope of Mount Sutro, which is within a 25-X Height and Bulk District (25-foot height limit and no bulk limit). Figure 12 on the following page depicts height and bulk districts in the area.



Source: San Francisco Planning Department, During Associates

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Height & Bulk Districts in the Project Vicinity Figure 12

PROPOSITION M, THE ACCOUNTABLE PLANNING INITIATIVE

In November 1986, the voters of San Francisco approved Proposition M, the Accountable Planning Initiative, which added Section 101.1 to the *Planning Code* to establish eight Priority Policies. These policies, and the sections of this EIR addressing the environmental issues associated with the policies are: (1) preservation and enhancement of neighborhood-serving retail uses; (2) protection of neighborhood character (Section IV.A. Land Use and Land Use Planning); (3) preservation and enhancement of affordable housing (Section IV.A. Land Use and Land Use Planning); (4) discouragement of commuter automobiles (Section IV.C. Transportation and Circulation); (5) protection of industrial and service land uses from commercial office development and enhancement of resident employment and business ownership; (6) maximization of earthquake preparedness (Section IV.F., Geology and Soils); (7) landmark and historic building preservation (Initial Study Section 13, Cultural, on page 47 in Appendix A of this EIR); and (8) protection of open space (Initial Study Section 6, Air Quality/Climate, on pages 24–26 in Appendix A of this EIR).

Prior to issuing a permit for any project that requires an EIR under CEQA, and prior to issuing a permit for any demolition, conversion, or change of use, and prior to taking any action that requires a finding of consistency with the *General Plan*, the City is required to find that the proposed project or legislation would be consistent with the Priority Policies. The consistency of the proposed project with the environmental topics associated with the Priority Policies is discussed in the Chapter IV of this EIR. The case report and approval motions for the project will contain the Department's comprehensive project analysis and findings regarding consistency of the proposed project with the Priority Policies.

REGIONAL PLANS AND POLICIES

The five principal regional planning agencies and their over-arching policy/plans to guide planning in the nine-county Bay Area include (1) Association of Bay Area Governments' (ABAG's) "A Land Use Policy Framework," *Projections 2009, and Regional Housing Needs Allocation 2007-2014;* (2) Bay Area Air Quality Management District's (BAAQMD's) *CEQA Guidelines*; (3) Metropolitan Transportation Commission's (MTC's) *Regional Transportation Plan (RTP)—Transportation 2030*, (4) Regional Water Quality Control Board's (RWQCB's) *San Francisco Basin Plan*, and (5) San Francisco Bay Conservation and Development Commission's (SFBCDC's) *San Francisco Bay Plan*. There would be no conflicts with regional plans.

SAN FRANCISCO PLANNING CODE

The *Planning Code,* which incorporates the City's Zoning Maps, implements the *San Francisco General Plan (General Plan)* and governs permitted uses, densities, and configuration of buildings within the city. Permits to construct new buildings (or to alter or demolish existing ones) may not be issued unless (1) the proposed project conforms and complies with the *Planning Code*, (2) allowable exceptions are granted pursuant to provisions of the *Planning Code*, or (3) amendments to the *Planning Code* are included as part of the project.

Use Districts

As discussed in Section II. D. Intended Uses of This EIR, the proposed residential project would be considered as a PUD, which requires Conditional Use Authorization by the Planning Commission. The project sponsor seeks an exception from the required rear yard depth.

The RM-1 District permits one dwelling unit per 800 square feet of lot area. Given the size of Lot 25, which is 49,558 square feet, up to 61 dwelling units would be permitted on the project site; 34 dwelling units are proposed.

Rear yards are required in the RM-1 District equal to 45 percent of the total depth of the lot, but may be reduced pursuant to Section 134(c) of the *Planning Code* such that the rear building line is an average of the rear building lines of adjacent properties. In the proposed project's case, the required rear yard would be 35 percent of the total lot depth. The site has a depth of approximately 70 feet at most locations, with a greater depth at the western end. The proposed buildings would have a setback from the rear property line varying from 13 feet at the easternmost duplex to 93 feet at the westernmost townhome. This would not comply with the rear yard requirement, and as mentioned above, the project sponsor seeks an exception from the required rear yard depth.

A minimum of one parking space is required per dwelling unit. Up to four spaces per duplex (48 spaces) and up to 15 spaces for the ten-unit townhome (for a total of 63 spaces) would be considered accessory parking. The proposed project would include 68 parking spaces: 32 dedicated off-street parking spaces within the 12 duplex buildings, and 36 off-street spaces in the parking garage of the townhome building (28 dedicated to residents and eight for visitors). Two of the 68 parking spaces would be handicapped-accessible. The parking would comply with the minimum requirements of *Planning Code* Section 151 but would exceed the amount of parking deemed accessory by five spaces. The Planning Commission could grant a Conditional Use Authorization for those five spaces as part of its PUD action. No off-street loading space would be provided since none is required under *Planning Code* Section 152.

Height and Bulk Limits

The proposed project would comply with the provisions of the 40-X Height and Bulk District, which permits construction of residences up to a height of 40 feet above curb level with no bulk limitations.

PROJECT APPROVALS

Because of the project site size, the proposed residential project would be considered as a PUD, which requires Conditional Use Authorization by the Planning Commission. As discussed above, the project sponsor seeks an exception from the required rear yard depth and to authorize five non-accessory parking spaces. Any physical environmental effects associated with the rear yard depth are evaluated in this EIR. Before its consideration of the Conditional Use Authorization for a PUD, the Planning Commission would need to certify the EIR as adequate and final, and adopt California Environmental Quality Act (CEQA) Findings. Other reviews and approvals include DPW approval of the subdivision of Lot 25 into 13 parcels, review of permit application for a project within the Northwest Mount Sutro Slope Protection Area by DBI's Structural Advisory Committee, building permits approved by DBI, and connection of the private road to Crestmont Drive approved by DPW. The project is subject to and would comply with the Residential Inclusionary Affordable Housing Program (*Planning Code* Sections 315 to 315.9).[62]

IMPACTS

SIGNIFICANCE THRESHOLDS

The project would have a significant environmental impact on land use if it were to:

- Physically divide an established community.
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, the *General Plan,* specific plans, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.
- Have a substantial adverse impact on the existing character of the vicinity.

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62 On August 1, 2006, the Board of Supervisors adopted amendments to *Planning Code* Section 315, increasing the percentage of required inclusionary housing units to 15 percent on-site or 20 percent off-site site (the requirements before the amendment were 12 percent and 17 percent, respectively).

Under CEQA, a conflict between a proposed project and a *General Plan* policy does not necessarily indicate a significant effect on the environment. The Planning Department staff Conditional Use Authorization case report for the Planning Commission will analyze the project's consistency with *General Plan* policies and *Planning Code* compliance, and will discuss any requested exceptions or modifications from the *Planning Code* requirements. As a result, the impact analysis below does not evaluate inconsistencies between the proposed project and *General Plan* policies that do not relate to physical environmental impacts, although other sections of this EIR analyze physical environmental impacts that could result from such conflicts.

IMPACT ANALYSIS

Division of an Established Community

Impact LU-1: The project would not divide an established community. (Less than Significant)

The proposed project would remove the existing trees on the site, and construct 34 dwelling units and a private new street extending from near the north end of Crestmont Drive. The new paved private street would curve to a north/south contour about 200 feet from Crestmont Drive. The new private paved cul-de-sac would be relatively level, whereas, generally, the other nearby streets are sloped. The project site islocated between existing dwelling units uphill on Crestmont Drive south of the project site, and dwelling units downhill on Warren Drive and Fifth Avenue and northwest and west of the project site. Land use impacts are considered significant if they disrupt or divide the physical arrangement of an established community. The project would not disrupt or divide the physical arrangement of surrounding land uses, substantially change the existing street plan, or impede the passage of persons or vehicles. Thus, the project would not physically divide an established community. Therefore, the proposed project would have a ***less-than-significant*** impact on the established residential neighborhood.

Compatibility with Plans and Policies

Impact LU-2: The project would not conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect. (Less than Significant)

Land use plans and policies are those which directly address physical environmental issues and/or contain targets or standards which must be met in order to preserve or improve characteristics of San Francisco's physical environment. As noted in the Regional Plans and Policies and the San Francisco *Planning Code* sections above, the proposed project would not obviously or substantially conflict with any such adopted environmental plan or policy. Therefore, the impact on plans and policies would be ***less than significant***.

Change in Land Use and Project Area Character

Impact LU-3: The project would not have a substantial adverse impact on the existing character of the vicinity. (Less than Significant)

The proposed project would change the land use on the project site from a steep, undeveloped site with trees and vegetation to residential uses, and would increase the density of development in the project area. The proposed project would consist of 13 buildings with a total of 34 dwelling units and a total of approximately 65,750 square feet of living space, 68 parking spaces, and a new paved, 20-foot-wide, approximately 700-foot-long private cul-de-sac.

The surrounding area consists of residential uses, dedicated open space, and private, undeveloped, vegetated sites. The project would add new residential development on a wooded site that has never been developed previously, and would increase the density of residential development in the project area. The proposed 13 residential buildings (12 duplexes and one ten-unit townhome building), would be four stories, built into the slope of the hill. The buildings would be one to four stories above the new private street grade level at the front of the buildings and a maximum of two stories below the new street level at the rear of the buildings (see Figure 8, on page 39). The western portion of the townhome building and the westernmost duplex building would be entirely above the new private street grade level; the other buildings would be partially above and partially below the new private street grade level. With the development of the proposed project, the surrounding area would remain residential. The private road on the project site would continue to provide access for informal recreational activities such as walking.

The project buildings would range from 16 feet to 40 feet high above the private street level, and would be similar in height to the other buildings uphill and downhill from the project site (except for the Avalon Sunset Towers). The density, massing, and rear yard configuration of the proposed project would be similar to the single-family and duplex structures uphill (to the south) and would be less dense and massive than the multi-unit residential buildings downhill (to the north and northwest).

The existing character of the project site is residential surrounded by the wooded slopes of Mount Sutro. With the mountain as background, there is a sense of verticality from the existing two- to four-level residences built into the steeply sloped hillside. Because of the steep slope of the site, the project buildings would be tiered down the slope of the site with a shorter rear yard than required in an RM-1 District. The tiered configuration and modified rear yard are similar to the configuration of buildings on lots uphill from the project site, on Crestmont Drive.

The character of the project area would be affected by the proposed residential development on the large undeveloped, partially-wooded, vegetated site. However, the project would be compatible with the existing types of land uses, sizes, scale of development, and density in the project vicinity. There are single-family and two-family units uphill on Crestmont Drive, to the south and east of the project site. Downhill, to the north, are multi-family units. In addition, northwest and downhill from the project site is the 11-story Avalon Sunset Towers. The project would change the use of the site because it is currently undeveloped, but the project would comply with development controls for the area and would not substantially or adversely alter the character of the area.

For the reasons discussed above, the proposed project would have a ***less-than-significant*** impact on the existing character of the vicinity.

Cumulative

Impact C-LU-1: The proposed project, in combination with other past, present, and reasonably foreseeable future projects, would not result in cumulative land use impacts. (Less than Significant)

The CEQA Guidelines consider cumulative land use impacts for projects that are proposed, under review, or under construction within close proximity to one another. As discussed in Section V.A. Growth Inducing Impacts, on pages 255–256, the proposed project would provide access to an adjacent undeveloped, wooded and vegetated parcel, Lot 27 in Assessor's Block 2636, which is also zoned RM-1; however, there is no current proposal to develop Lot 27. Because there is no other project in close proximity to the project site, there would be no cumulative land use impacts to which the proposed project would make a cumulatively considerable contribution. Therefore the project would result in ***less-than-significant*** cumulative land use impacts.

Conclusion

The proposed change in land use from an undeveloped lot to residential development would constitute a substantial intensification of land use at the project site. However, the change would not be a significant adverse land use impact because there are similar existing single-family, duplex, and multi-family residential uses with comparable densities and rear yard configurations surrounding the project site. In addition, the project vicinity is already established as a residential area. Further, the proposed density of 34 units is consistent with the density of development in the vicinity, and is in compliance with the permitted number of dwelling units in an RM-1 District. The project would not disrupt or divide an established community, nor would it adversely affect the existing character of the vicinity or be incompatible with the existing residential community that is located in the Mount Sutro/Forest Knolls/Clarendon Heights neighborhood. Therefore, the proposed change in land use would be a less-than-significant project-specific impact, and because there is no other project proposed in close proximity to the project site, the project would not contribute to any cumulative land use impacts.

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B. AESTHETICS

SETTING

URBAN FORM AND VISUAL CHARACTER

The urban form and visual character of the project area are strongly influenced by Mount Sutro and its steep topography and wooded and vegetated landscape, the open space of UCSF on the upper area of Mount Sutro, and the residential development which surrounds the mountain in lower areas. The project area encompasses the undeveloped, densely forested upper portion on Mount Sutro, a lower, mid-level area of developed and vegetated and/or wooded undeveloped parcels which includes the project site, and the lower slope and relatively flat areas to the north and west, which are developed predominantly with low-rise residential buildings. With the exception of a few mid-rise buildings, such as the 11-story Avalon Sunset Towers located downhill from the project site, the low-rise development generally follows the natural topography of the area. As a result, there is a marked contrast between the wooded and vegetated open space on Mount Sutro and the interspersed development and surrounding urbanization.

The project site is on the northwest slope of Mount Sutro, in an area that appears to be wooded, vegetated open space. Crestmont Drive is located south of the project site, and the wooded undeveloped slopes of Mount Sutro are to the northeast, east, and southeast. Uphill from the site are residential structures that appear to be tall on their downslope, rear north side. The project site and nearby open space divide these residential structures on Crestmont Drive from the denser residential development at a lower elevation. On the steep slopes of the project vicinity, roads, such as Crestmont Drive and Warren Drive, generally follow the contour lines of the mountain, with the result that development along these roads appears, from mid-range to distant vantage points, as horizontal bands of clustered buildings interspersed among bands of vegetated and wooded open space. Viewed from the northwest, the undeveloped project site appears to be one of the open spaces below the horizontal band of residences uphill, along Crestmont Drive and above the dense development at the lower elevations. Building scale and massing in the project area are varied, consisting of one-story to 11-story buildings, the majority of which have rear yards but little or no side yards. Development in the immediate project vicinity is residential, including single-family, duplex, and apartment buildings.

Most of the nearby buildings to the south (uphill) are 2- to 4-story residential buildings built into the side of Mount Sutro so that their downhill elevations appear as multi-level buildings facing the project site. To the northwest of the site, at the base of the hill, are the 11-story building Avalon Sunset Towers

Apartments and to the north are 2- to 4-story, multi-family residential buildings (Kirkham Heights Apartments).

The nearest commercial area is located along Irving Street and 9th Avenue (between Lincoln Way and Judah Street), approximately 0.25 mile to the north and northwest; but due to the configuration of local streets, it is approximately one mile away by vehicle. The height and bulk of these commercial buildings are similar to the surrounding residential areas. Thus, from more distant vantage points, the commercial areas are similar in visual character to the surrounding residential areas.

The residential buildings along Crestmont Drive near the project site are closely spaced, and are generally one story to three stories high on the uphill, Crestmont Drive side. The rear, downhill side of these buildings vary from two to four stories with supporting posts and piers below, of which some are exposed and some are enclosed. The residential buildings have a variety of colors, textures, façade treatments, and roof styles, but have an overall contemporary design character that is relatively consistent. The rectilinear forms, bulk, and heights are also relatively consistent.

The twin 11-story Avalon Sunset Towers, located northwest and downhill of the project site, have a contemporary design, as do the numerous buildings of the 86-unit Kirkham Heights Apartments located north and downhill of the project site. As a result, the contrasts between the wooded, vegetated open areas and the developed areas, and their siting at different elevations due to the steep topography, are more visually prominent than differences between the buildings themselves.

In the immediate project vicinity, there is no nineteenth- or early twentieth-century building that contributes a historic architectural visual character.

With the exceptions of the Avalon Sunset Towers and the larger, taller buildings of the UCSF campus farther to the northeast of the project site, buildings in the project vicinity are relatively small in massing and low-rise in height.

The visual character of the project site is as an undeveloped, vegetated, wooded area with a grove of eucalyptus trees in the center and east portions of the site, and an open area on its downslope to the west and northwest. The site contains approximately 880 non-native trees, consisting primarily of blue gum eucalyptus, red gum eucalyptus, and acacia.

The southern, uphill portion of the site contains a dead-end dirt road that connects to Crestmont Drive on the east boundary of the site. The project site is between the houses uphill on Crestmont Drive, and the northwest base of the hill at Locksley Avenue, Sixth Avenue, and Warren Drive (downhill of the project site). The wooded summit of Mount Sutro is to the east of the project site. In close-range views of the site, from the north and west, the existing trees and vegetation are prominent. Mid-range views toward the site encompass both the undeveloped vegetated site and the contrasting nearby structures. In long-range views, the site also appears as an undeveloped area with adjacent development, but the site is less prominent relative to the much larger Mount Sutro Open Space Reserve on the higher elevations of Mount Sutro.

The project site's original native vegetation has been replaced by non-native grasses, brush, and trees, primarily eucalyptus, over the past century (see Appendix A. Initial Study, Topic 8. Biology, on pages 33–40). For nearby residents, pedestrians, and motorists on Crestmont Drive, the trees on and near the project site contribute color, texture, and variety to the visual quality of this side of Mount Sutro. The scenic quality of the site and its environs is primarily attributable to the vegetated open areas to the west and the stands of eucalyptus, red gum, and acacia trees on the central and eastern portions of the site. The trees on the site are similar in visual character to those of nearby open spaces on Mount Sutro. The site does not contain scenic resources such as large native trees, rock outcroppings, or other features of the built or natural environment that contribute to a scenic public setting.

VIEWS

Five views of the project site, figures 14 through 18, on pages 80–84, show existing conditions and photo-simulated views of the proposed project. This subsection focuses on the existing conditions shown in the upper images of the figures; the photo-simulated views of the proposed project are addressed in the impacts analysis starting on page 85. Figure 13, on page 79, shows the locations of these viewpoints. Figure 14, on page 80, is a view looking west along the long east-west axis of the project site, adjacent to 505-507 Crestmont Drive. This vantage point provides long-range views across the project site, framed by existing buildings, of western San Francisco, a portion of Golden Gate Park, and the Pacific Ocean. The view depicted in Figure 14 is not a formally designated scenic view or vista, the project site is not a formally designated viewpoint, and this location is not a scenic resource or vista that provides unique views or views of unusual quality. Figure 15 on page 81, is a view looking east from the intersection of Lawton Street and Eighth Avenue. This perspective provides a mid-range view of the predominantly undeveloped and forested western slope of Mount Sutro, which includes the project site. Figure 16, on page 82, is a view looking south from the south end of Fifth Avenue. This view illustrates short- to mid-range views from the south end of Fifth Avenue looking uphill to the project site and the existing residential buildings along Fifth Avenue and Crestmont Drive, with forested areas of the western slope of Mount Sutro. Figure 17, on page 83, is a view looking east from Grand View Park. This perspective encompasses nearby development and a long-range view of Mount Sutro, downtown San Francisco, and the East Bay hills. Figure 18, on page 84, is a view looking south from the playing field in Golden Gate

Park, near the intersection of Martin Luther King, Jr. Way and Seventh Avenue. This views includes Mount Sutro and the existing project area.

Public open spaces and parks from which the project site can be seen include Golden Gate Park and Grand View Park, approximately 0.7 mile to the north and west, respectively, from the project site, and the Mount Sutro Open Space Reserve of UCSF, which is east of the project site, and uphill from the project site, on the east side of Crestmont Drive. Most of Golden Gate Park is relatively flat, as is the intervening area and surrounding area north of Mount Sutro and the project site; however, Golden Gate Park's large size and dense landscaping contrast with the densely urbanized nature of the surrounding area. Approximately 0.7 mile to the west of the project site is a ridge, which is lower in elevation than Mount Sutro, with densely developed slopes and topped with the open, landscaped Grand View Park.

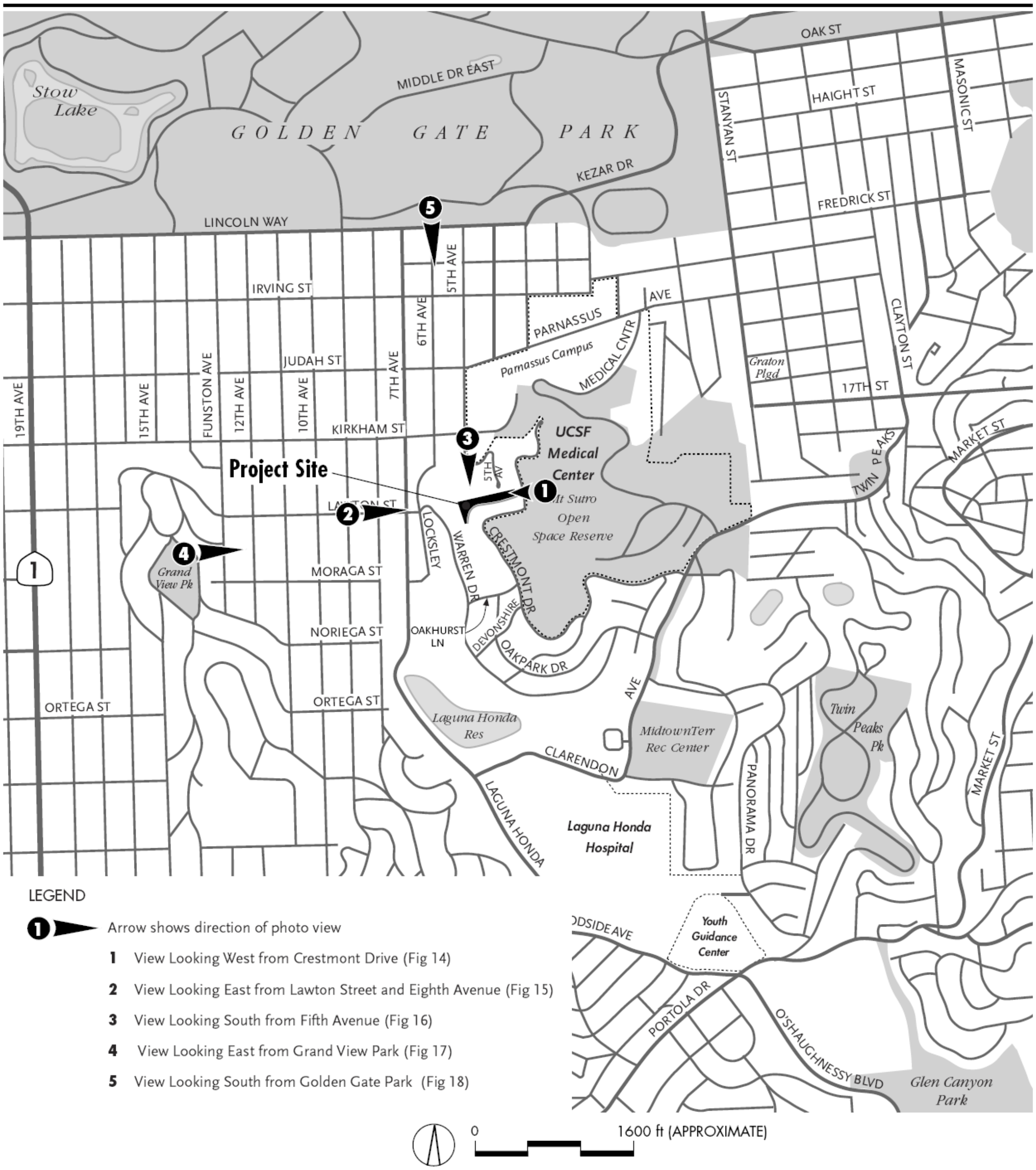
There is no formally designated scenic view, vista, or viewpoint near the project site. Other public areas in the project vicinity from which the site can be seen are the surrounding public streets and sidewalks, including Crestmont Drive and Warren Drive; Fifth, Sixth, Seventh, and Locksley avenues; and Kirkham, Lawton, and Moraga streets.

Views of the project site from most areas of the relatively flat and low-lying Golden Gate Park are limited by its dense mature trees and landscaping. However, Mount Sutro and the project site are visible from a limited number of open areas, such as the playing field near the intersection of Martin Luther King, Jr. Way and Seventh Avenue (see Figure 18, on page 84).

Grand View Park is atop a hill, and its top and east side slopes afford expansive public views. These include views eastward to the western slope of Mount Sutro and the intervening valley, as well as numerous other features such as Golden Gate Park and the Downtown and the Financial District to the northeast, and Mount Davidson to the southeast. The project site constitutes a relatively small portion of the open space on Mount Sutro that is visible from Grand View Park.

Views of the project site from UCSF's Mount Sutro Open Space Reserve, except at its periphery near the project site, are screened by its dense forest.

Golden Gate Heights Park is on a hill approximately 0.5 mile southwest of the project site and approximately 0.4 mile south of Grand View Park. Views of Mount Sutro and the project site from Golden Gate Heights Park are blocked by intervening dense residential development to its north and east.



Source: During Associates

6-1-11

Viewpoint Locations Figure 13

Existing View

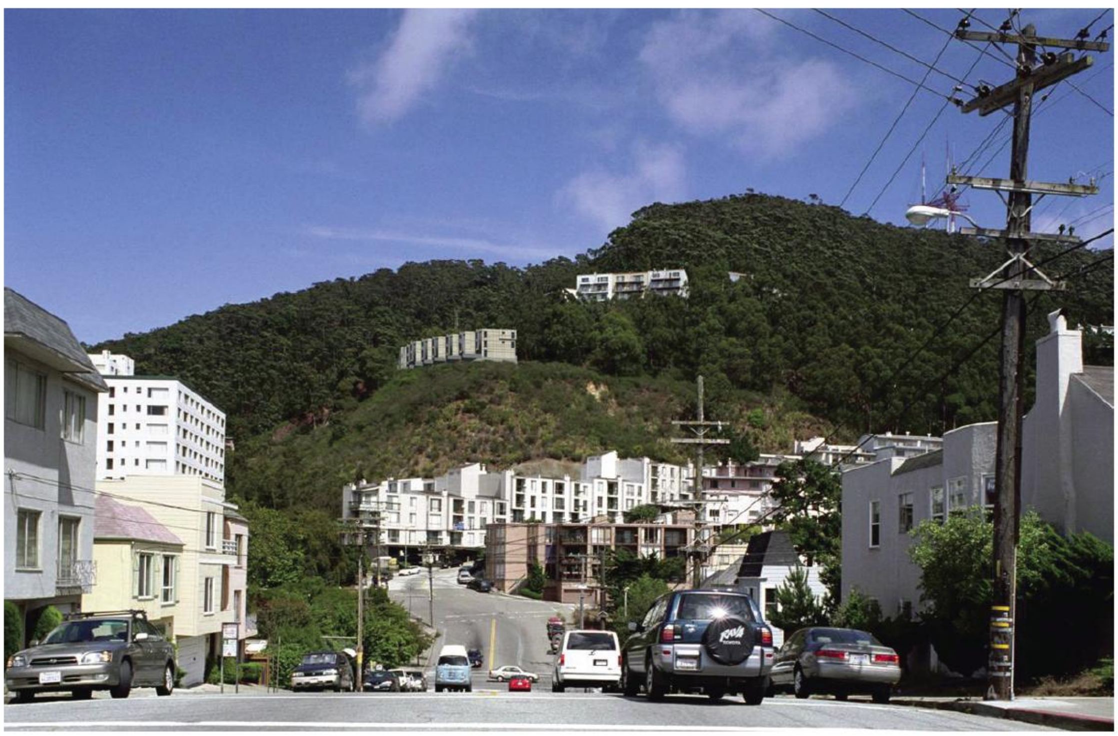
View with Project

Source: Square One Productions

9·24·11

View Looking West from Crestmont Drive Figure 14

Existing View



View with Project

Source: Square One Productions

9-24-11

View Looking East from Lawton Street and Eighth Avenue Figure 15

Existing View

View with Project

Source: Square One Productions

9-24-11

View Looking South from Fifth Avenue Figure 16

Existing View

View with Project

Source: Square One Productions

9-24-11

View Looking East from Grand View Park Figure 17

Existing View

View with Project

Source: Square One Productions

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View Looking South from Golden Gate Park Figure 18

The steep topography of the project area also affords expansive views from numerous vantage points, including residences and public streets and sidewalks, such as on Crestmont and Warren drives. These views include the Presidio and the hills of Golden Gate National Recreation Area in Marin County to the north, Golden Gate Park to the north and northwest, and Grand View Park to the west.

IMPACTS

SIGNIFICANCE THRESHOLDS

The project would have a significant effect on the environment in terms of aesthetics if it would:

- Have a substantial adverse effect on a scenic vista;
- Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and other features of the built or natural environment which contribute to a scenic public setting;
- Substantially degrade the existing visual character or quality of the site and its surroundings; or
- Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area or which would substantially impact other people or properties.

Environmental effects associated with light and glare were determined to be less than significant in the Initial Study (Appendix A, on page 15). Therefore, this topic is not discussed in this EIR.

As discussed in Section IV.H. CEQA Checklist Update, on page 233, the Planning Department revised their CEQA Initial Study Checklist since the publication of the Initial Study (Appendix A) on May 27, 2006. The significance criteria above reflect the current Checklist. The second criterion above, regarding scenic resources, was not included in the Initial Study. All of the criteria above are addressed in the evaluation of aesthetic impacts below.

IMPACT ANALYSIS

Changes in visual quality would result from two elements of the proposed project: (1) removal of the trees and vegetation on the site, and (2) residential development consisting of 13 buildings and an approximately 20-foot-wide, 700-foot-long paved street.

Design and aesthetics are by definition subjective, and open to interpretation by decision makers and members of the public. The proposed project's buildings design and aesthetics would be considered by the Planning Department and Planning Commission as part of the project review, a process separate from the environmental review.

Scenic Vistas

Impact AE-1: The project would not have a substantial adverse impact on scenic vistas. (Less than Significant)

As discussed in Setting, above, there is no formally designated scenic view, vista or viewpoint near the project site. (Views of and from the project site are discussed under Visual Analysis, below.) In the context of CEQA, the project site is not a scenic resource or vista that provides unique views or views of unusual quality. The site contains trees that contribute to the scenic quality of the area, along with nearby open spaces on Mount Sutro, although the site is not a designated scenic vista, and the existing trees on the site are not as lush or dense as those on the higher elevations of Mount Sutro. As part of the project, the site would be landscaped with trees and plants. For these reasons, the project's impact on scenic vistas would be ***less than significant***.

Scenic Resources

Impact AE-2: The project would not have a substantial adverse impact on scenic resources. (Less than Significant)

As discussed in Setting, above, the project site does not contain any scenic resources such as large native trees, rock outcroppings, or other features of the built or natural environment. The site has scenic characteristics similar in visual quality to those of nearby open spaces on Mount Sutro and UCSF's Mount Sutro Open Space Reserve. For these reasons, the project's impact on scenic resources would be ***less than significant***.

Visual Character

Impact AE-3: The project would not have a substantial adverse impact on visual character. (Less than Significant)

The proposed development is a residential complex with a total of 13 buildings and a new paved cul-de-sac on an undeveloped, wooded site. After construction of the proposed project, the visual character of the project site would be distinctly urban, with the trees and vegetation removed from the site and replaced by the project buildings and new landscaping along a private cul-de-sac. The new street would be constructed along approximately the same alignment as the existing dirt road on the site. On the north and west downhill areas, the structures would appear to be four stories (approximately 50 feet) tall. From uphill areas to the south and east, the buildings would appear to be two to four stories (up to 40 feet) above the new street.

The proposed residential buildings would be generally rectilinear in form. The design would be contemporary in character with exterior materials consisting of fiber cement panel and metal panel. The architectural character of the proposed project would be compatible with the contemporary design of the residences on Crestmont Drive, the apartment buildings on Warren Drive, and the Kirkham Heights apartment complex downhill of the project site to the north. The proposed height, massing, style, and placement of the proposed project buildings would create a development form similar in visual character to that of the single-family houses and duplexes on Crestmont Drive (see Figure 14 on page 80, Figure 15 on page 81, and Figure 16 on page 82).

Approximately 880 eucalyptus and acacia trees would be removed from the project site. The San Francisco Board of Supervisors adopted legislation (effective March 1, 2006) amending existing city ordinances that would require a special permit from the DPW to remove any tree designated as a "landmark" or significant tree on public and private properties within the jurisdiction of the City and County of San Francisco. Under the legislation, the criteria for designating a landmark tree include such considerations as age, size, shape, species, location, historical association, and visual quality. No tree on the project site is currently designated a "landmark" tree. A "significant" tree is defined by the legislation as being greater than 12 inches in diameter, or being greater than 20 feet tall, or having a canopy greater than 15 feet, and being within 10 feet of a public right-of-way. A tree removal permit from the DPW is required to remove any significant trees. No tree on the project site meets the criteria for designation as a significant tree, as discussed in the Initial Study on page 40 in Appendix A of this EIR.

The trees on-site, which would be removed, are dominated by eucalyptus but include red gum, acacia, and plum trees. These trees contribute to the visual quality of the site, and their removal would be a visual change of the project site. However, the change from an undeveloped site to a residential development would be consistent with the type, scale, and character of existing residential structures in the area. Because the project would be similar in visual character to nearby development, and would not introduce contrasting visual elements to the project vicinity, it would not be considered a substantial visual degradation of the project site and would not substantially degrade the visual character or quality of the area. Thus, the impact on visual quality of the area would be less than significant.

To the west and north of the site, the land slopes sharply downward toward the base of Mount Sutro, and, to the east and south, the land slopes sharply upward from the project site area. Hence, from distant areas to the west and north, the project would be visible from almost all public vantage points. The impact on views from selected distant public vantage points is discussed below.

Since the project buildings would be downhill from the immediately adjacent residential buildings to the south (along Crestmont Drive), the project would be prominently visible from these residences. The existing downhill views of trees and shrubbery would be replaced by the south-facing façades and roofs of the project buildings and the paved street. Although most existing private foreground views from these adjacent residences to the south would be altered, there would not be blockage or substantial degradation of expansive views, including expansive views of the horizon. The two-story residential building to the east (505-507 Crestmont Drive) is at a lower elevation than buildings along Crestmont Drive to the south of the project site, and at a higher elevation than the project site. Private views to the west from the lower floors of 505-507 Crestmont Drive would be blocked by the project buildings. Reduced private views from a few nearby residences would be an unavoidable consequence of the project, and could be an undesirable change for those residents whose views, primarily to the northwest and west, would be altered by the removal of the project site trees and the addition of the project buildings. Such changes, however, would not be considered significant environmental effects under CEQA, which is concerned with the effect on the environment of persons in general, because, as discussed below, the existing views from public areas would not be substantially degraded, and the effects on nearby private views would not affect publicly accessible scenic vistas. Thus, changes to a few nearby private views resulting from the project would not substantially degrade the existing visual character or quality of the environment under CEQA.

As mentioned above, five views of the project site show existing conditions and photo-simulated views of the proposed project.

Figure 14, on page 80, shows existing and with proposed residential development views, looking west from near the north end of Crestmont Drive where the project's new street would meet it. This vantage point provides long-range views, framed by existing buildings, of western San Francisco, a portion of Golden Gate Park, and the Pacific Ocean. From this perspective, the proposed project would conform to the general pattern of development evident in the vicinity of the project site, which is characterized by contiguous, rectilinear residential buildings that appear to be three to four stories high. From the vantage point shown in this figure, the project buildings would be prominently visible but would appear vertically lower than the existing residences on Crestmont Drive due to the steeply sloping topography of the project vicinity. The project buildings would appear lower than the 505-507 Crestmont Drive building at the north end of Crestmont Drive, just north of the project entrance. The project would alter a few existing private foreground views from adjacent residences along Crestmont Drive to the south, and from the two-story residential building to the east (505-507 Crestmont Drive). Private views to the west from the lower floors of 505-507 Crestmont Drive (some of which are below grade) would be blocked by the project buildings, but for other nearby residences there would not be a substantial degradation of private views, including expansive views of the horizon.

As stated above, there is no formally designated scenic view, vista, or viewpoint near the project site. Although the view of Golden Gate Park and the Pacific Ocean from the street level of Crestmont Drive would be largely blocked from the viewpoint shown in Figure 14, the proposed project would not block a formally designated scenic public view or vista. The proposed project would contribute to the changing urban form of the area, and alter the character from undeveloped, wooded and vegetated land to low-rise residential, but it would have a less-than-significant aesthetic visual impact from the perspective of this figure.

Figure 15, on page 81, illustrates views looking east from the intersection of Lawton Street and Eighth Avenue toward the project site. This perspective provides a mid-range view of the predominantly undeveloped and forested western slope of Mount Sutro, which includes the project site. From this vantage point, the project buildings would be clearly visible below the existing Crestmont Drive dwellings in the area between the dense forest on the upper portion of Mount Sutro and the dense urban development at the lower elevation and the relatively flat areas.

Although the project would alter the visual character of the project vicinity by adding structures and decreasing the amount of undeveloped, wooded land, this would be a minor change in the overall visual context of this view. Thus, no scenic public view or vista would be blocked. The overall character of the upper portion of the mountain would remain dense woods and vegetation.

Figure 16, on page 82, illustrates short- to mid-range views from the south end of Fifth Avenue looking uphill to the project site, in its current undeveloped condition and with the proposed residential development, and the existing residential buildings along Fifth Avenue and Crestmont Drive, with forested areas of the western slope of Mount Sutro. From this vantage point, the proposed project would be clearly visible, and would appear to be of similar height and mass as the existing residences along Crestmont Drive. However, because of the topography of the area, the project would be viewed against the backdrop of the existing residences above, which extend along the entire length of the proposed buildings and beyond. The project would not block views of the sky or the wooded UCSF's Mount Sutro Open Space Reserve, uphill from Crestmont Drive. The project structures would change the visual character of the area to a more developed one, but it would not add a contrasting or conflicting visual element to the vicinity or substantially degrade the visual character of the area.

Figure 17, on page 83, illustrates views from Grand View Park looking east towards Mount Sutro and the project site. This perspective encompasses nearby development and a long-range view of Mount Sutro, downtown San Francisco, and the East Bay hills. The proposed project would be visible from Grand View Park, but would be a relatively small component of the view from Grand View Park. The overall character of the undeveloped, upper portion of Mount Sutro, the dense development below, and the wooded and vegetated open space with intermittent bands of development between the two would not be substantially altered. The project buildings would not block or substantially degrade any scenic view from Grand View Park.

Figure 18 on page 84, shows views of Mount Sutro and the existing project area without the project and with the project development from an open playing field in Golden Gate Park, on the north side of Martin Luther King, Jr. Way (north of Lincoln Way), at Seventh Avenue. The proposed project would be visible from this area of Golden Gate Park. From this perspective, the proposed project would appear as a band of infill development between the lower development and the band of buildings that appear to be on a ridge (which are the Crestmont Drive residential buildings). The project would increase and consolidate the total mass of buildings in this view, but it would be a relatively minor component of the view from this part of Golden Gate Park. The overall visual character of Mount Sutro with the lower elevation development would not be substantially altered. The project buildings would not block or substantially degrade any scenic view from Golden Gate Park.

As discussed above, the proposed project would change the visual character of the site from undeveloped to urban and would affect a few private views in the immediate vicinity of the project, but would be consistent with the height, massing, and style of existing nearby development, and would not remove any landmark or significant trees, introduce contrasting visual elements to the project vicinity, significantly affect views or views from public vantage points, or substantially degrade the visual character of the area. For these reasons, the proposed project would have a ***less-than-significant*** impact on visual character.

Cumulative Analysis

Impact C-AE-1: The proposed project, in combination with other past, present, and reasonably foreseeable future projects, would not result in cumulative aesthetic impacts. (Less than Significant)

The proposed project would not constitute a substantial adverse scenic vista impact; nor substantially damage a scenic resource or scenic public setting, nor substantially degrade the visual quality or character. Because there are no other nearby planned or proposed development projects, the project would have a ***less-than-significant*** cumulative aesthetic impact.

Conclusion

Views of the project buildings would be available from public streets and sidewalks, from Grand View Park, and from limited locations in the Mount Sutro Open Space Reserve and Golden Gate Park. The project would not substantially block any views from these public areas. Existing private views of the project site from the few adjacent and nearby residences would be altered by the proposed project which would include removal of the existing trees on the site. None of the on-site trees is designated a scenic, landmark, or significant tree. While their removal would be a change from the existing visual character of the project area, the proposed project would have a less-than-significant impact on scenic vistas, and scenic resources since the project would be a minor visual component of the Mount Sutro setting.

Although the project would add development in the area and result in a change in the visual environment of the northwest slope of Mount Sutro, the areas to the north, south, and west of the site are already developed. The project would change the site's visual character from an undeveloped, wooded and vegetated area to a landscaped residential development, but the project would not substantially alter the existing pattern of heights and massing in the project vicinity, nor include structures that contrast or conflict with the existing residential development above and below the project site.

For the reasons above, the proposed project would not substantially degrade or obstruct any scenic view or vista now observed from public areas, or cause a substantial and demonstrable negative change, and the change in the existing visual character of the project vicinity would be less than significant. As discussed above, there are no other projects proposed in the immediate site vicinity, and cumulative impacts would also be less than significant.

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C. TRANSPORTATION AND CIRCULATION

This section describes existing transportation conditions (roadway traffic, transit, parking, pedestrian, and bicycle conditions) in the vicinity of the proposed project, and an evaluation of the transportation impacts of the proposed residential development. This section summarizes the results of a transportation impact analysis prepared for the proposed project.[63,64] The transportation analysis was conducted based on the methodology presented in the San Francisco Planning Department's *Transportation Impact Analysis Guidelines for Environmental Review* (*SF Guidelines*).[65]

SETTING

TRANSPORTATION STUDY AREA

For the traffic analysis, six study intersections were identified as locations likely to be most affected by the project. The study intersections include:

1. Warren Drive / Seventh Avenue
2. Warren Drive / Devonshire Way
3. Crestmont Drive / Devonshire Way
4. Clarendon Avenue / Laguna Honda Boulevard
5. Clarendon Avenue / Oak Park Drive
6. Clarendon Avenue / Christopher Drive

The parking study area consists of Crestmont Drive between Devonshire Way and the terminus of Crestmont Drive, and Devonshire Way between Crestmont Drive and Oak Park Drive. The study intersections and parking study area are shown in Figure 19, on page 94.

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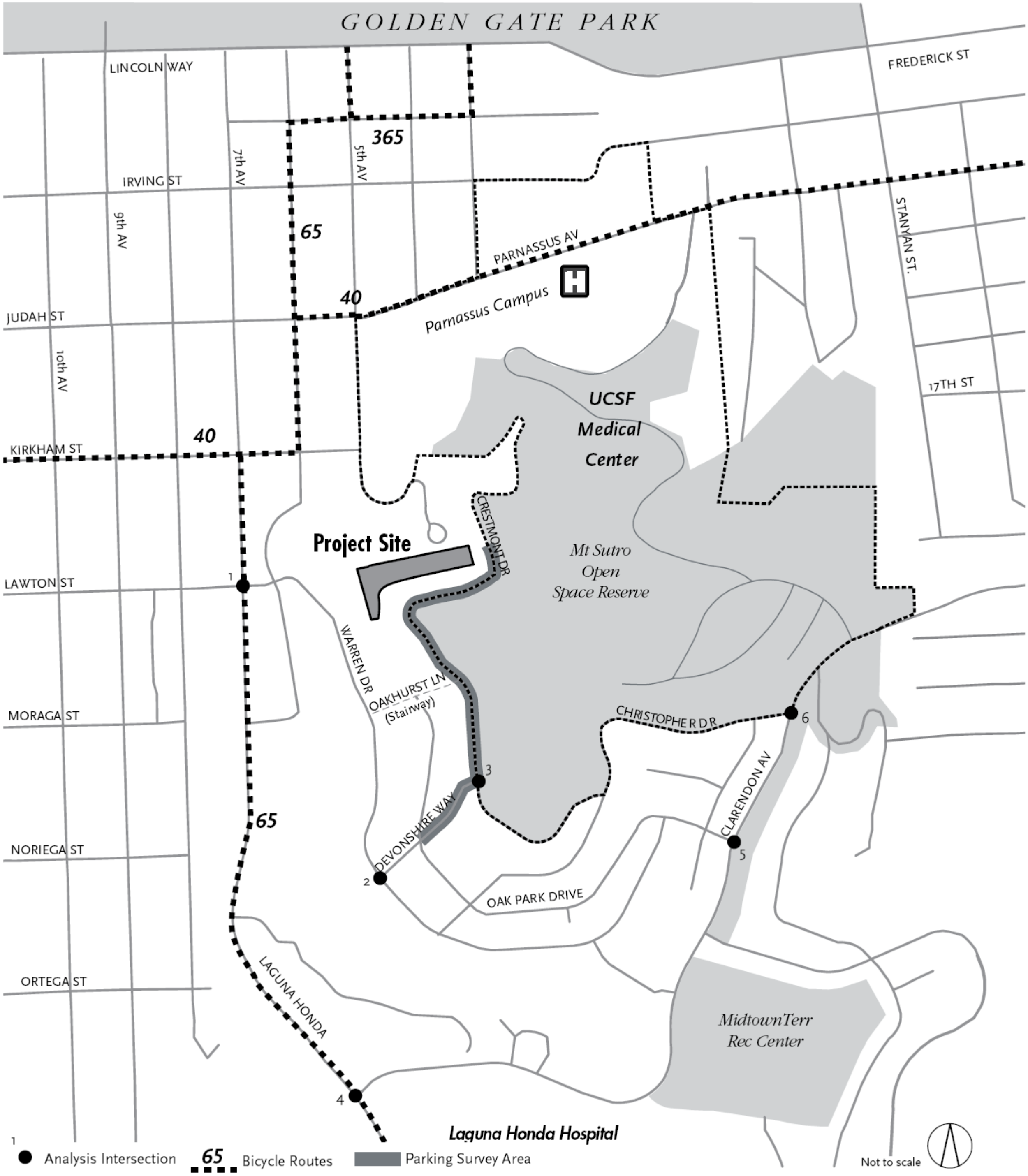
63 LCW Consulting, *Crestmont Hills Transportation Study – Final Report*, February 6, 2006. This report is on file and available for public review as part of Project File 2004.0093E at the San Francisco Planning Department, 1650 Mission Street, Suite 400.

64 Because the *Crestmont Hills Transportation Study – Final Report* was prepared in 2006, the transportation analysis in this section was reviewed and updated by José Farrán, P.E., of Adavant Consulting, a qualified transportation consultant. This review and revision is documented in: José Farrán, Adavant Consulting, *Memorandum to Lisa Gibson, San Francisco Planning Department, Re: Crestmont Hills EIR – Update of the Transportation Analysis by Adavant Consulting*, October 13, 2011.This document is on file and available for public review as part of Project File 2004.0093E at the San Francisco Planning Department, 1650 Mission Street, Suite 400.

65 San Francisco Planning Department, *Transportation Impact Analysis Guidelines for Environmental Review*, October 2002. Available online at http://www.sf-planning.org/Modules/ShowDocument.aspx?documentid=6753, accessed February 27, 2012.



Source: LCW Consulting

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Transportation Analysis and Parking Survey Area Figure 19

ROADWAY NETWORK

Regional Freeways

Regional access to the project area is provided by Interstate 80 (I-80), United States Highway 101 (US 101), and Interstate 280 (I-280). I-280 provides regional access between San Francisco and the Peninsula and South Bay. I-280 merges with Highway 1 near the San Francisco/San Mateo county line, at the interchange with Junipero Serra Boulevard (which connects with Nineteenth Avenue, of the Highway 1 network). In addition, I-280 connects with US 101 in the southeast part of the city. I-280 on-ramps and off-ramps nearest to the project site are located at Monterey Boulevard, and at John Daly Boulevard via Nineteenth Avenue. US 101 is a north-south freeway that provides regional access between San Francisco and points north (the North Bay via the Golden Gate Bridge) and points south (the Peninsula and South Bay). US 101 connects with Highway 1, north of San Francisco, and connects with I-80 near the Bay Bridge. I-80 is an east-west freeway providing regional access between San Francisco and the East Bay (via the San Francisco-Oakland Bay Bridge). I-80 merges with US 101 near downtown San Francisco.

Local Streets

Table 2 on the following page presents the *San Francisco General Plan* designations for the streets in the vicinity of the project site.

Seventh Avenue/Laguna Honda Boulevard

Laguna Honda Boulevard is a north-south arterial that extends north from Portola Drive to just north of Laguna Honda, at which point it then becomes Seventh Avenue, which continues north to Lincoln Way and Golden Gate Park. Seventh Avenue then continues north from Fulton Street, on the north side of Golden Gate Park, to the Presidio. Laguna Honda Boulevard and Seventh Avenue have one lane to two travel lanes in each direction. North of Golden Gate Park, Seventh Avenue generally has one travel lane in each direction. In the vicinity of the project site, Laguna Honda Boulevard and Seventh Avenue have limited areas where on-street parking is permitted. The *San Francisco General Plan* identifies Laguna Honda Boulevard, north of Woodside Avenue, and Seventh Avenue, between Noriega Street and Lincoln Way, as Secondary Arterial, Secondary Transit streets and Neighborhood Pedestrian streets. In addition, Laguna Honda Boulevard and Seventh Avenue are designated as part of the Citywide Bicycle Network.

Table 2
***San Francisco General Plan* Street Designations[1]**

Street	Vehicular[2]	Transit[3]	Pedestrian[4]	Bicycle[5]
Seventh Avenue / Laguna Honda Boulevard	Secondary Arterial	Secondary Transit Street	Neighborhood Pedestrian Street	Citywide Bicycle Route
Clarendon Avenue	Secondary Arterial	–	–	–
Crestmont Drive[6]	–	–	–	–
Oak Park Drive[6]/ Christopher Drive[6]	–	–	–	–
Warren Drive[6]	–	–	–	–
Devonshire Way[6]	–	–	–	–

Appendix B of this EIR includes the definitions of the various *General Plan* street designations.

Notes:

1 *San Francisco General Plan*, Transportation Element.
2 Transportation Element, Maps 6-8, pp. I.4.32-34.
3 Transportation Element, Map 9, p. I.4.42.
4 Transportation Element, Maps 11-12, pp. I.4.55-56.
5 Transportation Element, Map 13, p. I.4.59.
6 These streets are not included in the *San Francisco General Plan* Street Design list

Source: LCW Consulting, *Crestmont Hills Transportation Study – Final Report*, February 2006.

Clarendon Avenue

Clarendon Avenue is an east-west arterial that extends between Clayton Street and Laguna Honda Boulevard. In the vicinity of the project site, Clarendon Avenue has two travel lanes in each direction and sidewalks on both sides of the street. A left turn pocket is provided on the northbound side for westbound left turns onto Oak Park Drive. Left turns from Clarendon Avenue to Christopher Drive, and from Christopher Drive to Clarendon Avenue, are not permitted. The *San Francisco General Plan* identifies Clarendon Avenue as a Secondary Arterial.

Christopher Drive

Christopher Drive is a local residential street that extends through the Forest Knolls/Clarendon Heights neighborhood, and connects with Clarendon Avenue. Access at Christopher Drive is limited to right turns from Clarendon Avenue onto Christopher Drive and right turns from Christopher Drive onto

Clarendon Avenue. Christopher Drive has one travel lane in each direction, and parking and sidewalks on both sides of the street.

Crestmont Drive

Crestmont Drive is a long, winding local residential street that extends from Christopher Drive and terminates just north of the project site at a turn-around.[66] It is approximately 1,550 feet in length with no intervening intersections. The width of Crestmont Drive varies between about 28 feet near the intersection with Devonshire Drive, to about 26 feet at its narrowest location near Oakhurst Lane (public right-of-way stairway), and has one travel lane in each direction and on-street parking on both sides of the street (on-street parking is prohibited for a 145-foot segment of Crestmont Drive between the project site and Devonshire Way). Sidewalks are provided only on the west side of the street and the north side where it extends eastward. From Devonshire Way to its termination north of the project site.

Oak Park Drive

Oak Park Drive is a local residential street that extends through the Forest Knolls/Clarendon Heights neighborhood, and connects with Clarendon Avenue. Access to Oak Park Drive is at Clarendon Avenue. Oak Park Drive has one travel lane in each direction. Parking and sidewalks are on both sides of the street.

Warren Drive

Warren Drive is a local residential street that extends from Seventh Avenue to Oak Park Drive. Warren Drive has one travel lane in each direction, and parking and sidewalks on both sides of the street. West of Seventh Avenue, Warren Drive extends west as Lawton Street. Muni's 36-Teresita buses travel along Warren Drive between Oak Park Drive and Seventh Avenue in the project area. The nearest 36-Teresita bus stop is about 0.4 mile from the project site, on Warren Drive at Oakhurst Lane.

Devonshire Way

Devonshire Way is a steeply graded, two-block street that connects Crestmont Drive and Warren Drive. It has one travel lane in each direction. Parking and sidewalks are on both sides of the street.

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[66] While Crestmont Drive physically terminates just north of the project site, parcel maps indicate that Crestmont Drive extends further north as a "paper street."

INTERSECTION OPERATIONS

A grading system called Level of Service (LOS) is commonly used to describe the operational conditions at intersections. LOS is a qualitative description of an intersection's performance based on the average delay per vehicle (see Appendix B, Transportation Definitions). Intersection levels of service range from LOS A, which indicates free flow or excellent conditions with short delays, to LOS F, which indicates congested or overloaded conditions with extremely long delays. In San Francisco, LOS A through D are considered excellent to satisfactory service levels, respectively, and LOS E and LOS F are considered unsatisfactory service levels. Unsignalized intersections are considered to operate at unsatisfactory conditions if one approach operates at LOS E or LOS F, and California Department of Transportation (Caltrans) signal warrants are required.[67]

Existing weekday p.m. peak-hour intersection operating conditions at the six intersections selected for analysis in the study area are presented in Table 3, on page 99 (see Figure 19, on page 94, for the locations of the six study intersections). During the weekday p.m. peak-hour (generally between 5:00 and 6:00 p.m.), all six study intersections currently operate with acceptable conditions (LOS D or better). Due to the low traffic volumes on the local residential streets in the project area, the study intersections closest to the project site (Crestmont/Devonshire and Devonshire/Warren) operate with minimal delays, at LOS A conditions. Two T-intersections at Clarendon/Oak Park and Clarendon/Christopher also operate with minimal delays, at LOS B or better conditions for the southbound approach to Clarendon Avenue. The signalized intersection of Clarendon/Laguna Honda is also a T-intersection and operates at LOS D. The signalized intersection of Seventh/Warren operates at LOS C conditions.

Traffic volumes on Crestmont Drive, north of Devonshire Way, are low throughout the day because this segment of Crestmont Drive functions as a cul-de-sac, and mainly serves the residences on the street. The p.m. peak hour volumes reflect this condition. Traffic volume counts during the p.m. peak hour indicate that there are about 41 vehicles traveling on Crestmont Drive, north of Devonshire Way (29 northbound vehicles, and 12 southbound vehicles). These p.m. volumes are typical of limited-access residential streets.

67 In order to ensure that the advantages outweigh the disadvantages of installing a signal, and to provide some consistency in the application of signals, a series of signal warrants for traffic signals have been developed to define the minimum conditions under which further consideration of a signal is appropriate.

Table 3
Intersection Level of Service
Existing and Existing plus Project Conditions – Weekday P.M. Peak-Hour

	Existing		Existing plus Project	
	Delay[1]	**LOS**	**Delay[1]**	**LOS**
1. Warren Drive / Seventh Avenue [2]	22.4	C	23.2	C
2. Warren Drive / Devonshire Way [3]	7.5 (sb)	A	7.7 (sb)	A
3. Crestmont Drive / Devonshire Way [3]	7.2 (nb)	A	7.4 (eb)	A
4. Clarendon Avenue / Laguna Honda Boulevard [2]	49.0	D	50.5	D
5. Clarendon Avenue / Oak Park Drive [3]	12.0 (sb)	B	12.2 (sb)	B
6. Clarendon Avenue / Christopher Drive [3]	9.2 (sb)	A	9.2 (sb)	A

Notes:
1 Delay presented in seconds per vehicle.
2 Signalized intersection.
3 Unsignalized intersection - STOP-controlled. Delay and LOS presented for worst approach. Worst approach indicated in ( ), and sb = southbound and nb = northbound.

Source: LCW Consulting, *Crestmont Hills Transportation Study – Final Report*, February 2006.

As noted above, Crestmont Drive is about 26 feet wide, and on-street parking is generally permitted on both sides of the street. The narrow right-of-way with its on-street parking limit the available travel way for vehicles. When vehicles traveling in opposite directions approach each other at the same time, one vehicle must pull over to allow the other vehicle to pass. Due to the low traffic volume on this street, the frequency of vehicles bypassing each other is limited, and the pass-by operations result in minimal increase in delays for drivers. Similar one-way pass-by operations on narrow two-way streets are characteristic of numerous residential streets in hillside San Francisco neighborhoods (e.g., Castenada Avenue or Marcela Avenue, in the adjacent Forest Hill neighborhood, among others).

TRANSIT NETWORK

Public transit service is provided by the San Francisco Municipal Railway (Muni) bus and rail lines. The closest bus line to the project site is the 36-Teresita with a bus stop on Warren Drive at Oakhurst Lane, which is a walking distance of about 0.4 mile from the project site. Access to this bus stop from the project site is via a winding, steep route on Crestmont Drive, Oakhurst Lane (stairs), and Devonshire Way. The 43-Masonic and 44-O'Shaughnessey buses stop at the intersection of Seventh Avenue and Lawton Street, a walking distance of about 0.6 mile from the project site. The 6-Parnassus and the 66-Quintara stop at Ninth Avenue and Lawton Street, a walking distance of about 0.7 mile from the project site. As with the bus stop on Warren Drive at Oakhurst Lane, there is no direct access from the project site to the bus stops at Seventh Avenue and Lawton Street, and at Ninth Avenue and Lawton Street, and there is a steep grade for pedestrians and transit riders between Crestmont and Seventh Avenue, varying between 5 and 18 percent. Field observations indicate that all lines currently have available capacity in the project area.

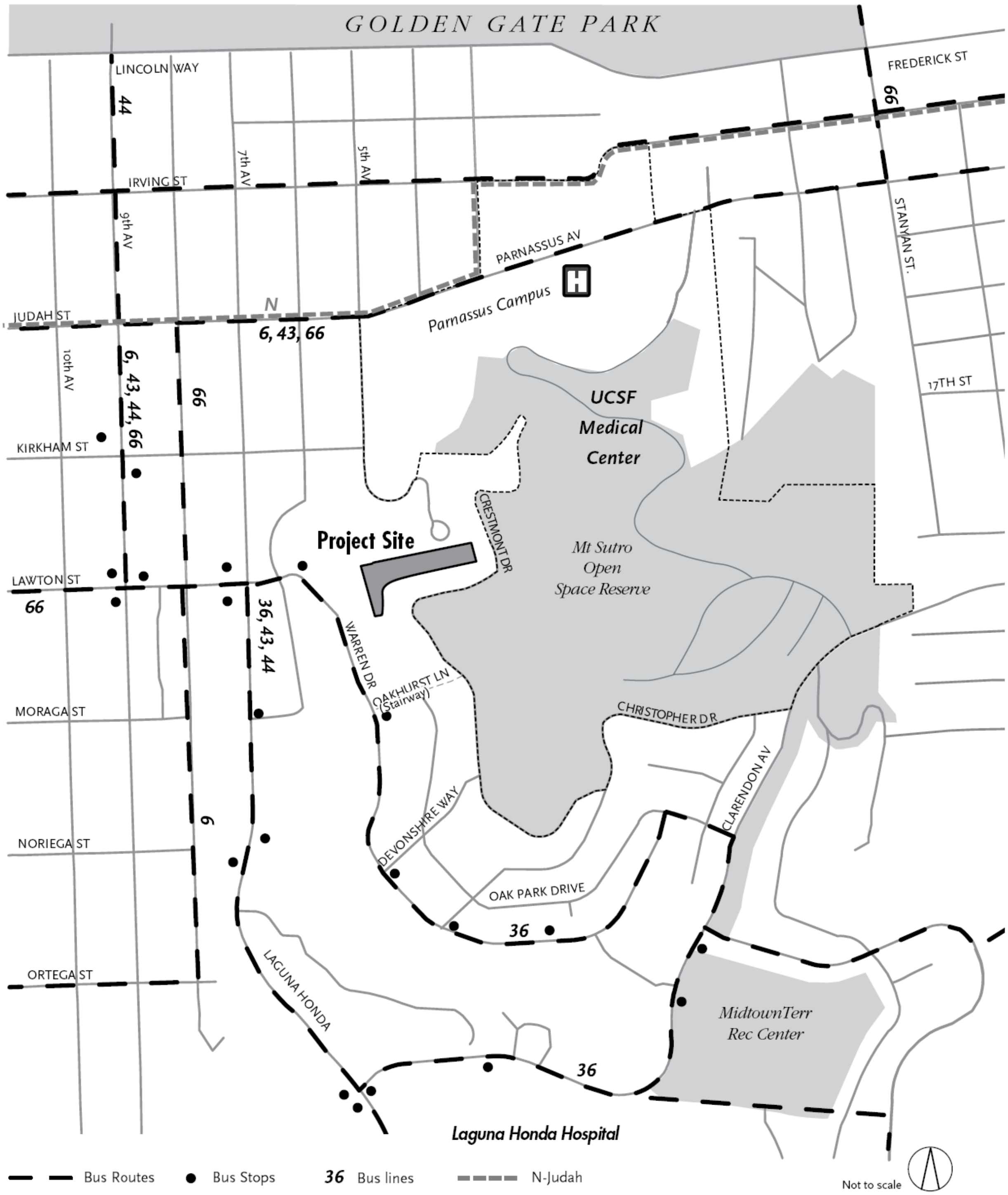
In addition to the bus lines, there are four Muni Metro trains serving the area west of Twin Peaks, which includes the project area. The N-Judah line runs on Judah, Irving, and Cole streets, and its closest stop to the project site is a walking distance of about 1.0 mile north at the intersection of Judah Street and Ninth Avenue. Actual peak period headways between trains are 10 to 15 minutes during the a.m. and p.m. peak periods (Muni's published schedule headway is eight minutes). The K-Ingleside, L-Taraval, and M-Ocean Beach stop at the Forest Hill station on Laguna Honda and Dewey Boulevard, a walking distance of about 1.5 miles from the site. The Forest Hill station is served by the 36-Teresita bus line, which operates on Warren Drive in the project area.

Transit service between San Francisco and the North Bay is provided by Golden Gate Transit; between San Francisco and the East Bay, by Alameda-Contra Costa Transit (AC Transit) and Bay Area Rapid Transit (BART); and between San Francisco and the South Bay, by San Mateo County Transit (SamTrans), BART, and Caltrain. These regional providers can be accessed from the project site via connections with Muni transit lines. Transit routes and stop locations in the area of the proposed project are shown on Figure 20 on page 101.

PARKING CONDITIONS

The existing on-street parking conditions were examined in the immediate vicinity of the project site—on Crestmont Drive between Devonshire Way and the north terminus of Crestmont Drive, and on Devonshire Way, between Crestmont Drive and Oak Park Drive (see Figure 19, on page 94). Parking conditions were observed during the weekday evening period (6:30 to 7:30 p.m.) when residential parking demand is generally greatest in San Francisco neighborhoods.

Within the parking study area, on-street parking is generally unrestricted. Along Crestmont Drive, on-street parking is permitted on the east side (where there is no sidewalk), except where there are some red zones (parking not permitted) along sharp curves of the street. Additional on-street parking is permitted



Source: LCW Consulting

9-24-11

Transit Network Figure 20

along the west curb; however, the spacing of residential driveways limits the curb space for on-street parking.

Table 4 presents the parking supply and use in the parking study area. The parking field survey found about 94 parking spaces in the study area. During the weekday evening period (6:30 to 7:30 p.m.) these spaces are about 36 percent occupied. Some residents along Crestmont Drive park in their driveways or park parallel at the front of the curb cut, partially blocking their driveways. Between eight and ten vehicles were observed parking within or partially in the driveways. These vehicles are not included in Table 4, since they did not occupy an on-street parking space. In San Francisco, a vehicle can be legally parked in front of the resident's driveway on the street (parallel to the street). A vehicle parked in the driveway violates the City parking ordinance if sidewalks are obstructed. In addition, a vehicle parked in a required front setback area would violate *Planning Code* requirements.

Table 4
Existing On-Street Parking Supply and Utilization
Weekday Evening Conditions

	Supply (spaces)	Occupied Spaces	% Occupied
Crestmont Drive [1]			
East side	60	20	33%
West side	15	11	73%
Devonshire Way [2]			
North side	6	1	18%
South side	13	2	15%
Total	94	34	36%

Notes:

1 Parking study area on Crestmont Drive between Devonshire Way and Crestmont Drive terminus to the north of the project site.

2 Parking study area on Devonshire Way between Crestmont Drive and Oak Park Drive.

Source: LCW Consulting, *Crestmont Hills Transportation Study – Final Report*, February 2006

PEDESTRIAN CONDITIONS

In the vicinity of the project site, local residential streets generally have sidewalks about six to ten feet wide. The nearby pedestrian network includes Oakhurst Lane, a public right-of-way stairway, that runs between Crestmont and Warren drives. Sidewalks are not provided on the east side of Crestmont Drive. Pedestrian volumes were observed to be light throughout the day. Pedestrian traffic in the area was observed to be primarily related to the existing residential uses. Overall, the sidewalks and crosswalks in the project site area were observed to be operating under satisfactory conditions, with pedestrians moving at normal walking speeds and with space to bypass other pedestrians. Pedestrian use of the site itself was observed to be minimal. No conflicts between vehicles and pedestrians were observed during field surveys.

Bicycle Conditions

In the general area of the project site, Seventh Avenue/Laguna Honda, Kirkham Street, Sixth Avenue, and Parnassus Avenue are designated Citywide Bicycle Routes. These routes are interconnected to the Citywide Bicycle Network and provide access to and from the project area from locations throughout the city. In the area of the proposed project, Bicycle Route #65 runs in both directions along Seventh Avenue/Laguna Honda Boulevard, and is a Class II facility (bicycle lane)[68] between the Muni Metro Forest Hill Station and Warren Drive, and a Class III facility (signed route only)[69] to the north and south of the Class II segment. Bicycle Route #40 runs east-west along Kirkham Street and Parnassus Avenue. Route #40 is generally a Class III facility; however, portions of the route on Kirkham Street between Ninth and Sixth avenues, as well as along Sixth Avenue, are Class II facilities. No additional bicycle routes are designated in the project vicinity by the recently implemented San Francisco Bicycle Plan.[70]

During field surveys, few bicyclists were observed to be riding along Seventh Avenue/Laguna Honda Boulevard. In general, during the weekday evening period, bicycle conditions were observed to be operating acceptably, with no conflict observed between bicyclists, pedestrians, and vehicles.

Emergency Vehicle Access

Emergency vehicle access is discussed in Section IV.G. Emergency Access, on page 229.

IMPACTS

Significance Thresholds

As discussed in Section IV.H. CEQA Checklist Update, on page 233, the Planning Department revised its CEQA Initial Study Checklist since the publication of the Initial Study (Appendix A) on May 27, 2006.

[68] A Class II bicycle route is an on-street striped bike lane.

[69] A Class III bicycle route is an on-street signed bicycle route, on which improvements vary.

[70] San Francisco Municipal Transportation Agency, *San Francisco Bicycle Plan*, June 26, 2009.

The significance criteria in the Initial Study differ from the criteria below, which reflect the current Checklist. The Initial Study did not evaluate impacts on transportation and circulation, stating that these impacts would be evaluated in the EIR. All of the current criteria are addressed in the evaluation of transportation and circulation impacts below.

The City has not formally adopted significance thresholds for impacts related to transportation, but generally considers that implementation of the proposed project would have significant impacts on transportation resources if it were to:

- Conflict with an applicable plan, ordinance or policy establishing a measure of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit;
- Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways;
- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;
- Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);
- Result in inadequate emergency access; or
- Conflict with adopted policies, plans, or programs regarding public transit, bikeways, or pedestrian facilities, or otherwise substantially decrease the performance or safety of such facilities.

The transportation and circulation impact findings herein are also based on the following significance criteria used by the San Francisco Planning Department for the determination of impacts associated with a proposed project.

Intersections

The operational impact on signalized intersections is considered significant when project-related traffic causes the intersection level of service to deteriorate from LOS D or better to LOS E or LOS F, or from LOS E to LOS F. The operational impacts on unsignalized intersections are considered significant if project-related traffic causes the level of service at the worst approach to deteriorate from LOS D or better to LOS E or LOS F and Caltrans signal warrants would be met, or would cause Caltrans signal warrants to be met when the worst approach is already operating at LOS E or LOS F.

A project may result in significant adverse impacts at intersections that already operate at LOS E or LOS F under existing conditions, depending upon the magnitude of the project's contribution to the worsening of the average delay per vehicle. In addition, the project would have a significant adverse impact if it would cause major traffic hazards or contribute considerably to cumulative traffic increases that would cause deterioration in levels of service to unacceptable levels or worsen the average delay per vehicle at an intersection already at LOS E or LOS F conditions.

Transit

A project would have a significant effect on the environment if it would cause a substantial increase in transit demand that could not be accommodated by adjacent transit capacity, thus resulting in unacceptable levels of transit service; or cause a substantial increase in delays or operating costs so that significant adverse impacts in transit service levels could result. Based on the Muni and regional transit screenlines analyses,[71] a project would have a significant effect on the transit provider if project-related transit trips would cause the capacity utilization standard[72] to be exceeded during the p.m. peak hour.

Parking

San Francisco does not consider parking supply as part of the permanent physical environment and therefore, does not consider changes in parking conditions to be environmental impacts as defined by CEQA. However, this report presents a parking analysis to inform the public and the decision makers as to the parking conditions that could occur as a result of implementing the proposed project.

Parking conditions are not static, as parking supply and demand varies from day to day, from day to night, from month to month, etc. Hence, the availability of parking spaces (or lack thereof) is not a permanent physical condition, but changes over time as people change their modes and patterns of travel.

Parking deficits are considered to be social effects, rather than impacts on the physical environment as defined by CEQA. Under CEQA, a project's social impacts need not be treated as significant impacts on the environment. Environmental documents should, however, address the secondary physical impacts

[71] Screenline analysis assumes that there are identifiable corridors or directions of travel which are served by a grouping of transit lines. It is assumed that someone traveling on transit in that direction will choose one of the transit lines that collectively serve the corridor or that direction of travel, and if one line is overloaded, the transit user will shift to another line headed in the same general direction. Screenlines are selected to intercept a group of transit lines at or near their maximum load point. Thus, screenlines divide a geographic area into specific sectors.

[72] Muni has established a capacity utilization standard of 85 percent.

that could be triggered by a social impact (CEQA Guidelines Section 15131(a)). The social inconvenience of parking deficits, such as having to hunt for scarce parking spaces, is not an environmental impact, but there may be secondary physical environmental impacts, such as increased traffic congestion at intersections, air quality impacts, safety impacts, or noise impacts caused by congestion. In the experience of San Francisco transportation planners, however, the absence of a ready supply of parking spaces, combined with available alternatives to auto travel (e.g., transit service, taxis, bicycles, or travel by foot) and a relatively dense pattern of urban development, induces many drivers to seek and find alternative parking facilities, shift to other modes of travel, or change their overall travel habits. Any such resulting shifts to transit service, in particular, would be in keeping with the City's "Transit First" policy. The City's Transit First Policy, established in the City's Charter Section 8A115, provides that "parking policies for areas well served by public transit shall be designed to encourage travel by public transportation and alternative transportation."

The transportation analysis accounts for secondary effects, such as cars circling and looking for a parking space in areas of limited parking supply, by assuming that all drivers would attempt to find parking at or near the project site and then seek parking farther away if convenient parking is unavailable. Moreover, the secondary effects of drivers searching for parking is typically offset by a reduction in vehicle trips due to others who are aware of constrained parking conditions in a given area. Hence, any secondary environmental impacts which may result from a shortfall in parking in the vicinity of the proposed project would be minor, and the traffic assignments used in the transportation analysis, as well as in the associated air quality, noise, and pedestrian safety analyses, reasonably address secondary effects.

Pedestrians

The project would have a significant effect on the environment if it would result in substantial overcrowding on public sidewalks, create hazardous conditions for pedestrians, or otherwise interfere with pedestrian accessibility to the site and adjoining areas.

Bicycles

The project would have a significant effect on the environment if it would create hazardous conditions for bicyclists or otherwise substantially interfere with bicycle accessibility to the site and adjacent areas.

Loading

A project would have a significant effect on the environment if it would result in a loading demand during the peak hour of loading activities that could not be accommodated within proposed on-site loading facilities or within convenient on-street loading zones, and would create hazardous conditions or significant delays affecting traffic, transit, bicycles, or pedestrians.

Emergency Vehicle Access

The project would have a significant effect on the environment if it would result in inadequate emergency access.

Construction

Construction-related impacts generally would not be considered significant due to their temporary and limited duration.

The proposed project would have no effect on air traffic patterns. Therefore, this topic is not discussed further in this EIR.

Impact TR-1: The proposed project would not conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation, nor would the proposed project conflict with an applicable congestion management program, including but not limited to level of service standards and travel demand measures. (Less than Significant)

Policy 10.4 of the Transportation Element of the *San Francisco General Plan* states that the City will "Consider the transportation system performance measurements in all decisions for projects that affect the transportation system" to determine whether the proposed project would conflict with a transportation- or circulation-related plan, ordinance or policy. The trips generated by the proposed project, the proposed project's effects on intersection operations, transit demand, impacts on pedestrian and bicycle circulation, parking and freight loading, as well as construction impacts are analyzed below.

PROJECT TRAVEL DEMAND

To estimate the number of new person-trips that would be generated by the project, trip generation rates for two- and three-bedroom units were applied to the proposed residential units and calculated on a daily weekday and weekday p.m. peak-hour basis. These person-trips were distributed to eight geographical areas, including the four quadrants of San Francisco; the East Bay; the North Bay; the South Bay; and outside the area. Additionally, these person-trips were assigned to the various available travel modes (auto, transit, walk, and other modes). Both the distribution and type of travel mode (mode split) of the trips were based on the land use categories and their trip generation rates; the purpose of the trip; plus the geographic distribution of residents' and workers' trips within San Francisco and in the Bay

Area. The number of vehicle trips generated by the project was determined from the auto person-trips and an average vehicle occupancy.

Person-trip generation for the residential land uses was based on rates compiled by the San Francisco Planning Department and published in the *SF Guidelines*, which contains the methodology for analyzing transportation/circulation effects. The trip distribution, mode split, and average vehicle occupancy rates were obtained from the 2000 US Census journey-to-work data.

Using the standard mode split from the US Census for the tract in which the project is located (Tract 301), the proposed project would generate approximately 340 person-trips on a daily weekday basis and 59 person-trips during the p.m. peak-hour. Of the 59 p.m. peak-hour person-trips, 44 trips would be by auto, 10 trips would be by transit, and 5 trips would be by walking and other modes. At an average vehicle occupancy rate of 1.19, about 37 new vehicle trips would be generated by the project during the weekday p.m. peak-hour, of which about 25 (68 percent) would be inbound to the project site, and 12 (32 percent) would be outbound from the project site.

ALL TRIPS BY AUTOMOBILE VEHICLE

The project site is not conveniently located for public transit users, pedestrians, and bicyclists. The project area has steep slopes, and the pedestrian route to and from the project site via the stairs of Oakhurst Lane is steep and circuitous because of the undeveloped land between the project site and the stairs. The steep grades between Crestmont Drive and Warren Drive and Seventh Avenue would hamper transit use and walk trips by project residents and visitors. Therefore, in addition to the analysis using the standard mode split from the US Census for Tract 301, a sensitivity analysis was performed that assumed all project-generated person-trips would occur by auto, to account for the steep grades between Crestmont Drive and Warren Drive and Seventh Avenue, which would contribute to limiting transit use and walk trips by project residents and visitors. In this case, the proposed project would generate about 50 p.m. peak-hour vehicle-trips (33 inbound and 17 outbound).

TRAFFIC IMPACTS

Under the standard census mode split scenario, the proposed project would generate about 25 inbound and 12 outbound vehicle trips during the weekday p.m. peak-hour. These 37 trips would use the new private road and Crestmont Drive for access to and from the project site, and would be distributed to the local and regional road network based on the origin/destination of each trip (from the trip distribution rates) and the street directions. Although all project-generated traffic would use Crestmont Drive to access the site, traffic volumes on Crestmont Drive would remain low. Currently, during the p.m. peak hour, there are about 41 vehicles using Crestmont Drive, north of Devonshire Way. With the project, this number would increase to 78 vehicles during the weekday p.m. peak hour.

As shown on Table 3, on page 99, under Existing plus Project conditions, the addition of project-generated traffic would result in a relatively small change in the average delay per vehicle at the study intersections (at most an additional 1.5 seconds per vehicle), and all six study intersections would continue to operate at the same service levels as under existing conditions. The addition of the 37 project-generated p.m. peak-hour vehicles would not degrade intersection LOS to LOS E or LOS F. Therefore, project-generated vehicle traffic would not result in a significant, adverse impact on intersection operations.

Under the sensitivity analysis in which all the project residents and visitors would travel by auto (i.e., 100 percent auto mode with an auto occupancy of 1.19 persons per vehicle [from 2000 Census Tract 301 data]), the proposed project would generate about 50 p.m. peak-hour vehicle-trips (33 inbound and 17 outbound), compared to the estimated 37 vehicle trips using the mode split data from the US Census Tract 301 in which the project is located, as discussed above. Table 5, on page 110, presents the Existing plus Project intersection levels of service assuming all trips to and from the project site would be by auto. The results of the intersection LOS analysis indicate that all intersections would continue to operate as under Existing conditions, and delays would be slightly higher (1.8 seconds or less) than the delays presented on Table 3, on page 99, but would not degrade intersection level of service to LOS E or LOS F. Therefore, the 100 percent auto mode use by project residents and visitors would not result in a significant, adverse impact on intersection operations. Assuming that all trips to and from the project site would be by auto, traffic volumes on Crestmont Drive would remain low. There would be a total of 91 p.m. peak hour vehicle trips on Crestmont Drive, north of Devonshire Way, as compared with 41 vehicle trips under current conditions.

Since Crestmont Drive is a narrow winding street which terminates in a cul-de-sac (just north of the project site), it primarily serves local residential traffic. Traffic volumes on Crestmont Drive, north of Devonshire Way, are lower than on other streets in the area. While the project would increase the number of p.m. peak hour vehicle trips on Crestmont Drive from existing conditions, these trips would be accommodated without substantially degrading the existing roadway operations. The impact on local roadway operations would be ***less than significant***.

Table 5
Intersection Level of Service
Existing and Existing plus Project Conditions – Weekday PM Peak-Hour Sensitivity Analysis (Assuming All Trips by Auto)

	Existing		Existing plus Project	
	Delay[1]	LOS	Delay[1]	LOS
1. Warren Drive / Seventh Avenue [2]	22.4	C	23.7	C
2. Warren Drive / Devonshire Way [3]	7.5 (sb)	A	7.8 (sb)	A
3. Crestmont Drive / Devonshire Way [3]	7.2 (nb)	A	7.5 (eb)	A
4. Clarendon Avenue / Laguna Honda Boulevard [2]	49.0	D	51.8	D
5. Clarendon Avenue / Oak Park Drive [3]	12.0 (sb)	B	12.3 (sb)	B
6. Clarendon Avenue / Christopher Drive [3]	9.2 (sb)	A	9.2 (sb)	A

Notes:
1 Delay presented in seconds per vehicle.
2 Signalized intersection.
3 Unsignalized intersection - STOP-controlled. Delay and LOS presented for worst approach. Worst approach indicated in ( ), and sb = southbound, nb = northbound, and eb = eastbound.

Source: LCW Consulting, February 2006.

Impact TR-2: The proposed project would not substantially increase hazards due to a design feature or incompatible uses. (Less than Significant)

The proposed project would add a new private street that connects with Crestmont Drive, but would not otherwise affect the existing roadway network. The project would not alter the configuration of, or add features that would alter existing lines of sight along, Crestmont Drive. As discussed under Traffic Impacts, above, project-generated trips would be accommodated without substantially degrading the existing roadway operations. Because project-related vehicles would not substantially affect roadway operations, there would not be substantial effects on visibility for drivers along Crestmont Drive. Connection of the new private street proposed by the project would be subject to review and approval by the Office of Emergency Services, Department of Public Works, and the San Francisco Fire Department. As discussed in Section IV.G. Emergency Access, on page 229, the project would have a less-than-significant impact on emergency access. The proposed residential project would be compatible with the existing residential uses in the area. For these reasons, the impact of the proposed project on hazards due to design features would be ***less than significant***.

Impact TR-3: The proposed project would not result in inadequate emergency access. (Less than Significant)

As discussed in Section IV.G. Emergency Access, on pages 229–232 of this EIR, the project would have a ***less-than-significant*** impact on emergency access.

Impact TR-4: The proposed project would not conflict with adopted policies, plans, or programs regarding public transit, bicycle or pedestrian facilities, or otherwise decrease the performance or safety of such features. (Less than Significant)

TRANSIT IMPACTS

As indicated in the Setting, Existing Transit Service section, on page 99, bus stops for the transit lines in the project area are walking distances of 0.4 to 0.7 mile from the project site. In addition, the steep grades between Crestmont Drive and Warren Drive and Seventh Avenue could deter transit use by the project residents and visitors. Nevertheless, the project could generate up to ten transit trips (seven inbound and three outbound) during the weekday p.m. peak-hour. These transit trips to and from the project site would use the 36-Teresita on Warren Drive (a walking distance of about 0.4 mile from the project site), and may also use the Muni lines further from the site. The 43-Masonic and 44-O'Shaughnessy stop at the intersection of Seventh Avenue and Lawton Street (a walking distance of about 0.6 mile from the project site), while the 6-Parnassus and 66-Quintara stop at Ninth Avenue and Lawton Street (a walking distance of about 0.7 mile from the project site). In the project area, the transit lines have available capacity during the weekday p.m. peak-hour that could accommodate the additional ten transit trips generated by the project. Therefore, the project would not generate a substantial demand for public transit that could not be met, and transit impacts would be ***less than significant***.

PEDESTRIAN IMPACTS

Pedestrian trips could be generated by the project which would include walk trips to and from the project residential units, plus walk trips to and from the Muni bus stops on Warren Drive and Seventh Avenue. During the weekday p.m. peak-hour, the project could add about 15 pedestrian trips (ten to/from transit and five walk to/from elsewhere) to the surrounding streets throughout the study area, depending upon the origin/destination of each trip.

These new pedestrian trips could be accommodated on the sidewalk of the new on-site private road (in front of the project buildings, on the north side of the private road), and on existing sidewalks adjacent to the project site and the stairs of Oakhurst Lane, and would not substantially affect the current pedestrian conditions. Since the sidewalks in the vicinity of the proposed project currently have low pedestrian activity (pedestrian traffic is primarily related to the existing residential uses), pedestrian conditions would continue to remain acceptable. The proposed project's impact on pedestrian conditions would be ***less than significant***.

BICYCLE IMPACTS

It is anticipated that a portion of the "other" trips generated by the proposed project would be bicycle trips. With the current bicycle and traffic volumes on the adjacent streets, bicycle travel generally occurs without major impedances or safety problems. Although the project would result in an increase in the number of vehicles in the vicinity of the project site, this increase would not be substantial enough to impede bicycle travel in the area. Therefore, the impact on bicycle travel would be ***less than significant***.

LOADING IMPACTS

The proposed project would provide eight unassigned parking spaces within the townhome parking garage that could be used also for loading/unloading. In addition, there would be room at the end of the private street, which is not required for the fire truck turn-around, that could accommodate delivery vehicles. The project would not be required to provide any off-street loading spaces under the *Planning Code*. In total, the 34 residential units would generate about 2.1 daily delivery/service-vehicle trips. Based on the methodology and assumptions provided in the *SF Guidelines,* this would result in a demand for 0.1 loading space during both the average and the peak-hour of loading activities. As such, the eight unassigned parking spaces, and/or room at the end of the private street, would accommodate the anticipated loading/unloading demand. Therefore, the proposed project would result in a ***less-than-significant*** loading impact.

CONSTRUCTION IMPACTS

Construction of the project would take approximately 23 months. Construction-related activities would typically occur Monday through Friday, from 7:00 a.m. to 7:00 p.m. The project sponsor does not anticipate that construction activities would occur on weekends.

Construction staging would be on-site where the new private street would be located. The project sponsor does not anticipate that any sidewalks adjacent to the project site would be closed during the construction period. Traffic lanes in the project vicinity would not be closed during construction. However, if temporary traffic lane and sidewalk closures would be needed, they would be subject to review and approval by the DPW and the Interdepartmental Staff Committee on Traffic and

Transportation in order to minimize impacts on local traffic. No Muni bus stop would be affected by the construction activity. In the event that a Muni bus stop would need to be relocated, the relocation would be coordinated with Muni's Street Operations/Special Events office.

During the construction period, there would be a flow of construction-related trucks into and out of the site. There would be between two and ten construction trucks traveling to the site daily during the construction period. The impact of construction truck traffic would be a temporary lessening of the project area streets' capacity due to the slower movement and larger turning radii of construction trucks, which may affect both traffic and Muni operations. Most of the construction-related truck traffic would use Nineteenth Avenue (from I-280/Highway 1 from the Peninsula and South Bay) and I-80 (from the East Bay). Truck routing for construction activities has not yet been determined; however, truck access to the site from the south is anticipated to be routed to and from Nineteenth Avenue via Warren Drive and Lawton Street. For access to the site from I-80, trucks would likely use I-280 south of the site and connect to Nineteenth Avenue. Construction traffic from the North Bay would be less than that from the Peninsula, South Bay, and East Bay.

There would be between 15 and 45 construction workers per day at the project site, depending on the development phase. The trip distribution and mode split of the construction workers are not known at the time this EIR was prepared. However, the addition of worker-related vehicle- or transit-trips would not substantially affect transportation conditions, since any impacts on local intersections or the transit network would be similar to, or less than, those associated with the project. Most of the construction workers would drive to the site, and would therefore cause a temporary parking demand. The construction worker parking demand would be accommodated along Crestmont Drive, and then once constructed, along the new private road. On-street parking along Crestmont Drive is generally available during the daytime hours to accommodate construction worker demand, as residential parking demand along Crestmont Drive is greatest during the evening and overnight hours. The development phases of the proposed project would not substantially affect area-wide parking conditions.

For the reasons above, the proposed project would result in a ***less-than-significant*** construction impact on transportation. Additionally, **Improvement Measure, I-TR-4** could be implemented to lessen the less-than-significant construction impacts.

Improvement Measure I-TR-4

Any construction traffic occurring between 5:00 to 6:00 p.m. would coincide with p.m. peak hour traffic and could temporarily impede traffic and transit flow, although it would not be considered a significant impact. An improvement measure limiting truck movements between 5:00 to 6:00 p.m. (or other times, if approved by the SFMTA) would minimize disruption of the general traffic flow on adjacent streets during the p.m. peak period and further improve transportation conditions at the project site during construction.

The project sponsor and construction contractor(s) would meet with the staff of the Traffic Engineering Division of the DPT, the Fire Department, Muni, the Planning Department, and other City agencies to determine feasible traffic improvement measures to reduce traffic congestion during construction of the project.

2025 CUMULATIVE ANALYSIS

Impact C-TR-1: The proposed project, in combination with other past, present, and reasonably foreseeable future projects, would not have significant cumulative transportation impacts (Less than Significant)

Future year 2025 Cumulative traffic conditions were estimated based on cumulative development and growth identified by the San Francisco County Transportation Authority's (SFCTA) travel demand forecasting model (SF-CHAMP Model). The transportation cumulative impacts analysis utilized the SF-CHAMP Model and the data analysis methodology included an analysis of impacts of past and present development in accordance with CEQA Guidelines Section 15130(b)(1) (B).

The SF-CHAMP Model is an activity-based travel demand model that has been validated to incorporate existing development and to represent future transportation conditions in San Francisco associated with growth. The model predicts all person travel for a full day based on assumptions of growth in population, housing units, and employment, which are then allocated to different periods throughout the day, using time of day sub-models. The SF-CHAMP Model predicts future person travel by mode for auto, transit, walk and bicycle trips. The SF-CHAMP Model also provides forecasts of vehicular traffic on regional freeways, major arterials and on the study area local roadway network considering the available capacity, origin-destination demand and travel speeds when assigning the future travel demand to the roadway network. The SF-CHAMP model data used in this study was also used for the development of 2025 Cumulative traffic conditions for the San Francisco Bicycle Plan EIR.[73]

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[73] José Farrán, Adavant Consulting, *Memorandum to Lisa Gibson, San Francisco Planning Department, Re: Crestmont Hills EIR – Update of the Transportation Analysis by Adavant Consulting*, October 13, 2011.This document is on file and available for public review as part of Project File 2004.0093E at the San Francisco Planning Department, 1650 Mission Street, Suite 400.

Future 2025 intersection turning volumes were developed by applying growth factors calculated from traffic volume growth between year 2004 and year 2025 conditions, obtained from the SF-CHAMP Model, to actual traffic volumes collected in the field. The purpose of developing a model-based growth factor rather than using future traffic estimates obtained directly from the model was to compensate for potential errors that could exist in the model validation.

The cumulative growth rate accounts for the level of traffic that would be associated with other proposed and potential projects in the area of the project site, including the proposed project. These projected traffic volumes in combination with recently implemented intersection geometry changes called for by the San Francisco Bicycle Plan were used to forecast the LOS conditions at the six study intersections under 2025 Cumulative conditions during the weekday p.m. peak-hour using the same methodology as was used for Existing and Existing plus Project conditions.

Table 6 on the following page presents the 2025 Cumulative weekday p.m. peak-hour intersection operating conditions and LOS. Overall, under 2025 Cumulative conditions, four of the six study intersections would continue to operate at LOS B or better, while the intersections of Warren Drive / Seventh Avenue and Clarendon/Laguna Honda would deteriorate to LOS F.

The proposed project's contribution to the critical movements was examined at the two intersections operating at LOS F in 2025 to determine whether the increase due to project trips would contribute considerably to critical movements operating at LOS E or LOS F.

- At the intersection of Warren Drive/Seventh Avenue, the project would add a total of eight vehicles to two of the three movements that determine the overall LOS performance at this intersection during the p.m. peak-hour: three vehicles to the southbound through-movement that would operate at LOS F, and five vehicles to the westbound through-movement that would operate at LOS D. The project's contribution to the southbound movement that would operate poorly (LOS F) would be minimal (0.3 percent), and therefore, its contribution to the 2025 Cumulative impacts would not be considered significant. Under the sensitivity analysis, which assumed that all project-generated trips would occur by auto, the project would add a total of 11 vehicles during the p.m. peak hour to the movements that determine the overall LOS: four vehicles to the southbound through-movement, and seven vehicles to the westbound through-movement. Under the sensitivity analysis, the project's contribution in this scenario to the southbound movement that would operate at LOS F would also be minimal (0.4 percent).

Table 6
Intersection Level of Service
Existing and 2025 Cumulative Conditions – Weekday P.M. Peak-Hour

	Existing		2025 Cumulative	
	Delay[1]	**LOS**	**Delay[1]**	**LOS**
1. Warren Drive / Seventh Avenue [2]	22.4	C	**>80**	**F**
2. Warren Drive / Devonshire Way [3]	7.5 (sb)	A	7.8 (sb)	A
3. Crestmont Drive / Devonshire Way [3]	7.2 (nb)	A	7.4 (eb)	A
4. Clarendon Avenue / Laguna Honda Boulevard [3, 4]	49.0	D	**>80**	**F**
5. Clarendon Avenue / Oak Park Drive [3]	12.0 (sb)	B	13.8 (sb)	B
6. Clarendon Avenue / Christopher Drive [3]	9.2 (sb)	A	10.1 (sb)	B

Notes:

1 Delay presented in seconds per vehicle.

2 Signalized intersection.

3 Unsignalized intersection - STOP-controlled. Delay and LOS presented for worst approach. Worst approach indicated in ( ), and sb = southbound, nb = northbound, and eb = eastbound.

4 Intersections operating at LOS E or LOS F are highlighted in bold.

Sources: LCW Consulting, February 2006; Adavant Consulting, October 2010

- At the intersection of Clarendon/Laguna Honda, the project would add a total of 17 vehicles to the three movements that determine the overall LOS performance at this intersection during the p.m. peak-hour: one vehicle to the westbound left turn movement that would operate at LOS F, three vehicles to the southbound left turn movement that would operate at LOS A, and 13 vehicles to the northbound through-movement that would operate at LOS F. The project's contribution to the two movements that would operate poorly (LOS F) would be minimal (at or below 0.8 percent) and therefore, its contribution to the 2025 Cumulative impacts would not be considered significant. Under the sensitivity analysis, which assumed that all project-generated trips would occur by auto, the project would add a total of 23 vehicles during the p.m. peak hour to the movements that determine the overall LOS: two vehicles to the westbound left turn movement, four vehicles to the southbound left turn movement, and 17 vehicles to the northbound through-movement. Under the sensitivity analysis, the project's contribution in this scenario to the two movements that would operate at LOS F would also be minimal (at or below 1.1 percent).

Although the intersections of Warren Drive/Seventh Avenue and Clarendon/Laguna Honda would operate at LOS F under 2025 Cumulative conditions, the project's traffic contribution to the movements that determine the overall performance at these two intersections would not be considered substantial under both the standard and the sensitivity analysis scenarios. Therefore, project traffic would not represent a considerable contribution to the adverse cumulative conditions at the intersections of Warren Drive/Seventh Avenue and Clarendon/Laguna Honda, and the project would have a ***less-than-significant*** cumulative traffic impact.

As discussed under Transit Impacts, above, the transit lines have available capacity during the weekday p.m. peak-hour that could accommodate the additional ten transit trips generated by the project. These ten transit trips would not represent a considerable contribution to year 2025 transit impacts, and the project would have a ***less-than-significant*** cumulative transit impact.

The proposed project would generate a small number of pedestrians and bicyclists. This would not represent a considerable contribution to year 2025 pedestrian and bicycle impacts, and the project would have ***less-than-significant*** cumulative impacts on bicycles and pedestrians.

Because there are no other nearby planned or proposed development projects, there would be no cumulative transportation impacts to which the proposed project would make a cumulatively considerable contribution.

PARKING INFORMATION

The *Planning Code* requires one off-street, on-site, independently accessible parking space per dwelling unit for a residential development in an RM-1 District. The proposed project would include 68 independently accessible parking spaces, consisting of 60 dedicated off-street parking spaces for residents, and eight unassigned additional independently accessible spaces for residents, service vehicles, and visitors. Hence, the project's supply of parking spaces would exceed the *Planning Code* requirement. Two of the 68 unassigned parking spaces would be handicapped-accessible, which would meet the *Planning Code* requirement.

Using the 2000 Census data for the project area, and taking into account the total size of the residential development and the number of bedrooms of each dwelling unit, the project would generate a total long-term parking demand for 51 spaces during the weekday evening (when residential parking demand is highest). The demand of 51 spaces would be accommodated within the project's parking supply of 68 parking spaces, and would result in a surplus of 17 spaces. For these reasons, project parking would be adequate.

CONCLUSION

Based on the above analysis, the proposed project would not result in significant transportation impacts.

1. The project would not substantially increase traffic relative to existing traffic load and capacity of the street system. In the Existing Conditions plus Project scenario, intersection LOS would not change at any of the six intersections from LOS E or better to LOS E or worse.

2. Although the project would increase the number of vehicle trips on Crestmont Drive, a narrow, long, winding street, it would not alter substantially existing circulation patterns or create major traffic hazards on Crestmont Drive where traffic volumes would remain low, or other nearby streets.

3. The project would not substantially increase transit demand above levels that could be accommodated by existing transit capacity. The proposed project could generate ten person trips on transit during the p.m. peak-hour (seven inbound and three outbound), spread among nine Muni bus and light rail lines, and other transit providers: BART, SamTrans, Caltrain, AC Transit, and Golden Gate Transit.

4. The proposed project would provide 68 spaces, thus exceeding the *Planning Code* requirement for the number of parking spaces, and exceeding the project's total long-term parking demand of 51 spaces.

5. The project would have less-than-significant impacts on pedestrian conditions, bicycle travel, and loading/unloading.

6. In the Year 2025 Cumulative scenario, the project's contribution to adverse cumulative conditions would not be cumulatively considerable and, thus, would not be significant at the intersections (Warren Drive/Seventh Avenue and Clarendon/Laguna Honda) operating at LOS F for cumulative conditions.

7. The proposed project would have less-than-significant cumulative (2025) transportation impacts. The project also would not make a considerable contribution to cumulative pedestrian, bicycle, or construction traffic impacts.

D. AIR QUALITY

SETTING

CRITERIA AIR POLLUTANTS

As required by the 1970 federal Clean Air Act, the United States Environmental Protection Agency (US EPA) has identified six criteria air pollutants that are pervasive in urban environments and for which state and federal health-based ambient air quality standards have been established. US EPA calls these pollutants criteria air pollutants because the agency has regulated them by developing specific public health- and welfare-based criteria as the basis for setting permissible levels. Ozone, carbon monoxide (CO), particulate matter (PM), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead are the six criteria air pollutants.

The Bay Area Air Quality Management District's (BAAQMD's) air quality monitoring network provides information on ambient concentrations of criteria air pollutants at various locations in the San Francisco Bay Area. Table 7 is a five-year summary of highest annual criteria air pollutant concentrations (2005 to 2009), collected at the BAAQMD's air quality monitoring station at 16th and Arkansas streets, in San Francisco's lower Potrero Hill area.[74] Table 7 compares measured pollutant concentrations with the most stringent applicable ambient air quality standards (state or federal).

Ozone

Ozone is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG) and nitrogen oxides (NOx). The main sources of ROG and NOx, often referred to as ozone precursors, are combustion processes (including motor vehicle engines) and the evaporation of solvents, paints, and fuels. In the Bay Area, automobiles are the single largest source of ozone precursors. Ozone is referred to as a regional air pollutant because its precursors are transported and diffused by wind concurrently with ozone production through the photochemical reaction process. Ozone causes eye irritation, airway constriction, and shortness of breath and can aggravate existing respiratory diseases such as asthma, bronchitis, and emphysema. Table 7 shows that, according to published data, the most stringent applicable standards (state 1-hour standard of 9 parts per hundred million (pphm) and the federal 8-hour standard of 8 pphm) were not exceeded in San Francisco between 2005 and 2009.

74 Data from this single location do not describe pollutant levels throughout San Francisco, as these levels may vary depending on distance from key emissions sources and local meteorology. However, the BAAQMD monitoring network does provide a reliable picture of pollutant levels over time.

Table 7
Summary of San Francisco Air Quality Monitoring Data (2005–2009)

Pollutant	Most Stringent Applicable Standard	Number of Days Standards Were Exceeded and Maximum Concentrations Measured				
		2005	2006	2007	2008	2009
Ozone						
Days 1-hour Std. Exceeded	9 pphm [a]	0	0	0	0	0
Max. 1-hour Conc. (pphm) [b]		5.8	5.3	6.0	8.2	7.2
Days 8-hour Std. Exceeded	7 pphm [a]	0	0	0	0	0
Max. 8-hour Conc. (pphm) [b]		5.4	4.6	5.3	6.6	5.6
Carbon Monoxide (CO)						
Days 1-hour Std. Exceeded	20 ppm [a]	0	0	0	0	0
Max. 1-hour Conc. (ppm)		2.9	2.9	2.7	5.7	NA
Days 8-hour Std. Exceeded	9 ppm [a]	0	0	0	0	0
Max. 8-hour Conc. (ppm)		2.1	2.1	1.6	2.3	2.9
Suspended Particulates (PM_{10})						
Days 24-hour Std. Exceeded [c]	50 μg/m³ [a]	0	<u>**3**</u>	<u>**2**</u>	0	0
Max. 24-hour Conc. (μg/m³)		46	<u>**61**</u>	<u>**70**</u>	41	35
Annual Average (μg/m³)	20 μg/m³ [a]	<u>**20.1**</u>	<u>**22.9**</u>	<u>**21.8**</u>	<u>**21.9**</u>	18.6
Suspended Particulates ($PM_{2.5}$)						
Days 24-hour Std. Exceeded [d]	35 μg/m³ [b]	<u>**6**</u>	<u>**3**</u>	<u>**5**</u>	0	<u>**1**</u>
Max. 24-hour Conc. (μg/m³)		<u>**43.6**</u>	<u>**54.3**</u>	<u>**45.5**</u>	29.4	<u>**35.5**</u>
Annual Average (μg/m³)	12 μg/m³ [a]	9.5	9.7	8.9	11.7	ND
Nitrogen Dioxide (NO_2)						
Days 1-hour Std. Exceeded	100 ppb [a, e]	0	0	0	0	0
Max. 1-hour Conc. (ppb) [b]		66	<u>**107**</u>	69	62	59
Annual Average (μg/m³)	30 ppb [a]	17	16	16	15	ND
Sulfur Dioxide (SO_2)						
Days 24-hour Std. Exceeded	40 ppb [a]	0	0	0	0	ND
Max. 24-hour Conc. (ppb) [b]		7	6	6	4	ND

Table notes continue on the following page.

Notes: Bold and underlined values are in excess of applicable standard.

conc. = concentration; ppm = parts per million; pphm = parts per hundred million; ppb=parts per billion; μg/m³ = micrograms per cubic meter

ND = No data or insufficient data.

a State standard, not to be exceeded.

b Federal standard, not to be exceeded.

c Based on a sampling schedule of one out of every six days, for a total of approximately 60 samples per year.

d Federal standard was reduced from 65 μg/m³ to 35 μg/m³ in 2006.

e Federal standard introduced in 2010, based on a 3-year average of the 98th percentile of daily highest samples.

Sources: BAAQMD, Bay Area Air Pollution Summary, 2005 – 2009. Available online at: http://www.baaqmd.gov/Divisions/Communications-and-Outreach/Air-Quality-in-the-Bay-Area/Air-Quality-Summaries.aspx;. Also CARB Air Quality Data, available online at: http://www.arb.ca.gov/adam/index.html.

Carbon Monoxide (CO)

CO is an odorless, colorless gas usually formed as the result of the incomplete combustion of fuels. The single largest source of CO is motor vehicles; the highest emissions occur during low travel speeds, stop-and-go driving, cold starts, and hard acceleration. Exposure to high concentrations of CO reduces the oxygen-carrying capacity of the blood and can cause headaches, nausea, dizziness, and fatigue, impair central nervous system function, and induce angina (chest pain) in persons with serious heart disease. Very high levels of CO can be fatal. As shown in Table 7, no exceedances of the state CO standards were recorded between 2005 and 2009. Measurements of CO indicate maximum 8-hour CO levels approximately 30 percent of the allowable 8-hour standard.

Particulate Matter (PM_{10} and $PM_{2.5}$)

Particulate matter is a class of air pollutants that consists of heterogeneous solid and liquid airborne particles from manmade and natural sources. Particulate matter is measured in two size ranges: PM_{10} for particles less than 10 microns in diameter, and $PM_{2.5}$ for particles less than 2.5 microns in diameter. In the Bay Area, motor vehicles generate about half of the San Francisco Bay Area Air Basin's (SFBAAB's) particulates, through tailpipe emissions as well as brake pad and tire wear. Wood burning in fireplaces and stoves, industrial facility operations, and ground-disturbing activities such as construction are other sources of such fine particulates. These fine particulates are small enough to be inhaled into the deepest parts of the human lung and can cause adverse health effects. According to the California Air Resources Board (CARB), studies in the United States and elsewhere "have demonstrated a strong link between elevated particulate levels and premature deaths, hospital admissions, emergency room visits, and asthma attacks," and studies of children's health in California have demonstrated that particle pollution "may significantly reduce lung function growth in children." The CARB also reports that statewide attainment of particulate matter standards could prevent thousands of premature deaths, lower hospital admissions for cardiovascular and respiratory disease and asthma-related emergency room visits, and avoid hundreds of thousands of episodes of respiratory illness in California.[75]

Among the criteria pollutants that are regulated, particulates appear to represent a serious ongoing health hazard. As long ago as 1999, the BAAQMD was reporting, in its CEQA Guidelines, that studies had shown that elevated particulate levels contribute to the death of approximately 200 to 500 people per year in the Bay Area. High levels of particulates have also been known to exacerbate chronic respiratory ailments, such as bronchitis and asthma, and have been associated with increased emergency room visits and hospital admissions.

Table 7, page 120, shows that exceedances of the state PM_{10} standard have routinely occurred in San Francisco. It is estimated that the state 24-hour PM_{10} standard was exceeded on up to 18 days per year between 2005 and 2009.[76]

The BAAQMD began monitoring $PM_{2.5}$ concentrations in San Francisco in 2002. The federal 24-hour $PM_{2.5}$ standard was not exceeded until 2006, when the standard was lowered from 65 micrograms per cubic meter ($\mu g/m^3$) to 35 $\mu g/m^3$. The state annual average standard was not exceeded between 2005 and 2008 (data are not available for 2009).

$PM_{2.5}$ is of particular concern because epidemiologic studies have demonstrated that people who live near freeways and high-traffic roadways have poorer health outcomes, including increased asthma symptoms and respiratory infections and decreased pulmonary function and lung development in children. As a result, the City enacted Article 38 of the San Francisco Health Code, approved November 25, 2008, which requires that, for new residential projects of 10 or more units located in proximity to high-traffic roadways, as mapped by the San Francisco Department of Public Health (DPH), an Air Quality Assessment be prepared to determine whether residents would be exposed to unhealthful levels of $PM_{2.5}$. Through air quality modeling, the assessment is conducted to determine if annual average concentration of $PM_{2.5}$ from the roadway sources would exceed a concentration of 0.2 micrograms per cubic meter

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75 California Air Resources Board, "Recent Research Findings: Health Effects of Particulate Matter and Ozone Air Pollution," January 2004. Available online at http://www.arb.ca.gov/research/health/fs/PM-03fs.pdf. This document is also available for review at the Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2004.0093E.

76 PM_{10} is sampled every sixth day; therefore, actual days over the standard can be estimated to be six times the numbers listed in the table.

(annual average).[77] If this standard is exceeded, the project sponsor must redesign the project so as to reduce $PM_{2.5}$ exposure, which may include installation of a filtered air supply system with high-efficiency filters (as applicable), designed to remove at least 80 percent of ambient $PM_{2.5}$ from habitable areas of residential units. The proposed San Francisco Overlook Development is not located within Health Code Article 38's Roadway Exposure Zone.

Nitrogen Dioxide (NO_2)

NO_2 is a reddish brown gas that is a by-product of combustion processes. Automobiles and industrial operations are the main sources of NO_2. Aside from its contribution to ozone formation, NO_2 can increase the risk of acute and chronic respiratory disease and reduce visibility. NO_2 may be visible as a coloring component on high pollution days, especially in conjunction with high ozone levels. Table 7, page 120, shows that the current standard for NO_2 is being met in the Bay Area. In 2010, the US EPA implemented a new 1–hour NO_2 standard presented in Table 8 on the following page. Currently the CARB is recommending that the SFBAAB be designated as an attainment area for the new standard.

The US EPA has also established requirements for a new monitoring network to measure NO_2 concentrations near major roadways in urban areas with a population of 500,000 or more. Sixteen new near-roadway monitoring sites will be required in California, three of which will be in the Bay Area. These monitors are required to be deployed by January 2013. The new monitoring data may result in a need to change area designations in the future. The CARB will revise the area designation recommendations, as appropriate, once the new monitoring data become available.

Sulfur Dioxide (SO_2)

SO_2 is a colorless acidic gas with a strong odor. It is produced by the combustion of sulfur-containing fuels such as oil, coal, and diesel. SO_2 has the potential to damage materials and can cause health effects at high concentrations. It can irritate lung tissue and increase the risk of acute and chronic respiratory

77 According to DPH, this threshold, or action level, of 0.2 micrograms per cubic meter represents about 8 - 10 percent of the range of ambient $PM_{2.5}$ concentrations in San Francisco based on monitoring data, and is based on epidemiological research that indicates that such a concentration can result in an approximately 0.28 percent increase in non-injury mortality, or an increased mortality at a rate of approximately 20 "excess deaths" per year per one million population in San Francisco. "Excess deaths" (also referred to as premature mortality) refer to deaths that occur sooner than otherwise expected, absent the specific condition under evaluation; in this case, exposure to $PM_{2.5}$. (San Francisco Department of Public Health, Occupational and Environmental Health Section, Program on Health, Equity, and Sustainability, "Assessment and Mitigation of Air Pollutant Health Effects from Intra-urban Roadways: Guidance for Land Use Planning and Environmental Review, May 6, 2008. Twenty excess deaths per million based on San Francisco's non-injury, non-homicide, non-suicide mortality rate of approximately 714 per 100,000. Although San Francisco's population is less than one million, the presentation of excess deaths is commonly given as a rate per million population.)

Table 8
State and Federal Ambient Air Quality Standards

Pollutant	Averaging Time	(State) SAAQS[a]		(Federal) NAAQS[b]	
		Standard	Attainment Status	Standard	Attainment Status
Ozone	1 hour	0.09 ppm	N	NA	See Note c
	8 hour	0.07 ppm	N	0.075 ppm	N/Marginal
Carbon Monoxide (CO)	1 hour	20 ppm	A	35 ppm	A
	8 hour	9 ppm	A	9 ppm	A
Nitrogen Dioxide (NO_2)	1 hour	0.18 ppm	A	0.1 ppm[d]	U
	Annual	0.03 ppm	NA	0.053 ppm	A
Sulfur Dioxide (SO_2)	1 hour	0.25 ppm	A	0.075 ppm[e]	A
	24 hour	0.04 ppm	A	NA	NA
Particulate Matter (PM_{10})	24 hour	50 μg/m³	N	150 μg/m³	U
	Annual	20 μg/m³	N	NA	NA
Fine Particulate Matter	24 hour	NA	NA	35 μg/m³	N
($PM_{2.5}$)	Annual	12 μg/m³	N	15 μg/m³	A
Sulfates	24 hour	25 μg/m³	A	NA	NA
Lead	30 day	1.5 μg/m³	A	NA	NA
	Cal. Quarter	NA	NA	1.5 μg/m³	A
Hydrogen Sulfide	1 hour	0.03 ppm	U	NA	NA
Visibility-Reducing Particles	8 hour	See Note f	U	NA	NA

Notes: A = Attainment; N = Nonattainment; U = Unclassified; NA = Not Applicable, no applicable standard; ppm = parts per million; μg/m³ = micrograms per cubic meter.

[a] SAAQS = state ambient air quality standards (California). SAAQS for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, particulate matter, and visibility-reducing particles are values that are not to be exceeded. All other state standards shown are values not to be equaled or exceeded.

[b] NAAQS = national ambient air quality standards. NAAQS, other than ozone and particulates, and those based on annual averages or annual arithmetic means, are not to be exceeded more than once a year. The 8-hour ozone standard is attained when the three-year average of the fourth highest daily concentration is 0.08 ppm or less. The 24-hour PM_{10} standard is attained when the three-year average of the 99th percentile of monitored concentrations is less than the standard. The 24-hour $PM_{2.5}$ standard is attained when the three-year average of the 98th percentile is less than the standard.

[c] The US EPA revoked the national 1-hour ozone standard on June 15, 2005.

[d] To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within the area must not exceed 0.1 ppm (effective January 22, 2010).

[e] On June 2, 2010, the US EPA established a new 1-hour SO2 standard, effective August 23, 2010, which is based on the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations. The EPA also revoked both the existing 24-hour SO2 standard of 0.14 ppm and the annual primary SO2 standard of 0.030 ppm, effective August 23, 2010.

[f] Statewide visibility-reducing particle standard (except Lake Tahoe Air Basin): Particles in sufficient amount to produce an extinction coefficient of 0.23 per kilometer when the relative humidity is less than 70 percent. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range.

Source: Bay Area Air Quality Management District (BAAQMD), Air Quality Standards and Attainment Status. Website Accessed on March 16, 2011: http://hank.baaqmd.gov/pln/air_quality/ambient_air_quality.htm.

disease. Table 7, page 120, shows that the state standard for SO_2 is being met in the Bay Area, and pollutant trends suggest that the SFBAAB will continue to meet this standard for the foreseeable future.

In 2010, the US EPA implemented a new 1-hour SO_2 standard presented in Table 8, page 124. The US EPA anticipates initially designating areas based on 2008-2010 monitoring data, or refined dispersion modeling results if provided by the state by June 2012. Similar to the new federal standard for NO_2, the US EPA has established requirements for a new monitoring network to measure SO_2 concentrations to be operational by January 2013. The new monitoring data may result in a need to change area designations by then.

Lead

Leaded gasoline (phased out in the United States beginning 1973), paint (on older houses andcars), smelters (metal refineries), and manufacture of lead storage batteries have been the primary sources of lead released into the atmosphere. Lead has a range of adverse neurotoxic effects, which puts children at special risk. Some lead-containing chemicals cause cancer in animals. Lead levels in the air have decreased substantially since leaded gasoline was eliminated. Ambient lead concentrations are only monitored on an as-warranted, site-specific basis in California. On October 15, 2008, the US EPA strengthened the national ambient air quality standard for lead by lowering it from 1.5 $\mu g/m^3$ to 0.15 $\mu g/m^3$. The US EPA revised their monitoring requirements for lead in December 2010. These requirements focus on airports and large urban areas resulting in an increase of 76 monitors nationally.

Toxic Air Contaminants

Toxic air contaminants (TACs) are air pollutants that may lead to serious illness or increased mortality, even when present in relatively low concentrations. Human health effects of TACs include birth defects, neurological damage, cancer, and death. There are hundreds of different types of TACs with varying degrees of toxicity. Individual TACs vary greatly in the health risk they present; at a given level of exposure, one TAC may pose a hazard that is many times greater than another.

TACs do not have ambient air quality standards, but are regulated by the BAAQMD using a risk-based approach. This approach uses a health risk assessment to determine what sources and pollutants to control as well as the degree of control. A health risk assessment is an analysis in which human health exposure to toxic substances is estimated, and considered together with information regarding the toxic potency of the substances, to provide quantitative estimates of health risks.[78]

In addition to monitoring criteria pollutants, both the BAAQMD and the CARB operate TAC monitoring networks in the San Francisco Bay Area. These stations measure 10 to 15 TACs, depending on the specific station. The TACs selected for monitoring are those that have traditionally been found in the highest concentrations in ambient air, and therefore tend to produce the most significant risk. The BAAQMD operates an ambient TAC monitoring station at its 16th and Arkansas streets facility in San Francisco. Table 9, page 146, summarizes the annual average ambient concentrations of various TACs in San Francisco. When TAC measurements at this station are compared to ambient concentrations of various TACs for the Bay Area as a whole, the cancer risks associated with mean TAC concentrations in San Francisco are similar to those for the Bay Area as a whole. Therefore, the estimated average lifetime cancer risk resulting from exposure to TAC concentrations monitored at the San Francisco station does not appear to be any greater than for the Bay Area as a region.

Diesel Particulate Matter

The CARB identified diesel particulate matter (DPM) as a toxic air contaminant in 1998, primarily based on evidence demonstrating cancer effects in humans.[79] The exhaust from diesel engines includes hundreds of different gaseous and particulate components, many of which are toxic. Mobile sources such as trucks and buses are among the primary sources of diesel emissions, and concentrations of DPM are higher near heavily traveled highways. The estimated cancer risk from exposure to diesel exhaust is much higher than the risk associated with any other toxic air pollutant routinely measured in the region. The CARB estimated the average Bay Area cancer risk from diesel particulate, based on a population-weighted average ambient diesel particulate concentration, at about 480 in one million, as of 2000. The

Text continues on page 128.

78 In general, a health risk assessment is required if the BAAQMD concludes that projected emissions of a specific air toxic compound from a proposed new or modified source suggest a potential public health risk. Such an assessment generally evaluates chronic, long-term effects, calculating the increased risk of cancer as a result of exposure to one or more TACs for the source in question.

79 California Air Resources Board, Fact Sheet, "The Toxic Air Contaminant Identification Process: Toxic Air Contaminant Emissions from Diesel-fueled Engines," October 1998. This document is available online at: http://www.arb.ca.gov/toxics/dieseltac/factsht1.pdf. This document is also available for review at the Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2004.0093E.

Table 9
Annual Average Ambient Concentrations of Carcinogenic Toxic Air Contaminants in San Francisco[a]

Substance	Concentration	Cancer Risk per Million[b]
Gaseous TACs	*(ppb)*	
Acetylaldehyde	0.39	2
Benzene	0.18	17
1,3-Butadiene	0.036	14
para-Dichlorobenzene	0.15	10
Carbon Tetrachloride	0.094	25
Ethylene Dibromide	0.01	6
Formaldehyde	2.69	20
Perchloroethylene	0.02	0.8
Methylene Chloride	0.12	0.4
MTBE	0.61	0.6
Chloroform	0.015	0.4
Trichloroethylene	0.01	0.1
Combined Risk for Listed Gaseous TACs		**96.3**
Particulate TACs	(ng/m^3)	
Chromium (Hexavalent)	0.059	9

Notes:

TACs = toxic air contaminants; ppb = parts per billion; ng/m^3 = nanograms per cubic meter.

[a] All values are from BAAQMD 2008 monitoring data for the Arkansas Street station, except for Formaldehyde and Hexavalent Chromium, which are statewide averages for the year 2008.

[b] Cancer risks were estimated by applying published unit risk values to the measured concentrations.

Source: California Air Resources Board, Ambient Air Toxics Summary-2008, available online at: http://www.arb.ca.gov/adam/toxics/sitesubstance.html, accessed February 27, 2012.

risk from diesel particulate matter declined from 750 in one million in 1990 to 570 in one million in 1995; by 2000, CARB estimated the average statewide cancer risk from DPM at 540 in one million.[80,81]

Recent air pollution studies have shown an association between respiratory and other non-cancer health effects and proximity to high traffic roadways. The CARB community health risk assessments and regulatory programs have produced air quality information about certain types of facilities for consideration by local authorities when siting new residences, schools, day care centers, parks and playgrounds, and medical facilities (i.e., sensitive land uses, or "receptors").[82] Sensitive land uses deserve special attention because children, pregnant women, the elderly, and those with existing health problems are especially vulnerable to the non-cancer effects of air pollution. There is also substantial evidence that children are more sensitive to cancer-causing chemicals.[83]

In 2000, the CARB approved a comprehensive Diesel Risk Reduction Plan to reduce diesel emissions from both new and existing diesel-fueled vehicles and engines. As part of the Plan, the CARB in 2008 approved a new regulation for existing heavy-duty diesel vehicles that will require retrofitting and replacement of vehicles (or their engines) over time such that by 2023, all vehicles must have a 2010 model year engine or equivalent. The regulation is anticipated to result in an 80 percent decrease in statewide diesel health risk in 2020 from the 2000 risk levels.[84] Additional regulations apply to new trucks and to diesel fuel. With new controls and fuel requirements, 60 trucks built in 2007 would have the same soot exhaust emissions as one truck built in 1988.[85] Despite these reductions, the CARB recommends that proximity to sources of DPM emissions be considered in the siting of new sensitive land uses. The CARB notes that these recommendations are advisory and should not be interpreted as defined "buffer zones," and that local

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80 California Air Resources Board, California Almanac of Emissions and Air Quality - 2009 Edition, Table 5-44 and p. 5-44. This document is available at: http://www.arb.ca.gov/aqd/almanac/almanac09/pdf/chap509.pdf, accessed May 26, 2011.

81 This calculated cancer risk values from ambient air exposure in the Bay Area can be compared against the lifetime probability of being diagnosed with cancer in the United States, from all causes, which is more than 40 percent (based on a sampling of 17 regions nationwide), or greater than 400,000 in one million, according to the National Cancer Institute.

82 As discussed below, parks and playgrounds are generally less sensitive than the other uses listed because exposure times are shorter, resulting in less exposure to pollutants.

83 California Air Resources Board, Air Quality and Land Use Handbook: A Community Health Perspective, April 2005. Available online at http://www.arb.ca.gov/ch/handbook.pdf, accessed February 27, 2012.

84 California Air Resources Board, "Overview of Truck and Bus Regulation Reducing Emissions from Existing Diesel Vehicles," fact sheet, February 25, 2009; and "Facts About Truck and Bus Regulation Emissions Reductions and Health Benefits," fact sheet, February 25, 2009. available online at http://www.arb.ca.gov/msprog/onrdiesel/documents.htm, accessed May 26, 2011.

85 Pollution Engineering, New Diesel Fuel Rules Start, , available online at http://www.pollutioneng.com/CDA/, accessed on October 30, 2006.

agencies must balance other considerations, including housing and transportation needs, the benefits of urban infill, community economic development priorities, and other quality of life issues. With careful evaluation of exposure, health risks, and affirmative steps to reduce risk where necessary, the CARB's position is that infill development, mixed use, higher density, transit-oriented development, and other concepts that benefit regional air quality can be compatible with protecting the health of individuals at the neighborhood level.[86]

Roadway-Related Pollutants

Motor vehicles are responsible for a large share of air pollution, especially in California. Vehicle tailpipe emissions contain diverse forms of particles and gases, and also contribute to particulates by generating road dust and through tire wear. Epidemiologic studies have demonstrated that people living in proximity to freeways or busy roadways have poorer health outcomes, including increased asthma symptoms, respiratory infections, and decreased pulmonary function and lung development in children. Air pollution monitoring done in conjunction with epidemiological studies has confirmed that roadway-related health effects vary with modeled exposure to particulate matter and nitrogen dioxide. In traffic-related studies, the additional non-cancer health risk attributable to roadway proximity was seen within 1,000 feet of high-traffic roadways and was strongest within 300 feet. As a result, the CARB recommends that new sensitive land uses not be located within 500 feet of a freeway or urban roads carrying 100,000 vehicles per day.[87] In 2008, the City adopted amendments to the Health Code (discussed under "Regulatory Setting"), requiring new residential projects near high-volume roadways to be screened for exposure hazards, and where indicated, to conduct an analysis of exposure and to mitigate hazards through design and ventilation.

Sensitive Receptors

Air quality does not affect every individual in the population in the same way, and some groups are more sensitive to adverse health effects than others. Population subgroups sensitive to the health effects of air pollutants include the elderly and the young, population subgroups with higher rates of respiratory disease such as asthma and chronic obstructive pulmonary disease, and populations with other

86 California Air Resources Board, Air Quality and Land Use Handbook; see footnote 52, p. 128.

87 This recommendation is put forth to minimize potential non-cancer health effects of exposure to pollutants known to increase incidence of asthma and other respiratory ailments, particularly fine particulates, as well as cancer risk from exposure to DPM and chemicals from automobile exhaust. With careful evaluation of exposure, health risks, and affirmative steps to reduce risk where necessary, the CARB's position is that infill development, mixed-use, higher density, transit-oriented development, and other concepts that benefit regional air quality can be compatible with protecting the health of individuals at the neighborhood level (California Air Resources Board, Air Quality and Land Use Handbook; see footnote 52, p. 128).

environmental or occupational health exposures (e.g,. indoor air quality) that affect cardiovascular or respiratory diseases. Land uses such as schools, children's day care centers, hospitals, and nursing and convalescent homes are considered to be the most sensitive to poor air quality because the population groups associated with these uses have increased susceptibility to respiratory distress. Parks and playgrounds are considered moderately sensitive to poor air quality because persons engaged in strenuous work or exercise also have increased sensitivity to poor air quality; however, exposure times are generally far shorter in parks and playgrounds than in residential locations and schools, for example, which typically reduces overall exposure to pollutants. Residential areas are considered more sensitive to air quality conditions compared to commercial and industrial areas because people generally spend longer periods of time at their residences, with associated greater exposure to ambient air quality conditions.[88]

The nearest residences to the project site are the two-unit residential building (505-507 Crestmont Drive) located adjacent to the project site to northeast, and the residences along Crestmont Drive, located adjacent to the project site to the south (375 to 497 Crestmont Drive). The nearest licensed child care centers are the Stepping Stones Pre-School - Inner Sunset at 1329 Seventh Avenue, and Little Angels Japanese Preschool at 1457 Ninth Avenue.[89] Schools within 0.25 mile of the proposed project include Clarendon Alternative Elementary School at 500 Clarendon Avenue and Cross Cultural Environmental Leadership (XCEL) Academy at 1350 Seventh Avenue. The nearest hospital is the University of California Medical Center, located about 0.25 mile northeast of the site, and the nearest convalescent home is the Lawton Health Care Center at 1575 Seventh Avenue, approximately 0.25 mile west of the site.

Regulatory Setting

Air Quality Regulations and Plans

Federal Ambient Air Quality Standards

The 1970 Clean Air Act (last amended in 1990) requires that regional planning and air pollution control agencies prepare a regional air quality plan to outline the measures by which both stationary and mobile sources of pollutants will be controlled in order to achieve all standards by the deadlines specified in the Clean Air Act. The ambient air quality standards are intended to protect the public health and welfare,

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88 The factors responsible for variation in exposure are also often similar to factors associated with greater susceptibility to air quality health effects.

89 California Department of Health Services, Community Care Licensing Division, Child Care Licensing Website search, March 14, 2011. This document is available online at http://www.ccld.ca.gov/docs/ccld_search/ccld_search.aspx, accessed February 27, 2012.

and they specify the concentration of pollutants (with an adequate margin of safety) to which the public can be exposed without adverse health effects. They are designed to protect those segments of the public most susceptible to respiratory distress, known as sensitive receptors, including asthmatics, the very young, the elderly, people weak from other illness or disease, or persons engaged in strenuous work or exercise. Healthy adults can tolerate occasional exposure to air pollution levels that are somewhat above the ambient air quality standards before adverse health effects are observed.

The current attainment status for the SFBAAB with respect to federal standards is summarized in Table 8, page 124. In general, the SFBAAB experiences low concentrations of most pollutants when compared to federal standards, except for ozone and particulate matter (PM_{10} and $PM_{2.5}$), for which standards are exceeded periodically.

In June 2004, the Bay Area was designated as a marginal nonattainment area of the national 8-hour ozone standard. The EPA lowered the national 8-hour ozone standard from 0.80 to 0.75 parts per million effective May 27, 2008. On February 7, 2012, the EPA proposed a rule that takes necessary steps to implement the 2008 national 8-hour ozone standard, establishing an approach for classification of nonattainment areas- areas not meeting the 2008 ozone standard.[90] The SFBAAB is in attainment for other criteria pollutants, with the exception of the 24-hour standards for PM_{10} and $PM_{2.5}$, for which the Bay Area is designated "Unclassified" and "Nonattainment," respectively.

State Ambient Air Quality Standards

Although the federal Clean Air Act established national ambient air quality standards, individual states retained the option to adopt more stringent standards and to include other pollution sources. California had already established its own air quality standards when federal standards were established, and because of the unique meteorological problems in California, there is considerable diversity between the state and national ambient air quality standards, as shown in Table 8. California ambient standards tend to be at least as protective as national ambient standards and are often more stringent.

In 1988, California passed the California Clean Air Act (California Health and Safety Code Sections 39600 et seq.), which, like its federal counterpart, called for the designation of areas as attainment or nonattainment, but based on state ambient air quality standards rather than the federal standards. As

[90] US EPA, *Fact Sheet, Proposed Rule—Implementation of the 2008 National Ambient Air Quality Standards for Ozone: Nonattainment Area Classifications Approach and Attainment Deadlines*. This document is available online at http://www.epa.gov/air/ozonepollution/pdfs/20120203factsheet.pdf, accessed February 16, 2012.

indicated in Table 8, page 124, the SFBAAB is designated as "nonattainment" for state ozone, PM_{10}, and $PM_{2.5}$ standards. The SFBAAB is designated as "attainment" for most other pollutants listed in the table.

Air Quality Planning Relative to State and Federal Standards

Air quality plans developed to meet federal requirements are referred to as State Implementation Plans. The federal and state Clean Air Acts require plans to be developed for areas designated as nonattainment (with the exception of areas designated as nonattainment for the State PM_{10} standard). In September 2010, the BAAQMD adopted the *2010 Bay Area Clean Air Plan*, which was prepared in cooperation with the Metropolitan Transportation Commission (MTC) and Association of Bay Area Governments (ABAG). The *2010 Bay Area Clean Air Plan* replaced the existing *Bay Area 2005 Ozone Strategy*, adopted in 2006.

The *2010 Clean Air Plan* updates the *2005 Ozone Strategy* in accordance with the requirements of the California Clean Air Act to implement "all feasible measures" to reduce ozone; provide a control strategy to reduce ozone, particulate matter, toxic air contaminants, and greenhouse gases in a single, integrated plan; review progress in improving air quality in recent years; and establish emission control measures to be adopted or implemented in the 2010–2012 time frame. The control strategy includes stationary-source control measures to be implemented through BAAQMD regulations; mobile-source control measures to be implemented through incentive programs and other activities; and transportation control measures to be implemented through transportation programs in cooperation with the MTC, local governments, transit agencies, and others. The *2010 Clean Air Plan* also represents the Bay Area's most recent triennial assessment of the region's strategy to attain the state one-hour ozone standard.

Toxic Air Contaminants

In 2005, the CARB approved a regulatory measure to reduce emissions of toxic and criteria pollutants by limiting the idling of new heavy-duty diesel vehicles. The regulations generally limit idling of commercial motor vehicles (including buses and trucks) within 100 feet of a school or residential area for more than five consecutive minutes or periods aggregating more than five minutes in any one hour.[91] Buses or vehicles also must turn off their engines upon stopping at a school and must not start their engines more than 30 seconds before beginning to depart from a school. Also, state law Senate Bill (SB)

[91] There are 12 exceptions to this requirement (e.g., emergency situations, military, adverse weather conditions, etc.), including: when a vehicle's power takeoff is being used to run pumps, blowers, or other equipment; when a vehicle is stuck in traffic, stopped at a light, or under direction of a police officer; when a vehicle is queuing beyond 100 feet from any restricted area; or when an engine is being tested, serviced, or repaired.

351 (adopted in 2003) prohibits locating public schools within 500 feet of a freeway or busy traffic corridor.

Bay Area Air Quality Management District

The BAAQMD is the regional agency with jurisdiction over the nine-county region located in the SFBAAB. ABAG, MTC, county transportation agencies, cities and counties, and various non-governmental organizations also join in the efforts to improve air quality through a variety of programs. These programs include the adoption of regulations and policies, as well as implementation of extensive education and public outreach programs.

BAAQMD is responsible for attaining and/or maintaining air quality in the SFBAAB within federal and State air quality standards. Specifically, BAAQMD has the responsibility to monitor ambient air pollutant levels throughout the SFBAAB and to develop and implement strategies to attain the applicable federal and State standards.

San Francisco General Plan Air Quality Element

The *San Francisco General Plan* (*General Plan*) includes the 1997 Air Quality Element. The objectives specified by the City include the following:

> *Objective 1:* Adhere to state and federal air quality standards and regional programs.
>
> *Objective 2:* Reduce mobile sources of air pollution through implementation of the Transportation Element of the General Plan.
>
> *Objective 3:* Decrease the air quality impacts of development by coordination of land use and transportation decisions.
>
> *Objective 4:* Improve Air Quality by increasing public awareness regarding the negative health effects of pollutants generated by stationary and mobile sources.
>
> *Objective 5:* Minimize particulate matter emissions from road and construction sites.
>
> *Objective 6:* Link the positive effects of energy conservation and waste management to emission reductions.

San Francisco Dust Control Ordinance

San Francisco Health Code Article 22B, and *San Francisco Building Code* Section 106.A.3.2.6, collectively the Construction Dust Control Ordinance, requires that all site preparation work, demolition, or other construction activities within San Francisco that have the potential to create dust or to expose or disturb more than 10 cubic yards or 500 square feet of soil comply with specified dust control measures whether or not the activity requires a permit from the DBI. The Director of DBI may waive this requirement for activities on sites less than one-half-acre that are unlikely to result in any visible wind-blown dust.

For project sites greater than one-half-acre in size, the Ordinance requires that the project sponsor submit a Dust Control Plan for approval by the DPH. DBI will not issue a building permit without written notification from the Director of Public Health that the applicant has a site-specific Dust Control Plan, or unless the Director waives the requirement. Interior-only tenant improvements, even if over one-half acre, that will not produce exterior visible dust are exempt from the site-specific Dust Control Plan requirement. The project site is greater than one-half acre in size, and thus the project sponsor would be required to prepare a Dust Control Plan.

San Francisco Health Code Provisions Regarding Roadway Generated Pollutants

San Francisco adopted Article 38 of the *San Francisco Health Code* in 2008, requiring that for new residential projects of 10 or more units located in proximity to high-traffic roadways, as mapped by the Department of Public Health, preparation of an Air Quality Assessment to determine whether residents would be exposed to unhealthful levels of $PM_{2.5}$ is required. The project site is not located within DPH's Roadway Exposure Zone. Therefore, further analysis of roadway related air pollutants for Health Code Article 38 compliance is not required.

IMPACTS

SIGNIFICANCE THRESHOLDS

The proposed project would have a significant air quality impact if it were to:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors);

- Expose sensitive receptors to substantial pollutant concentrations; or
- Create objectionable odors affecting a substantial number of people.

Approach to Analysis

This section discusses the thresholds for determining whether a project would result in a significant air quality impact. Table 10 on the following page summarizes the air quality thresholds of significance, followed by a discussion of each threshold.

The BAAQMD has conducted modeling to determine the size of a project that would be expected to result in criteria air pollutants above significance thresholds (as presented above). Based on default assumptions used by the Urban Land Use Emissions Model (URBEMIS), the BAAQMD has developed screening tables by land use categories that identify the size of a project that could potentially exceed criteria air pollutant significance thresholds. The screening tables provide a conservative indication of whether the proposed project could result in potentially significant air quality impacts. The screening levels are generally representative of new development on greenfield sites without any form of mitigation measures taken into consideration. The BAAQMD notes that for projects that are mixed-use, infill, and/or proximate to transit service and local services, emissions would be less than the greenfield-type project for which the screening criteria are based upon. If all the screening criteria are met, then operation of a proposed project would not result in criteria air pollutant emissions that would exceed the above significance thresholds[92].

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92 BAAQMD, CEQA Air Quality Guidelines, May 2011, p. 3-1.

Table 10
Air Quality Significance Thresholds

Pollutant	Construction Thresholds	Operational Thresholds	
	Average Daily Emissions (lbs/day)	Average Daily Emissions (lbs/day)	Annual Average Emissions (tons/year)
Criteria Air Pollutants			
ROG	54	54	10
NOx	54	54	10
PM_{10}	82	82	15
$PM_{2.5}$	54	54	10
CO	Not Applicable	9.0 ppm (8-hour average) or 20.0 ppm (1-hour average)	
Fugitive Dust	Construction Dust Ordinance or other Best Management Practices	Not Applicable	
Health Risks and Hazards for New Sources			
Excess Cancer Risk	10 per one million	10 per one million	
Chronic or Acute Hazard Index	1.0	1.0	
Incremental annual average $PM_{2.5}$	0.3 µg/m³	0.3 µg/m³	
Health Risks and Hazards for Sensitive Receptors (Cumulative from all sources within 1,000-foot zone of influence) and Cumulative Thresholds for New Sources			
Excess Cancer Risk	100 per one million		
Chronic Hazard Index	10.0		
Annual Average $PM_{2.5}$	0.8 ug/m³		

Source: BAAQMD CEQA Guidelines, May 3, 2011. Available at http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Updated-CEQA-Guidelines.aspx, accessed April 18, 2012.

Ozone Precursors. As discussed in the setting, the SFBAAB is currently designated as non-attainment for ozone and particulate matter (PM_{10} and $PM_{2.5}$). Ozone is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving ROG and NOx. The BAAQMD is the primary regulatory agency in the SFBAAB charged with ensuring that the region attains applicable federal and state ambient air quality standards. The potential for a project to result in a cumulatively considerable net increase in criteria air pollutants, which may contribute to an existing or projected air quality violation are based on the state and federal Clean Air Acts emissions limits for stationary sources. The federal New Source Review (NSR) program was created by the Clean Air Act (CAA) to ensure that stationary sources of air pollution are constructed in a manner that is consistent with attainment of federal health-based ambient air quality standards. Similarly, to ensure that new stationary sources do not cause or contribute to a violation of an air quality standard, BAAQMD Regulation 2, Rule 2 requires that any new source that emits criteria air pollutants above a specified emissions limit must offset those emissions. For ozone precursors, ROG and NOx, the offset emissions level is an annual average of 10 tons/year (or 54 lbs/day).[93] These levels represent emissions by which new sources are not anticipated to contribute to an air quality violation or result in a considerable net increase in criteria air pollutants.

Although this regulation applies to new or modified stationary sources, land use development projects result in ROG and NOx emissions as a result of increases in vehicle trips, architectural coating and construction activities. Therefore, the above thresholds can be applied to the construction and operational phases of land use projects and those projects that result in emissions below the above thresholds, would not be considered to contribute to an existing or projected air quality violation or result in a considerable net increase in ROG andNOx emissions. Because construction activities are temporary in nature, only the average daily thresholds are applicable to construction phase emissions.

Particulate Matter (PM_{10} and $PM_{2.5}$). The BAAQMD has not established an offset limit for $PM_{2.5}$ and the current federal prevention of significant deterioration (PSD) offset limit of 100 tons/year for PM_{10} is too high and would not be an appropriate significance threshold for the SFBAAB considering the nonattainment status of PM_{10}. However, the emissions limits provided for in the federal NSR that apply to stationary sources that emit criteria air pollutants in areas that are currently designated as nonattainment are appropriate significance thresholds. For PM_{10} and $PM_{2.5}$, the emissions limit under NSR is 15 tons/year (82 lbs/day) and 10 tons/year (54 lbs/day), respectively. These emissions limits represent levels at which a source is not expected to have an impact on air quality.[94] Similar to ozone precursor thresholds identified above, land use development projects typically result in particulate matter emissions as a result of increases in vehicle trips, space heating and natural gas combustion, landscape maintenance, and construction activities. Therefore, the above thresholds can be applied to the construction and operational phases of a land use project.Those projects that result in emissions below

93 BAAQMD, *Revised Draft Options and Justification Report, California Environmental Quality Act Thresholds of Significance*. October 2009. At page 17.

94 Ibid, p. 16.

the NSR emissions limits would not be considered to contribute to an existing or projected air quality violation or result in a considerable net increase in PM_{10} and $PM_{2.5}$ emissions. Because construction activities are temporary in nature, only the average daily thresholds are applicable to construction-phase emissions.

Other Criteria Pollutants. Regional concentrations of CO in the SFBAAB have not exceeded the CAAQS in the past 11 years and SO_2 concentrations have never exceeded the standards. The primary source of CO impacts from land use projects are vehicle traffic. Construction-related SO_2 emissions represent a negligible portion of total basin-wide emissions and construction-related CO emissions represent less than five percent of the SFBAAB total basin-wide CO emissions.[95] As discussed under Regulatory Setting, the SFBAAB is designated as attainment for both CO and SO_2. Furthermore, the BAAQMD has demonstrated that in order to exceed the California ambient air quality standard of 9.0 ppm (8-hour average) or 20.0 ppm (1-hour average) for CO, project traffic in addition to existing traffic would need to exceed 44,000 vehicles/hour at affected intersections (or 24,000 vehicles/hour where vertical and or horizontal mixing is limited).[96] Therefore, given the SFBAAB's attainment status and the limited CO and SO_2 emissions that could result from a land use projects, land use projects would not result in a cumulatively considerable net increase in CO or SO_2, and quantitative analysis not required.

Fugitive Dust. Fugitive dust emissions are typically generated during construction phases. Studies have shown that the application of best management practices (BMPs) at construction sites significantly controls fugitive dust.[97] Individual measures have been shown to reduce fugitive dust by anywhere from 30 percent to 90 percent.[98] The BAAQMD has identified a number of BMPs to control fugitive dust emissions from construction activities.[99] As discussed in the Regulatory Setting above, the City's Construction Dust Control Ordinance requires a number of measures to control fugitive dust. The construction dust ordinance has a mandate for "no visible dust." The BMPs employed in compliance with the City's Construction Dust Control Ordinance is an effective strategy for controlling fugitive dust.

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95 Ibid, p. 27.

96 Vertical and horizontal mixing refers to air movement patterns. Limited vertical or horizontal mixing would limit dispersion of pollutants, resulting in a concentration of pollutants.

97 Western Regional Air Partnership. 2006. *WRAP Fugitive Dust Handbook*. September 7, 2006. This document is availbale online at http://www.wrapair.org/forums/dejf/fdh/content/FDHandbook_Rev_06.pdf, accessed February 16, 2012.

98 BAAQMD, *Revised Draft Options and Justification Report, California Environmental Quality Act Thresholds of Significance*. October 2009, p. 27.

99 BAAQMD, *CEQA Air Quality Guidelines*, May 2011. This document is available online at http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Updated-CEQA-Guidelines.aspx, accessed February 27, 2012.

Health Risks and Hazards for New or Modified Sources. Construction activities typically require the use of heavy-duty diesel vehicles and equipment, which emit DPM. As discussed above, CARB identified DPM as a TAC in 1998, based on evidence demonstrating cancer effects in humans.[100] The exhaust from diesel engines includes hundreds of different gaseous and particulate components, many of which are toxic. Mobile sources such as trucks and buses are among the primary sources of diesel emissions, and concentrations of DPM are higher near heavily traveled highways. Other sources of health risks and hazards include: gas stations, stationary diesel engines (i.e., backup generators), dry cleaners, crematories, spray booths, diesel-fueled railroads, major ports, railyards, airports, oil refineries, power plants, and cement plants.[101] Land use projects that require a substantial amount of heavy-duty diesel vehicles and equipment, as well as projects that require stationary sources, such as a diesel backup generator, would result in emissions of DPM and possibly other TACs that may affect nearby sensitive receptors. Construction-phase TACs, however, would be temporary, and current health risk modeling methodologies are associated with longer-term exposure periods of 9, 40 and 70 years, which do not correlate well with the temporary and highly variable nature of construction activities, resulting in difficulties with producing accurate modeling results.[102] Nevertheless, DPM is a known TAC and therefore, appropriate thresholds are identified to ensure that a project does not expose sensitive receptors to substantial pollutant concentrations.

Similar to criteria pollutant thresholds identified above, the BAAQMD Regulation 2, Rule 5 sets cancer risk limits for new and modified sources of TACs at the maximally exposed individual (MEI). In addition to cancer risk, some TACs pose non-carcinogenic chronic and acute health hazards. Acute and chronic non-cancer health hazards are expressed in terms of a hazard index, or HI, which is a ratio of the TAC concentration to a reference exposure level (REL), a level below which no adverse health effects are expected, even for sensitive individuals.[103] In accordance with Regulation 2, Rule 5, the BAAQMD Air Pollution Control Officer shall deny any permit to operate a source that results in an increased cancer risk

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100 California Air Resources Board, Fact Sheet, "The Toxic Air Contaminant Identification Process: Toxic Air Contaminant Emissions from Diesel-fueled Engines," October 1998. This document is available online at http://www.arb.ca.gov/toxics/dieseltac/factsht1.pdf, accessed February 27, 2012. This document is also available for review at the Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2004.0093E.

101 BAAQMD, *Recommended Methods for Screening and Modeling Local Risks and Hazards,* May 2011, p. 11.

102 BAAQMD, *Revised Draft Options and Justification Report, California Environmental Quality Act Thresholds of Significance,* October 2009, p. 29.

103 Ibid, p. D-35.

of 10 per million or an increased chronic or acute HI of 1.0 at the MEI. This threshold is designed to ensure that the source does not contribute to a cumulatively significant impact.[104]

In addition, particulate matter, primarily associated with mobile sources (vehicular emissions) is strongly associated with mortality, respiratory diseases, and impairment of lung development in children, and other endpoints such as hospitalization for cardiopulmonary disease. Based on toxicological and epidemiological research, smaller particles and those associated with traffic appear more closely related to health effects.[105] Therefore, estimates of $PM_{2.5}$ emissions from a new source can be used to approximate broader potential adverse health effects. The EPA has proposed a significant impact level (SIL) for $PM_{2.5}$. For developed urban areas, including much of San Francisco, the EPA has proposed a SIL of between 0.3 ug/m^3 to 0.8 ug/m^3. The SIL represents the level of incremental $PM_{2.5}$ emissions that represents a significant contribution to regional non-attainment.[106] The BAAQMD has determined that on balance the annual average $PM_{2.5}$ threshold of 0.3 ug/m^3 will afford the same health protections as required by San Francisco's Health Code Article 38.[107] Therefore, the lower range of the EPA recommended SIL of 0.3 ug/m^3 is an appropriate threshold for determining the significance of a source's $PM_{2.5}$ impact.

In determining the potential distance that emissions from a new source (construction sources or operational sources) may affect nearby sensitive receptors, a summary of research findings in CARB's *Land Use Compatibility Handbook* suggest that air pollutants from high volume roadways are substantially reduced or can even be indistinguishable from upwind background concentrations at a distance of 1,000 feet downwind from sources such as freeways and large distribution centers.[108] Given the scientific data on dispersion of TACs from a source, the BAAQMD recommends assessing impacts of sources of TACs on nearby receptors within a 1,000-foot radius.[109] This radius is also consistent with CARB's *Land Use*

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104 BAAQMD. *CEQA Air Quality Guidelines*. May 2011. Available online at http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Updated-CEQA-Guidelines.aspx, p. D-40.

105 San Francisco Department of Public Health, *Assessment and Mitigation of Air Pollutant Health Effects for Intra Urban Roadways*: *Guidance for Land Use Planning and Environmental Review*, May 2008, p. 5.

106 BAAQMD. *CEQA Air Quality Guidelines*, May 2011, available online at http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Updated-CEQA-Guidelines.aspx, p. D-36.

107 Ibid, p. 41.

108 BAAQMD, *CEQA Air Quality Guidelines*, May 2011. This document is available at http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Updated-CEQA-Guidelines.aspx, p. D-38.

109 Ibid, p. D-40.

Compatibility Handbook and Health and Safety Code Section 42301.6 (Notice for Possible Source Near School).[110]

In summary, potential health risks and hazards from new sources on existing or proposed sensitive receptors are assessed within a 1,000-foot zone of influence and risks and hazards from new sources that exceed the following thresholds at the MEI are determined to be significant: excess cancer risk of 10 per million, chronic or acute HI of 1.0, and annual average $PM_{2.5}$ increase of 0.3 ug/m^3.

Health Risks and Hazards for New Receptors. As discussed above, sources of TACs have the greatest impact on receptors that are located in close proximity to pollutant sources. The further away from a significant source of TACs, the less receptors are exposed to hazardous air pollutants. As described above, BAAQMD recommends assessing the impacts of sources of TACs within 1,000 feet of a sensitive receptor. Therefore, an analysis of the potential impacts to new receptors should consider all cumulative sources of TACs within the 1,000-foot zone of influence. For projects siting new sensitive receptors, existing and proposed sources of TACs should not expose new sensitive receptors to an excess cancer risk greater than 100 per million. This absolute limit is based on EPA guidance for conducting air toxic analyses and making risk management decisions at the facility- and community-scale level.[111] As described by the BAAQMD, the EPA considers a cancer risk of 100 per million to be within the "acceptable" range of cancer risk. Furthermore, in the 1989 preamble to the benzene National Emmissions Standards for Hazardous Pollutants rulemaking,[112] the US EPA states that it "…strives to provide maximum feasible protection against risks to health from hazardous air pollutants by (1) protecting the greatest number of persons possible to an individual lifetime risk level no higher than approximately 1 in 1 million and (2) limiting to no higher than 1 in 10 thousand [100 in a million] the estimated risk that a person living near a plant would have if he or she were exposed too the maximum pollutant concentrations for 70 years." The 100 per million excess cancer cases is also consistent with the ambient cancer risk in the most pristine portions of the Bay Area based on BAAQMD regional modeling.[113] Therefore, when siting new sensitive receptors near sources of TACs and other hazardous air pollutants, the threshold for an incremental increase in cancer risk is 100 per million.

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110 Ibid, p. 40.

111 BAAQMD, *Revised Draft Options and Justification Report, California Environmental Quality Act Thresholds of Significance*, October 2009, p. 67.

112 54 Federal Register 38044, September 14, 1989.

113 Ibid, p. 67.

The BAAQMD's Air Toxics Hot Spots (ATHS) program provides guidance for implementing the ATHS Information and Assessment Act (Assembly Bill 2588, Connelly, 1987; Chaptered in the California Health and Safety Code Section 44300 et. al.). Accordingly, the BAAQMD has established a non-cancer chronic HI of 10.0. Any sources exceeding this level are required to implement mandatory risk reduction levels. As such, a chronic non-cancer HI of 10.0 from cumulative sources of TACs is an appropriate threshold when siting sensitive land uses.[114]

As discussed previously, the EPA is proposing an SIL for $PM_{2.5}$ ranging from 0.3 ug/m^3 to 0.8 ug/m^3. The SIL is intended to ensure that a source does not result in a cumulatively significant contribution to ambient $PM_{2.5}$ levels. Therefore, the upper-bound SIL of 0.8 ug/m^3 from all cumulative sources within 1,000 feet of a proposed sensitive receptor would be an appropriate level for determining a significant impact to new sensitive receptors.[115]

When siting new sensitive receptors, the thresholds identified above represent the cumulative limits from all sources within a 1,000-foot zone of influence from the new receptor; therefore single-source thresholds are unnecessary.

Cumulative Air Quality Impacts. Regional air quality impacts are by their very nature cumulative impacts. Emissions from past, present and future projects contribute to the region's adverse air quality impact on a cumulative basis. No single project by itself would be sufficient in size to result in nonattainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulative adverse air quality impacts.[116] As described above, the project-level thresholds for criteria air pollutants are based on levels by which new sources are not anticipated to contribute to an air quality violation or result in a considerable net increase in criteria air pollutants. Therefore, if a project's emissions are below the project-level thresholds, the project would not be considered to result in a considerable contribution to cumulative regional air quality impacts.

With respect to localized health risks and hazards, as described above, the significance thresholds for new receptors represent a cumulative impact analysis as this analysis considers all potential sources that may

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114 BAAQMD, *CEQA Air Quality Guidelines,* May 2011. This document is available at http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Updated-CEQA-Guidelines.aspx, p. D-43.

115 Ibid, p. D-43.

116 BAAQMD, *California Environmental Quality Act (CEQA) Air Quality Guidelines*, June 2010; and adopted Thresholds of Significance, June 2010. This document is available online at http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Updated-CEQA-Guidelines.aspx, p. 2-1.

result in adverse health impacts within a receptor's zone of influence. Similarly, new sources that contribute to health risks and hazards at nearby sensitive receptors that exceed these cumulative thresholds would result in significant health risk and hazards impacts to existing sensitive receptors.

Consistency with Applicable Air Quality Plan. As noted in the setting section above, the BAAQMD published the *2010 Clean Air Plan*, representing the most current applicable air quality plan for the SFBAAB. Consistency with this plan is the basis for determining whether the proposed project would conflict with or obstruct implementation of an applicable air quality plan.

IMPACT ANALYSIS

Project-related air quality impacts fall into two categories: short-term impacts due to construction, and long-term impacts due to project operation. First, during project construction, the project would affect local particulate concentrations primarily due to fugitive dust sources, as well as construction equipment exhaust. Over the long term, the project would result in an increase in emissions primarily due to increased motor vehicle trips. On-site stationary sources (such as natural gas heaters for water and space heating) and area sources (such as landscaping and use of consumer products) would result in lesser quantities of pollutant emissions.

Odors

Observation indicates that the project site is not affected by existing noxious odors. The proposed project would consist of residential uses not typically associated with noxious odors. Therefore, the project would not create objectionable odors affecting a substantial number of people, and odors are not discussed further in this section.

Construction Air Quality Impacts

Demolition, grading and new construction activities would temporarily affect local air quality during the project's proposed 23-month construction schedule, causing temporary increases in particulate dust and other pollutants. Emissions generated from construction activities include dust (including PM_{10} and $PM_{2.5}$)[117] primarily from "fugitive" sources, combustion emissions of criteria air pollutants (ROG, NO_x, CO, SO_x, and PM_{10} and $PM_{2.5}$) primarily from operation of construction equipment and worker vehicles, and evaporative emissions (ROG) from asphalt paving and architectural coating applications. In addition,

117 Particles that are 10 microns or less in diameter and 2.5 microns or less in diameter, respectively.

the use of diesel-powered equipment would result in emissions of DPM, which may result in adverse health risks and hazards to nearby sensitive receptors.

Impact AQ-1: Construction of the proposed project would not result in significant fugitive dust emissions. (Less than Significant)

Dust can be an irritant causing watering eyes or irritation to the lungs, nose and throat. Demolition, excavation, grading and other construction activities can cause wind-blown dust to add particulate matter to the local atmosphere. Depending on exposure, adverse health effects can occur due to this particulate matter in general and also due to specific contaminants such as lead or asbestos that may be constituents of soil.

As discussed in the Regulatory Setting, the City's Construction Dust Control Ordinance requires that all site preparation work, demolition, or other construction activities within San Francisco that have the potential to create dust or to expose or disturb more than 10 cubic yards or 500 square feet of soil comply with specified dust control measures whether or not the activity requires a permit from DBI. Additionally, all departments, boards, commissions, and agencies of the City and County of San Francisco that authorize construction or improvements on land under their jurisdiction shall adopt rules and regulations to ensure that the same dust control requirements are followed. For project sites greater than one-half acre in size, the Ordinance requires that the project sponsor submit a Dust Control Plan for approval by DPH. Interior-only tenant improvements, even if over one-half acre, that will not produce exterior visible dust are exempt from the site-specific Dust Control Plan requirement. Since the project site is approximately one-and-one-half acre, this requirement would apply to the proposed project.

The following regulations and procedures set forth in Article 22B of the San Francisco Health Code—Construction Dust Control Requirements—contain the BAAQMD-recommended best management practices:

- Water all active construction areas at least twice daily;
- Cover all trucks hauling soil, sand, and other loose materials, or require such truck to maintain at least 2 feet of freeboard (e.g., vertical boards rising at least 2 feet above the surface of hauled material;
- Pave, apply water at a minimum three times daily in dry weather, or apply non-toxic soil stabilizers to all unpaved access roads, parking areas, and staging areas;
- Sweep daily (with water sweepers) all paved access roads, parking areas, and staging areas;
- Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public street areas;

- Hydroseed or apply non-toxic soil stabilizers to inactive construction areas (previously graded areas inactive for ten days or more);
- Enclose, cover, water twice daily or apply (non-toxic) soil binders to exposed stockpiles (dirt, sand, etc.);
- Limit traffic speeds on unpaved roads to 15 miles per hour;
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways;
- Replant vegetation in disturbed areas as quickly as possible;
- Install wheel washers for all exiting trucks, or wash off the tires of all trucks and equipment prior to leaving the site;
- Install wind breaks, or plant trees/vegetative wind breaks at windward side(s) of construction areas;
- Suspend excavation and grading activity when winds (instantaneous gusts) exceed 25 mph;
- Limit the area subject to excavation, grading, and other construction activity at any one time; and
- Post a publicly visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond shall respond and take corrective action within 48 hours. The Air District's phone number shall be visible to ensure compliance with applicable regulations.

Compliance with the Construction Dust Control Ordinance would ensure that the effect of project-generated construction dust would be ***less than significant***. The Initial Study (see Appendix A), prepared before enactment of the Construction Dust Control Ordinance, includes a mitigation measure that includes some of the provisions of the Construction Dust Control Ordinance. Therefore compliance with the Construction Dust Control Ordinance would effectively implement the mitigation measure identified in the Initial Study, and the mitigation measure is no longer required.

Construction of the proposed project would entail the removal of trees on the project site. To the extent that the trees currently offer protection from wind-borne dust, construction of the proposed project would entail removing that protection. However, as discussed above, compliance with the Construction Dust Control Ordinance would ensure project-generated construction dust would result in a ***less-than-significant*** construction dust impact; and removal of the trees would not constitute a significant air quality impact.

Impact AQ-2: Construction-related vehicle use would not generate substantial emissions of criteria air pollutants. (Less than Significant)

Criteria pollutant emissions of ROG, NOx, PM_{10}, and $PM_{2.5}$ from off-road construction equipment, on-road construction-related vehicles, and paving and architectural coating would incrementally add to the regional atmospheric loading of these pollutants during project construction. As described above, the thresholds for determining a significant criteria air pollutant impact from construction phase emissions are as follows: 54 lbs/day of ROG, NO_x or $PM_{2.5}$ and 82 lbs/day of PM_{10}.

An Air Quality Technical Report (AQTR) was prepared for the proposed project. The reportestimated construction criteria air pollutant and localized health risk impacts.[118] Average daily criteria air pollutant emissions from project construction were estimated using California Emissions Estimator Model (CalEEMod™) and are presented in Table 11 below. Construction emissions are based on estimates of construction equipment and phasing as provided by the project sponsor. Where project specific data were not available (e.g., equipment horsepower and load factors), default assumptions from CalEEMod™ and CARB's 2011 In-Use Off-Road Equipment Emissions Inventory Model were used to estimate construction emissions. Additional modeling parameters are detailed in the AQTR prepared for the proposed project.

Table 11
Project Construction Emissions Estimates (Unmitigated)

Item	Estimated Daily Average Emissions (pounds per day)			
	ROG	NOx	PM_{10}	$PM_{2.5}$
Proposed Project	5	15	5.2	0.1
BAAQMD Threshold	54	54	82	54
Significant-	**No**	**No**	**No**	**No**

Note: Project construction emissions estimates are weighted daily averages based on lengths of construction phases, based on output from California Emissions Estimation Model (CalEEMod). Project-specific equipment numbers and types were utilized.

Source: ENVIRON International Corporation, *Air Quality Technical Report for San Francisco Overlook Development, San Francisco, CA, Health Risk Assessment, January, 2012*.

As indicated in Table 11, emissions from project construction would not exceed the applicable criteria air pollutant significance thresholds. Construction-related emissions of criteria pollutants would a ***less–than-significant*** impact on air quality.

118 ENVIRON International Corporation. *Air Quality Technical Report for San Francisco Overlook Development, San Francisco, CA, Health Risk Assessment*. January 2012. This report is on file and available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, San Francisco, CA, as part of Case File No. 2004.0093E.

Impact AQ-3: Project construction activities would emit toxic air contaminants that could expose sensitive receptors to substantial pollutant concentrations. (Less than Significant with Mitigation)

As discussed above, a proposed project would result in a significant health risk and hazards impact if construction activities would result in the following at the maximally exposed individual sensitive receptor (MEISR): excess cancer risk of 10 per million, chronic or acute HI of 1.0, or annual average $PM_{2.5}$ concentrations in excess of 0.3 micrograms per cubic meter. The AQTR prepared for the proposed project analyzed potential health risks and hazards resulting from construction-related emissions of DPM and $PM_{2.5}$.[119] The AQTR estimates emissions of DPM[120] and $PM_{2.5}$ that would be generated by project construction activities, utilized air dispersion models to determine concentrations of DPM and $PM_{2.5}$ in the project vicinity, identifies an MEISR, and evaluates long-term health risks and hazards resulting from the exposure of the MEISR to project emissions. The analysis conservatively assumes that the exposed population would be a resident child adjacent to the project site, and as such the excess cancer risk is approximately ten times greater. Based on these conservative modeling assumptions, the estimated cancer risk from construction equipment would be 50.7 in one million, greater than the significance threshold of 10 in one million. The chronic HI would be 1.380 and the acute HI would be 1.4, greater than the significance threshold of 1. The annual average $PM_{2.5}$ concentration would be 0.70 micrograms per cubic meter. Because all these measures would be above the applicable thresholds, the project-related impact on health risk, without mitigation would be ***significant***.

Therefore, Mitigation Measure M-AQ-3 is proposed to reduce construction emissions.

Mitigation Measure M-AQ-3 (Construction Emissions Minimization):

To reduce the health risk resulting from project construction activities, the project sponsor shall reduce construction emissions by a minimum of 87% as compared to that estimated in the Air Quality Technical Report (ENVIRON International Corporation, San Francisco, *Air Quality Technical Report for San Francisco Overlook Development, San Francisco, CA, Health Risk Assessment*, January 2012). This may be accomplished through the following requirements:

1. All equipment must meet Tier 2 emissions standards or higher, and
2. All equipment must utilize a California Air Resources Board (CARB) certified level 3 Verified Emissions Control Device.

[119] Ibid.

[120] PM_{10} exhaust emissions were conservatively assumed to represent total DPM emissions. This is a conservative assumption because DPM represents only a fraction of total PM_{10} exhaust emissions.

3. The project sponsor shall ensure that the above requirements are written into contract specifications including the requirement for the contractor to submit a comprehensive inventory of all off-road diesel equipment including each piece of equipment's license plate number, horsepower rating, engine production year, and confirmation that the equipment contains a Level 3 abatement device verified by CARB.

Should the project sponsor choose to comply with this mitigation measure through any means other than the requirements listed above, the project sponsor shall prepare a Construction Emissions Minimization Plan demonstrating an equivalent emissions reduction. The Construction Emissions Minimization plan shall be submitted to the Environmental Review Officer (ERO) for review and approval by an Environmental Planning Air Quality Specialist prior to the commencement of construction activities.

Implementation of Mitigation Measure M-AQ-3 would result in an 87 percent reduction of DPM and $PM_{2.5}$ emissions. The AQTR estimated the health risk and hazards impact under the mitigiated scenario using modeled dispersion factors to obtain actual air concentrationsthat were then used to estimate health risks and hazads at the project MEISR. The AQTR concluded that the health risks and hazards at the MEISR (a resident child adjacent to the project site), with implementation of Mitigation Measure M-AQ-3, would be reduced to 6.6 in one million, less than the significance threshold of 10 in one million. The chronic and acute HI would be reduced to 0.02 and 0.6, respectively, less than the significance threshold of 1.0. The annual average $PM_{2.5}$ concentration would be 0.20 micrograms per cubic meter, less than the significance threshold of 0.3 micrograms per cubic meter. Therefore, because all significance criteria would be reduced to below the applicable thresholds, with implementation of **Mitigation Measure M-AQ-3**, project-related construction health risks and hazards would be ***less than significant***.

Impact AQ-4: The proposed project would not contribute to an air quality violation or result in a considerable net increase in regional criteria air pollutants (Less than Significant)

As discussed above, a proposed project would result in a significant impact with respect to criteria air pollutants if project operations exceeded the following significance thresholds: 54 lbs/day (or 10 tons/year) of ROG, NO_x, or $PM_{2.5}$ or 82 lbs/day (15 tons/year) of PM_{10}. The operational screening size for general townhomes, as modeled by the BAAQMD, is 451 units. The project involves construction of 34 dwelling units and is therefore substantially below the screening size. Therefore, based on preliminary modeling by the BAAQMD, a project of this size would not result in criteria air pollutant or ozone precursor emissions that would cause or contribute to an air quality violation or result in a cumulatively considerable net increase of criteria air pollutants. Therefore, this impact would be ***less than significant***.

Impact AQ-5: The proposed project would not contribute to carbon monoxide (CO) emissions that would result in a cumulatively considerable increase in criteria air pollutants or result in CO hot spots. (Less than Significant)

The SFBAAB is designated as "attainment" for CO. As stated in the 2010 update of the BAAQMD *CEQA Air Quality Guidelines*, "Emissions and ambient concentrations of CO have decreased dramatically in the SFBAAB with the introduction of the catalytic converter in 1975. No exceedances of the CAAQS or NAAQS for CO have been recorded at nearby monitoring stations since 1991."[121] As stated above, the BAAQMD has demonstrated that in order to exceed the CAAQS of 9.0 ppm (8-hour average) or 20.0 ppm (1-hour average) for CO, project traffic in addition to existing traffic would need to exceed 44,000 vehicles/hour at affected intersections (or 24,000 vehicles/hour where vertical and or horizontal mixing is limited). The greatest volume at any of the study intersections is substantially less than 44,000 vehicles per hour. Therefore, effects related to CO concentrations would be ***less than significant***.

Impact AQ-6: The proposed project would not expose sensitive receptors to substantial pollutant concentrations. (Less than Significant)

The proposed project would not include any stationary sources of TACs (e.g., emergency backup generators). The proposed project would generate approximately 211 daily vehicle trips, which would contribute to roadway-related air pollutants.[122] This contribution of fewer than 10,000 vehicles per day would be considered a "minor, low impact source." The BAAQMD does not consider these sources to pose a significant health impact even in combination with other nearby sources.[123] Therefore, the proposed project would not generate TACs that would expose sensitive receptors to substantial pollutant concentrations.

The proposed project would introduce residential uses to the project site. As discussed in the Regulatory Setting, residential uses are considered sensitive receptors for purposes of air quality evaluation. Therefore, a screening-level analysis was prepared for the proposed project to evaluate the potential health risks and hazard impacts from adding new sensitive receptors to this location.[124] Exposure of sensitive receptors to TACs are evaluated within a 1,000-foot zone of influence, as described previously. The screening analysis reviewed available stationary source databases as provided by the BAAQMD,[125] and determined that there were no stationary sources within 1,000 feet of the project site that would

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121 Ibid, p. 6-1.

122 LCW Consulting, *Crestmont Hills Transportation Study – Final Report*, February 2006, op cit.

123 BAAQMD, *Recommended Methods for Screening and Modeling Local Risks and Hazards,* May 2011, p. 12.

124 The screening level analysis is presented in Appendix A of the *Air Quality Technical Report* prepared for the proposed project.

125 BAAQMD, *Stationary Source Screening Analysis Tool*, May 2011, available online at www.baaqmd.gov.

expose receptors at the project site to substantial health risks and hazards. Additionally, the BAAQMD recommends that potential health risks and hazards resulting from roadways with annual average daily traffic of 10,000 vehicles or greater should be evaluated. The screening analysis identified Seventh Avenue, about 500 feet west of the project, as the only roadway meeting the criteria for further evaluation. Accordingly, the AQTR prepared for the proposed project estimated the incremental health risks and hazards impact from this roadway and determined that the excess cancer risk attributable to this source would be 1.0 per million, chronic and acute HI would be 0.02, and annual average $PM_{2.5}$ concentrations would be approximately 0.03 micrograms per cubic meter. Because Seventh Avenue is the only source of health risks and hazards to the project site that requires further evaluation, these numbers represent the cumulative risks and hazards to potential new residents. The cumulative risk and hazard levels are substantially below applicable thresholds of an excess cancer risk of 100 per million, a chronic HI of 10, and an annual average $PM_{2.5}$ concentration of 0.8 $\mu g/m^3$. Therefore, the proposed project would not expose new sensitive receptors to substantial concentrations of TACs. This impact would be ***less than significant***.

Impact AQ-7: The proposed project would not conflict with the *2010 Clean Air Plan*, the applicable air quality plan. (Less than Significant)

BAAQMD adopted the Bay Area *2010 Clean Air Plan* (CAP) on September 15, 2010. The CAP provides a comprehensive plan to improve Bay Area air quality and protect public health. The CAP defines a control strategy to reduce emissions and decrease ambient concentrations of harmful pollutants; safeguard public health by reducing exposure to air pollutants that pose the greatest health risk, with an emphasis on protecting the communities most heavily impacted by air pollution; and reducing greenhouse gas (GHG) emissions. In determining consistency with the CAP, this analysis considers whether the project (1) supports the prijmary goals of the CAP, (2) includes applicable control measures, and (3) hinders implementation of the CAP

The primary goals of the CAP are to attain air quality standards, reduce pollutant exposure and protect public health, and reduce GHG emissions. GHG emissions are discussed in Section IV.E. The proposed project would result in short-term construction-related criteria air pollutant emissions. However, these emissions would be limited to the project's construction period. The proposed project would result in an increase in operational criteria air pollutants, primarily due to the new vehicle trips associated with the proposed project. However, as discussed above under Impact AQ-6, the proposed project's emissions would be considered a "minor, low-impact source." As the proposed project would not result in a substantial, long-term increase in emissions, the project would be considered to support the primary goals of the 2010 CAP.

To meet the primary goals of the CAP, the CAP recommends specific control measures and actions. These control measures are grouped into various categories and include: stationary and area source measures, mobile source measures, transportation control measures, land use measures, and energy and climate measures. The CAP recognizes that to a great extent, community design dictates individual travel mode and that a key long-term control strategy to reduce emissions of criteria pollutants, air toxics, and greenhouse gases 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 CAP includes 55 control measures aimed at reducing air pollution in the Bay Area.

The measures most applicable to the proposed project are Transportation Control Measures and energy and climate measures. With regard to implementation of Transportation Control Measures, the *San Francisco General Plan*, *San Francisco Planning Code*, and City Charter implement various Transportation Control Measures identified in the CAP through the City's Transit First Program, transit development impact fees applicable to commercial uses, and other actions. The proposed project would be consistent with such measures. The proposed project would similarly be consistent with the Energy and Climate Measures, as discussed in Section IV.E.

Examples of a project that would cause the disruption or delay of control measures include projects that would preclude the extension of a transit line or bike path, or projects that propose excessive parking beyond parking requirements. The proposed project would include building a new private cul-de-sac at the end of a public road, and would not preclude the extension of either transit or a bike path. There is existing bus service in the site vicinity as described under Transit Network, beginning on page 99. Because of site location and topology, it is assumed that a majority of residents and visitors of the proposed project would travel by vehicle. However, a vehicle-heavy travel mode would not hinder implementation of the CAP.

For the reasons described above, proposed project would be considered consistent with the CAP. Therefore, the project's impact relative to the goals of the 2010 CAP would be ***less than significant***.

Cumulative Air Quality Impacts

Impact C-AQ-1: The proposed project, in combination with other past, present, and reasonably foreseeable future projects, would not result in cumulatively considerable air quality impacts. (Less than Significant)

As discussed above, regional air quality impacts are by their very nature cumulative impacts. Emissions from past, present and future projects contribute to the region's adverse air quality impacts on a cumulative basis. No single project by itself would be sufficient in size to result in nonattainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulative adverse air quality impacts.[126] The project-level thresholds for criteria air pollutants are based on levels by which new sources are not anticipated to contribute to an air quality violation or result in a considerable net increase in criteria air pollutants. As shown in Impacts AQ-2, AQ-4, and AQ-5, the proposed project's construction and operational emissions would not exceed the project-level thresholds for criteria air pollutants. Therefore, the project would not be considered to result in a considerable contribution to cumulative regional air quality impacts.

With respect to siting new sensitive receptors at the project site, the impact analysis considers all potential sources of TACs within a 1,000-foot zone of influence that may pose a significant health risk, and therefore represents the cumulative impacts to new sensitive receptors.

The proposed project's construction activities would contribute to cumulative health risks and hazards at the off-site MEISR. Cumulative sources, in addition to project construction activities, include the contribution from vehicle traffic along Seventh Avenue. Combining unmitigated project construction emissions with the health risks and hazards from Seventh Avenue results in an estimated cumulative cancer risk of 51.7 in one million, less than the cumulative significance threshold of 100 in one million. The cumulative chronic HI would be less than 1.41, below the significance threshold of 10. The cumulative annual average $PM_{2.5}$ concentration would be 0.73 micrograms per cubic meter, less than the significance threshold of 0.8 micrograms per cubic meter.

However, the proposed project would be required to implement Mitigation Measure M-AQ-3, which would reduce construction emissions by approximately 87 percent. Cumulative health risks and hazards with incorporation of Mitigation Measure M-AQ-3 would result in an estimated cumulative cancer risk of 7.6 in one million, less than the cumulative significance threshold of 100 in one million. The cumulative

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126 BAAQMD, *California Environmental Quality Act (CEQA) Air Quality Guidelines*, June 2010; and adopted Thresholds of Significance, June 2010. Available online at http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Updated-CEQA-Guidelines.aspx, p. 2-1.

chronic HI would be less than 0.05, well below the significance threshold of 10. The annual average $PM_{2.5}$ concentration would be 0.23 micrograms per cubic meter, less than the cumulative significance threshold of 0.8 micrograms per cubic meter.

Cumulative health risks and hazards to nearby sensitive receptors, under both the mitigated and unmitigated scenarios, would be below the applicable cumulative thresholds. Therefore cumulative health risk impacts would be ***less than significant***.

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E. GREENHOUSE GAS EMISSIONS

This section provides a description of global climate change, greenhouse gas (GHG) emissions, the existing regulatory framework governing GHG emissions, and an analysis of the impacts related to GHGs associated with development at the project site. The proposed project's GHG emissions are evaluated based on compliance with plans and policies adopted for the purpose of reducing GHG emissions, namely the more aggressive local GHG reduction plan, *Strategies to Address Greenhouse Gas Emissions.*[127]

ENVIRONMENTAL SETTING

GREENHOUSE GAS EMISSIONS AND GLOBAL CLIMATE CHANGE

Gases that trap heat in the atmosphere are referred to as GHGs because they capture heat radiated from the sun as it is reflected back into the atmosphere, much like a greenhouse does. The accumulation of GHGs has been implicated as a driving force for global climate change. The primary GHGs are carbon dioxide, black carbon, methane, nitrous oxide, ozone, and water vapor.

Individual projects contribute to the cumulative effects of climate change by emitting GHGs during demolition, construction, and operational phases. While the presence of the primary GHGs in the atmosphere are naturally occurring, carbon dioxide (CO_2), methane, and nitrous oxide are largely emitted from human activities, accelerating the rate at which these compounds occur within the earth's atmosphere. Emissions of carbon dioxide are largely by-products of fossil fuel combustion, whereas methane results from off-gassing associated with agricultural practices and landfills. Black carbon has recently emerged as a major contributor to global climate change, possibly second only to CO_2. Black carbon is produced naturally and by human activities as a result of the incomplete combustion of fossil fuels, biofuels, and biomass[128]. Other GHGs include hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride, and are generated in certain industrial processes. CO_2 is the "reference gas" for GHG

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127 City and County of San Francisco, *Strategies to Reduce Greenhouse Gas Emissions,* November 2010. Available online at http://www.sf-planning.org/ftp/files/MEA/GHG-Reduction_Rpt.pdf, accessed April 18, 2012.

128 Center for Climate and Energy Solutions, *What is Black Carbon?*, available online at: http://www.c2es.org/global-warming-basics/blackcarbon-factsheet, accessed February 14, 2012.

emissions, meaning that emissions of total GHGs are typically reported in "carbon dioxide-equivalent" (CO_2E) measures.[129]

There is international scientific consensus that human-caused increases in GHGs have and will continue to contribute to global warming. Potential global warming impacts in California may include, but are not limited to, loss in snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years.[130] Secondary effects are likely to include a global rise in sea level, impacts to agriculture, changes in disease vectors, and changes in habitat and biodiversity.

The California Air Resources Board (CARB) estimated that in 2008 California produced about 478 million gross metric tons ($MMTCO_2E$) of CO_2E emissions. The CARB found that transportation is the source of 37 percent of the State's GHG emissions, followed by electricity generation (both in-state and out-of-state) at 24 percent and industrial sources at 19 percent. Commercial and residential fuel use (primarily for heating) accounted for 9 percent of CO_2E emissions.[131] In the Bay Area, fossil fuel consumption in the transportation sector (on-road motor vehicles, off-highway mobile sources, and aircraft) is the largest source of GHG emissions, accounting for approximately 39 percent of the Bay Area's 95.8 $MMTCO_2E$ of GHG emissions in 2007. Industrial and commercial sources (including office and retail uses) were the second largest contributors of GHG emissions contributing about 36 percent of total emissions. Electricity generation accounts for approximately 16 percent of the Bay Area's GHG emissions, followed by residential fuel usage (e.g., home water heaters, furnaces, etc.) at 7 percent, and agriculture at 1 percent. Among industrial sources, oil refining currently accounts for more than 40 percent of GHG emissions, or approximately 15 percent of the total Bay Area GHG emissions.[132]

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129 Because of the differential heat absorption potential of various GHGs, GHG emissions are frequently measured in "carbon dioxide-equivalents," which present a weighted average based on each gas's heat absorption (or "global warming") potential.

130 California Climate Change Portal. Frequently Asked Questions About Global Climate Change. Available online at http://www.climatechange.ca.gov/publications/faqs.html, accessed January 1, 2011.

131 California Air Resources Board, "California Greenhouse Gas Inventory for 2000-2008—by Category as Defined in the Scoping Plan." Available online at http://www.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_scopingplan_00-08_2010-05-12.pdf, accessed January 1, 2011.

132 BAAQMD, *Source Inventory of Bay Area Greenhouse Gas Emissions: Base Year 2007*, updated February 2010. Available online at w.baaqmd.gov/Divisions/Planning-and-Research/Emission-Inventory/Greenhouse-Gases.aspx , accessed February 14, 2012.

REGULATORY ENVIRONMENT

Federal

Supreme Court Ruling on California Clean Air Act Waiver

The US EPA is the federal agency responsible for implementing the CAA. The US Supreme Court ruled on April 2, 2007, that CO_2 is an air pollutant as defined under the CAA, and that EPA has the authority to regulate emissions of GHGs. However, there are no federal regulations or policies regarding GHG emissions applicable to the proposed project. (See Assembly Bill [AB] 1493 for further information on the California Clean Air Act [CCAA] Waiver.)

Energy and Independence Security Act of 2007 and Corporate Average Fuel Economy Standards

The Energy and Independence Security Act of 2007 (EISA) amended the Energy Policy and Conservation Act (EPCA) to further reduce fuel consumption and expand production of renewable fuels. The EISA's most significant amendment includes a statutory mandate for the National Highway Traffic Safety Administration (NHTSA) to set passenger car corporate average fuel economy (CAFE) standards for each model year (MY) at the maximum feasible level. This statutory mandate also eliminates the old default CAFE standard of 27.5 miles per gallon (mpg). The EISA requires that CAFE standards for MY 2011–2020 be set sufficiently high to achieve the goal of an industry-wide passenger car and light-duty truck average CAFE standard of 35 mpg. The rule making for this goal, per President Barack Obama's request, has been divided into two separate parts. The first part, which was published in the *Federal Register* in March 2009, includes CAFE standards for MY 2011 in order to meet the statutory deadline (i.e., March 30, 2009). The second part of the rule making applies to MY 2012 and subsequent years. These would be the maximum CAFE standards feasible under the limits of the EISA and the EPCA. NHTSA and EPA are working in coordination to develop a national program targeting MY 2012–2016 passenger cars and light trucks.

US Environmental Protection Agency Actions

In response to the issue of climate change, the US EPA has taken actions to regulate, monitor, and potentially reduce GHG emissions.

Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases under the Clean Air Act

On April 23, 2009, the US EPA published its proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases under the CAA (Endangerment Finding) in the *Federal Register*. The Endangerment Finding is based on Section 202(a) of the CAA, which states that the EPA Administrator should regulate and develop standards for "emission[s] of air pollution from any class or classes of new motor vehicles or new motor vehicle engines, which in [its] judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare." The proposed rule addresses Section 202(a) in two distinct findings. The first addresses whether or not the concentrations of the six key GHGs (i.e., CO_2, CH_4, N_2O, HFCs, perfluorocarbons, and sulfur hexafluoride) in the atmosphere threaten the public health and welfare of current and future generations. The second addresses whether or not the combined emissions of GHGs from new motor vehicles and motor vehicle engines contribute to atmospheric concentrations of GHGs and thus increase the threat of climate change.

The EPA Administrator proposed the finding that atmospheric concentrations of GHGs endanger the public health and welfare within the meaning of Section 202(a) of the CAA. The evidence supporting this finding consists of human activity resulting in "high atmospheric levels" of GHG emissions, which are very likely responsible for increases in average temperatures and other climatic changes. Furthermore, the observed and projected results of climate change (e.g., higher likelihood of heat waves, wildfires, droughts, sea level rise, and higher intensity storms) are a threat to public health and welfare. Accordingly, GHGs were found to endanger the public health and welfare of current and future generations.

The Administrator also proposed the finding that GHG emissions from new motor vehicles and motor vehicle engines are contributing to air pollution, which is endangering public health and welfare. The proposed finding states that in 2006, motor vehicles were the second largest contributor to domestic GHG emissions (24 percent of the total), behind electricity generation. Furthermore, in 2005, the US was responsible for 18 percent of global GHG emissions.[133] Thus, GHG emissions from motor vehicles and motor vehicle engines were found to contribute to air pollution that endangers public health and welfare.

On December 7, 2009, EPA finalized its decision that GHG emissions from motor vehicles constitute an "endangerment" under the CAA. This EPA finding allows for the establishment of GHG emissions standards for new motor vehicles.

Notice of Intent for Development of New GHG and Fuel Economy Standards In September 2010, the National Highway Traffic Safety Administration with EPA published a Notice of Intent for the development of new GHG and fuel economy standards for model year 2017-2025 vehicles. The agencies

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133 U.S. Federal Register, Part V, Environmental Protection Agency. 40 CFR Chapter 1, *Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the California Clean Air Act*; Final Rule. Tuesday December 15, 2009.

published a Supplemental Notice of Intent in December 2010. Draft regulations were published in December 2011, with a final rule due to be adopted in late 2012.[134]

In a related action, in June 2009, EPA granted California a waiver under the federal Clean Air Act, allowing the state to impose its own, stricter GHG regulations for vehicles beginning in 2009 (see below).

State

CARB is the state agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the California Clean Air Act (CCAA), adopted in 1988. With the passage of Assembly Bill (AB) 32, CARB was also given broad responsibility for promulgating regulations designed to achieve the general goals of AB 32. (For a discussion of AB 32, see "Assembly Bill 32 and the California Climate Change Scoping Plan" below.)

Various statewide and local initiatives have been introduced to reduce the state's contribution to GHG emissions. However, because every nation emits GHGs and thus makes an incremental cumulative contribution to global climate change, cooperation on a global scale will be required to reduce the rate of GHG emissions to a level that can effectively slow or stop the human-caused increase in average global temperatures and associated changes in climatic conditions.

Assembly Bill 1493

In 2002, then-Governor Gray Davis signed AB 1493, which required that the CARB develop and adopt, by January 1, 2005, regulations that achieve "the maximum feasible reduction of GHGs emitted by passenger vehicles and light-duty trucks and other vehicles determined by CARB to be vehicles whose primary use is noncommercial personal transportation in the state."

To meet the requirements of AB 1493, the CARB approved amendments to the California Code of Regulations (CCR) in 2004, adding GHG emissions standards to California's existing standards for motor vehicle emissions. Amendments to CCR Title 13, Sections 1900 and 1961 (13 CCR 1900, 1961), and adoption of Section 1961.1 (13 CCR 1961.1), require automobile manufacturers to meet fleet-average GHG emissions limits for all passenger cars, light-duty trucks within various weight criteria, and medium-duty passenger vehicle weight classes (i.e., any medium-duty vehicle with a gross vehicle weight [GVW] rating of less than 10,000 pounds and which is designed primarily for the transportation of persons), beginning with model year 2009. For passenger cars and light-duty trucks with a loaded vehicle weight

134 US Environmental Protection Agency, Transportation and Climate. Regulations and Standards. Available online at http://www.epa.gov/otaq/climate/regulations.htm,, accessed February 14, 2012.

(LVW) of 3,750 pounds or less, the GHG emission limits for model year 2016 are approximately 37 percent lower than the limits for the first year of the regulations, model year 2009. For light-duty trucks with an LVW of 3,751 pounds to a GVW of 8,500 pounds, as well as for medium-duty passenger vehicles, GHG emissions will be reduced approximately 24 percent between 2009 and 2016.

Because the Pavley standards (named for the bill's author, state Senator Fran Pavley) would impose stricter standards than those under the federal Clean Air Act, California applied to the US EPA for a waiver under the Clean Air Act; this waiver was granted in 2009. California has now agreed to cooperate with the federal GHG and Corporate Average Fuel Economy standards under development so that there will be a single national standard.

Executive Order S-3-05

In 2005, in recognition of California's vulnerability to the effects of climate change, then-Governor Schwarzenegger established Executive Order S-3-05, which sets forth a series of target dates by which statewide emissions of GHGs would be progressively reduced, as follows: by 2010, reduce GHG emissions to 2000 levels (approximately 458 $MMTCO_2E$); by 2020, reduce GHG emissions to 1990 levels (an estimated 427 $MMTCO_2E$); and by 2050, reduce GHG emissions to 80 percent below 1990 levels (approximately 85 $MMTCO_2E$).[135]

Assembly Bill 32 and the California Climate Change Scoping Plan

In 2006, California passed the California Global Warming Solutions Act of 2006 (Assembly Bill No. 32; California Health and Safety Code Division 25.5, Sections 38500, et seq., or AB 32), which requires the CARB to design and implement emission limits, regulations, and other measures, such that feasible and cost-effective statewide GHG emissions are reduced to 1990 levels by 2020 (representing a 25 percent reduction in emissions).

Pursuant to AB 32, CARB adopted a Scoping Plan in December 2008, outlining measures to meet the 2020 GHG reduction limits.[136] In order to meet these goals, California must reduce its GHG emissions by almost 30 percent below projected 2020 business as usual emissions levels, or about 15 percent from

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135 California Air Resources Board, Climate Change Scoping Plan: A Framework for Change, December 2008. Available online at http://www.arb.ca.gov/cc/scopingplan/document/scopingplandocument.htm, accessed January 2, 2011.

136 On January 24, 2011, a San Francisco superior court judge issued a proposed Statement of Decision against implementation of the Scoping Plan. No formal ruling has yet been issued. (Association of Irritated Residents et al v. California Air Resources Board, San Francisco Superior Court Case No. CPF-09-509562.)

today's levels. The Scoping Plan estimates a reduction of 174 $MMTCO_2E$ from the transportation, energy, agriculture, forestry, and high global warming potential sectors, as listed below.

GHG Reductions from the AB 32 Scoping Plan Sectors[137]	
GHG Reduction Measures By Sector	**GHG Reductions ($MMT\ CO_2E$)**
Transportation Sector	62.3
Electricity and Natural Gas	49.7
Industry	1.4
Landfill Methane Control Measure (Discrete Early Action)	1
Forestry	5
High Global Warming Potential GHGs	20.2
Additional Reductions Needed to Achieve the GHG Cap	34.4
Total	**174**
Other Recommended Measures	
Government Operations	1-2
Agriculture- Methane Capture at Large Dairies	1
Methane Capture at Large Dairies	1
Additional GHG Reduction Measures	
Water	4.8
Green Buildings	26
High Recycling/ Zero Waste • Commercial Recycling • Composting • Anaerobic Digestion • Extended Producer Responsibility • Environmentally Preferable Purchasing	9
Total	**42.8-43.8**

The CARB has identified an implementation timeline for the GHG reduction strategies in the Scoping Plan.[138] Some measures may require new legislation to implement, some will require subsidies, some have already been developed, and some will require additional effort to evaluate and quantify. Additionally, some emissions reductions strategies may require their own environmental review under CEQA or the National Environmental Policy Act (NEPA).

AB 32 also anticipates that local government actions will result in reduced GHG emissions. CARB has identified a GHG reduction target of 15 percent from current levels for local governments themselves and notes that successful implementation of the plan relies on local governments' land use planning and urban growth decisions because local governments have primary authority to plan, zone, approve, and

137 Op cit; see Footnote 136.

138 California Air Resources Board. AB 32 Scoping Plan. Available online at http://www.arb.ca.gov/cc/scopingplan/sp_measures_implementation_timeline.pdf, accessed March 2, 2010.

permit land development to accommodate population growth and the changing needs of their jurisdictions.

The Scoping Plan relies on the requirements of Senate Bill 375 (SB 375) to implement the carbon emission reductions anticipated from land use decisions. SB 375 was enacted to align local land use and transportation planning to further achieve the State's GHG reduction goals. SB 375 requires regional transportation plans, developed by Metropolitan Planning Organizations (MPOs), to incorporate a "sustainable communities strategy" in their regional transportation plans (RTPs) that would achieve GHG emission reduction targets set by CARB. SB 375 also includes provisions for streamlined CEQA review for some infill projects such as transit-oriented development. SB 375 would be implemented over the next several years and the Metropolitan Transportation Commission's 2013 RTP would be its first plan subject to SB 375.

Senate Bill 1368

SB 1368 is the companion bill of AB 32 and was signed by Governor Schwarzenegger in September 2006. SB 1368 requires the California Public Utilities Commission (CPUC) to establish a greenhouse gas emission performance standard for base-load energy generation from investor-owned utilities by February 1, 2007. The California Energy Commission (CEC) must establish a similar standard for local publicly owned utilities by June 30, 2007. These standards cannot exceed the greenhouse gas emission rate from a base-load combined-cycle natural gas-fired plant. The legislation further requires that all electricity provided to California, including imported electricity, must be generated from plants that meet the standards set by the CPUC and CEC.

Executive Order S-1-07

Executive Order S-1-07, signed by then-Governor Schwarzenegger in 2007, proclaimed that the transportation sector is the main source of GHG emissions in California, at over 40 percent of statewide emissions. The order established a goal of reducing the carbon intensity of transportation fuels sold in California by a minimum of 10 percent by 2020. It also directed the CARB to determine whether this Low Carbon Fuel Standard could be adopted as a discrete, early-action measure after meeting the mandates in AB 32. The CARB adopted the Low Carbon Fuel Standard on April 23, 2009.

Senate Bill 1078 and 107 and Executive Order S-14-08 and S-21-09

SB 1078 (Chapter 516, Statutes of 2002) requires retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide at least 20 percent of their supply from renewable sources by 2017. SB 107 (Chapter 464, Statutes of 2006) changed the target date to 2010. In November 2008, then-Governor Schwarzenegger signed Executive Order S-14-08, which expands the state's Renewable Portfolio Standard to 33 percent renewable power by 2020. In September 2009, then-Governor Schwarzenegger continued California's commitment to the Renewable Portfolio Standard by signing Executive Order S-21-09, which directs the CARB under its AB 32 authority to enact regulations to help the state meet its Renewable Portfolio Standard goal of 33 percent renewable energy by 2020.

Senate Bill 375

In addition to policy directly guided by AB 32, the legislature in 2008 passed Senate Bill (SB) 375, which provides for regional coordination in land use and transportation planning and funding to help meet the AB 32 GHG reduction goals. SB 375 requires regional transportation plans developed by the state's 18 Metropolitan Planning Organizations (in the Bay Area, the Metropolitan Transportation Commission (MTC)), to incorporate a "sustainable communities strategy" (SCS) in their regional transportation plans that will achieve GHG emission reduction targets set by CARB. SB 375 also includes provisions for streamlined CEQA review for some infill projects such as transit-oriented development. MTC's 2013 RTP will be its first plan subject to SB 375.

The CARB, in consultation with MPOs, will provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 2020 and 2035. These reduction targets will be updated every 8 years, but can be updated every 4 years if advancements in emissions technologies affect the reduction strategies to achieve the targets. The CARB is also charged with reviewing each MPO's SCS or alternative planning strategy (APS) for consistency with its assigned targets. If MPOs do not meet the GHG emissions reduction targets, transportation projects would not be eligible for funding programmed after January 1, 2012.

This bill also extends the minimum time period for the Regional Housing Needs Allocation cycle from 5 years to 8 years for local governments located within an MPO that meets certain requirements. City and county land use policies (including general plans) are not required to be consistent with the RTP (and associated SCS or APS). However, new provisions of CEQA would create incentives for qualified projects that are consistent with an approved SCS or APS, categorized as "transit priority projects."

Senate Bill 97

Senate Bill 97 (SB 97) required the Office of Planning and Research (OPR) to amend the state *CEQA Guidelines* to address the feasible mitigation of GHG emissions or the effects of GHGs. In response, OPR amended the *CEQA Guidelines* to provide guidance for analyzing GHG emissions. Among other changes to the *CEQA Guidelines*, the amendments add a new section to the CEQA Checklist (*CEQA Guidelines* Appendix G) to address questions regarding a project's potential to emit GHGs. The amendments were reviewed by the Office of Administrative Law, and became effective March 18, 2010. Accordingly, OPR's State *CEQA Guidelines* amendments have been incorporated into this analysis.

Regional

The Bay Area Air Quality Management District (BAAQMD) is the primary agency responsible for air quality regulation in the nine-county San Francisco Bay Area Air Basin (SFBAAB). The BAAQMD established a climate protection program to reduce pollutants that contribute to global climate change and affect air quality in the SFBAAB. The climate protection program includes measures that promote energy efficiency, reduce vehicle miles traveled, and develop alternative sources of energy, all of which assist in reducing emissions of GHGs and in reducing air pollutants that affect the health of residents. The BAAQMD also seeks to support current climate protection programs in the region and to stimulate additional efforts through public education and outreach, technical assistance to local governments and other interested parties, and promotion of collaborative efforts among stakeholders.

Local

City and County of San Francisco San Francisco's GHG Reduction Strategy

The City and County of San Francisco (City) has a history of environmental protection policies and programs aimed at improving the quality of life for residents and reducing impacts on the environment. A comprehensive assessment of these policies, programs and ordinances as they relate to reducing GHG emissions has been compiled into the City's *Strategies to Address Greenhouse Gas Emissions in San Francisco*,[139] collectively referred to as San Francisco's GHG Reduction Strategy. The GHG Reduction Strategy includes measures applicable to this project that would decrease the amount of GHGs emitted into the atmosphere and thus decrease San Francisco's overall contribution to climate change. The following plans, policies, and legislation demonstrate San Francisco's continued commitment to environmental protection.

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[139] San Francisco Planning Department. *Strategies to Address Greenhouse Gas Emissions in San Francisco*, 2010, available online at: http://www.sfplanning.org/index.aspx?page=1570. Accessed February 14, 2012.

Plans, Policies and Programs

Transit First Policy. In 1973, the City instituted the Transit First Policy, which added Article 8A, Section 8A.115 to the City Charter with the goal of reducing San Francisco's reliance on freeways and meeting transportation needs by emphasizing mass transportation. The Transit First Policy gives priority to public transit investments; adopts street capacity and parking policies to discourage increased automobile traffic; and encourages the use of transit, bicycling, and walking instead of single-occupant vehicles.

San Francisco Sustainability Plan. In July 1997, the Board of Supervisors endorsed the *Sustainability Plan for the City and County of San Francisco*, which establishes sustainable development as a fundamental goal of municipal public policy.

The Electricity Resource Plan (Revised December 2002). The City adopted the *Electricity Resource Plan* to help address growing environmental health concerns in San Francisco's southeast community, the site of two power plants. The plan presents a framework for assuring a reliable, affordable, and renewable source of energy for the future of San Francisco.

The Climate Action Plan for San Francisco. In February 2002, the San Francisco Board of Supervisors passed the Greenhouse Gas Emissions Reduction Resolution (Number 158-02) that set a goal for the City to reduce GHG emissions to 20 percent below 1990 levels by the year 2012. In September 2004, the San Francisco Department of the Environment and San Francisco Public Utilities Commission published the *Climate Action Plan for San Francisco: Local Actions to Reduce Greenhouse Gas Emissions*.[140] This climate action plan provides the context of climate change in San Francisco and examines strategies to meet the 20 percent GHG emissions reduction target. Although the Board of Supervisors has not formally committed the City to perform the actions addressed in the plan, and many of the actions require further development and commitment of resources, the plan serves as a blueprint for GHG emissions reductions, and several actions have been implemented or are now in progress.

San Francisco Municipal Transportation Agency's Zero Emissions 2020 Plan. The Zero Emissions 2020 Plan focuses on the purchase of cleaner emission transit buses, including hybrid diesel-electric buses. Under this plan, hybrid buses will replace the oldest diesel buses, some dating back to 1988. The hybrid buses emit 95 percent less particulate matter (soot) than the buses they replace; they produce 40 percent less nitrogen oxides and reduce GHGs by 30 percent.

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[140] San Francisco Department of the Environment and San Francisco Public Utilities Commission, 2004 (September), *Climate Action Plan for San Francisco: Local Actions to Reduce Greenhouse Emissions*, San Francisco, CA.

Zero Waste. In 2004, the City committed to a goal of diverting 75 percent of its waste from landfills by 2010, with the ultimate goal of zero waste by 2020. San Francisco currently recovers 72 percent of discarded material.[141]

GoSolarSF. On July 1, 2008, the San Francisco Public Utilities Commission launched its "GoSolarSF" program to San Francisco's businesses and residents, offering incentives in the form of a rebate program that could pay for approximately half the cost of installation of a solar power system and more to those qualifying as low-income residents.

The San Francisco Planning Department and the San Francisco Department of Building Inspection have also developed a streamlining process for solar photovoltaic permits and priority permitting mechanisms for projects pursuing Leadership in Energy and Environmental Design (LEED®) Gold certification.

Ordinances

San Francisco Planning Code. The *San Francisco Planning Code* reflects the latest smart growth policies and includes electric vehicle refueling stations in city parking garages, bicycle storage facilities for commercial and office buildings, and zoning that is supportive of high-density mixed-use infill development. The City's more recent area plans, such as the Rincon Hill Area Plan and the Market and Octavia Area Plan, provide transit-oriented development policies that allow for neighborhood-oriented retail services and limit off-street parking to accessory parking spaces. At the same time, there is a communitywide focus on ensuring that San Francisco's neighborhoods are "livable," reflected in the San Francisco Better Streets Plan, which provide streetscape policies throughout the city; the Transit Effectiveness Project, which aims to improve transit service; and the San Francisco Bicycle Plan. All of these plans and projects are intended to promote alternative transportation options for residents and visitors.

Construction and Demolition Debris Recovery Ordinance. In 2006, the City adopted Ordinance No. 27-06, requiring all construction and demolition debris to be transported to a registered facility that can divert a minimum of 65 percent of the material from landfills. This ordinance applies to all construction, demolition, and remodeling projects within the city.

Greenhouse Gas Reduction Ordinance. In May 2008, the City adopted an ordinance amending the San Francisco Environment Code to establish GHG emissions targets and departmental action plans, to

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141 San Francisco Department of the Environment. 2010. Zero Waste. Available online at http://www.sfenvironment.org/our_programs/overview.html?ssi=3, accessed June 2010.

authorize the San Francisco Department of the Environment to coordinate efforts to meet these targets, and to make environmental findings. The ordinance establishes the following GHG emissions reduction limits for San Francisco and the target dates by which to achieve them:

- Determine 1990 City GHG emissions by 2008, the baseline level with reference to which target reductions are set;
- Reduce GHG emissions by 25 percent below 1990 levels by 2017;
- Reduce GHG emissions by 40 percent below 1990 levels by 2025; and
- Reduce GHG emissions by 80 percent below 1990 levels by 2050.

The ordinance also specifies requirements for City departments to prepare climate action plans that assess GHG emissions associated with their activities and activities regulated by them, report the results of those assessments to the San Francisco Department of the Environment, and prepare recommendations to reduce emissions. In particular, the San Francisco Planning Department is required to (1) update and amend the City's applicable *General Plan* elements to include the emissions reduction limits set forth in this ordinance and policies to achieve those targets; (2) consider a project's impact on the City's GHG emissions reduction limits specified in this ordinance as part of its review under CEQA; and (3) work with other City departments to enhance the Transit First Policy to encourage a shift to sustainable modes of transportation, thereby reducing emissions and helping to achieve the targets set forth by the ordinance.

City and County of San Francisco's Green Building Ordinance. On August 4, 2008, then-Mayor Gavin Newsom signed into law San Francisco's Green Building Ordinance for newly constructed residential and commercial buildings and renovations to existing buildings. The ordinance specifically requires newly constructed commercial buildings over 5,000 square feet, residential buildings over 75 feet in height, and renovations on buildings over 25,000 square feet to be subject to an unprecedented level of required Leadership in Energy and Environmental Design (LEED®) Green Building Rating System™ certifications, which makes San Francisco the city with the most stringent green building requirements in the nation. In addition, green building standards are required for all newly constructed buildings, regardless of size or occupancy, as well as renovations to areas greater than 25,000 sf undergoing major structural, mechanical or electrical upgrades. Cumulative benefits of this ordinance includes reducing CO_2 emissions by 60,000 tons, saving 220,000 megawatt-hours of power, saving 100 million gallons of drinking water, reducing waste and stormwater by 90 million gallons, reducing construction and demolition waste by 700 million pounds, increasing the valuations of recycled materials by $200 million, reducing 540,000 automobile trips, and increasing generation of green power by 37,000 megawatt-hours.[142]

The Green Building Ordinance also continues San Francisco's efforts to reduce local GHG emissions to 20 percent below 1990 levels by the year 2012, a goal outlined in the City's 2004 climate action plan. In addition, by reducing San Francisco's emissions, this ordinance furthers efforts to reduce GHG emissions statewide, as mandated by the California Global Warming Solutions Act of 2006.

City and County of San Francisco Commuter Benefits Ordinance. The City adopted an ordinance, effective January 19, 2009, that allows commuters to deduct a specified amount per month, pretax, for transit and vanpool expenses. These commuter benefits must be offered by any employer with 20 employees or more that operates within the city. To qualify for these benefits, employees must work at least 10 hours per week averaged over a calendar month. Although not required by the ordinance, employers can offer the commuter benefits to employees who work fewer than 10 hours per week averaged over a month.

City and County of San Francisco Mandatory Recycling and Composting Ordinance. The City adopted an ordinance, effective October 21, 2009, that requires all businesses and residences to compost food scraps and biodegradable products. Green, blue, and black bins have been distributed to businesses and residents to sort their food and other biodegradable waste, recycling, and trash into their designated-color bins. Businesses and residences that do not comply with the ordinance are subject to fines, depending on the level and duration of non-compliance.

San Francisco has been actively pursuing cleaner energy, alternative transportation, and solid waste policies, many of which have been codified into regulations as discussed above. In an independent review of San Francisco's communitywide emissions, it was reported that San Francisco has achieved a 5 percent reduction in communitywide GHG emissions below the Kyoto Protocol 1990 baseline levels. The 1997 Kyoto Protocol sets a GHG reduction target of 7 percent below 1990 levels by 2012. The "community-wide inventory" includes GHG emissions generated by San Francisco—from residents, businesses, and commuters as well as from municipal operations. The inventory also includes emissions from both transportation and building energy sources.[143]

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142 These findings are contained within the final Green Building Ordinance, signed by the mayor on August 4, 2008.

143 IFC International. 2008 (August 1), *City and County of San Francisco: Community GHG Inventory Review*, San Francisco, CA. Prepared for City and County of San Francisco, Department of the Environment. San Francisco, CA.

The City's 2017 and 2025 GHG reduction goals are more aggressive than the State's GHG reduction goals as outlined in AB 32, and consistent with the State's long-term (2050) GHG reduction goals. San Francisco's *Strategies to Address Greenhouse Gas Emissions* identifies the City's actions to pursue cleaner energy, energy conservation, alternative transportation and solid waste policies, and concludes that San Francisco's policies have resulted in a reduction in GHG emissions below 1990 levels, meeting statewide AB 32 GHG reduction goals. As reported, San Francisco's 1990 GHG emissions were approximately 8.26 million metric tons (MMT) CO2E and 2005 GHG emissions are estimated at 7.82 MMTCO2E, representing an approximately 5.3 percent reduction in GHG emissions below 1990 levels.

The BAAQMD has reviewed San Francisco's GHG Reduction Strategy, concluding that "Aggressive GHG reduction targets and comprehensive strategies like San Francisco's help the Bay Area move toward reaching the State's AB 32 goals, and also serve as a model from which other communities can learn."[144]

IMPACTS

SIGNIFICANCE THRESHOLDS

The proposed project would have a significant air quality impact if it were to:

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or
- Conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of GHGs.

APPROACH TO ANALYSIS

As discussed above, SB 97 required OPR to amend the state *CEQA Guidelines* to address the feasible mitigation of GHG emissions or the effects of GHGs. In response, OPR amended the *CEQA Guidelines* to provide guidance for analyzing GHG emissions. Among other changes to the *CEQA Guidelines*, the amendments add a new section to the CEQA Checklist (*CEQA Guidelines* Appendix G) to address questions regarding the project's potential to emit GHGs. The significance thresholds identified above are based on the CEQA Guidelines and CEQA checklist, as amended by SB 97.

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144 BAAQMD letter contained in Appendix A of the *GHG Reduction Strategy*. Available online at http://www.sf-planning.org/index.aspx?page=1570, accessed May 2, 2011.

The proposed project's impact with respect to GHG emissions are based on compliance with local and state plans, policies and regulations adopted for the purpose of reducing the cumulative impacts of climate change. GHG emissions are analyzed in the context of their contribution to the cumulative effects of climate change because a single land use project could generate enough GHG emissions to noticeably change the global average temperature. As discussed above, the AB 32 Scoping Plan is the State's overarching plan for addressing climate change. The AB 32 Scoping Plan recommendations are intended to curb projected business-as-usual growth in GHG emissions and reduce those emissions to 1990 levels. Therefore, meeting AB 32 GHG reduction goals would result in an overall annual net decrease in GHGs as compared to current levels and accounts for projected increases in emissions resulting from anticipated growth. The BAAQMD has conducted an analysis of the effectiveness of meeting AB 32 goals from the actions outlined in the scoping plan and determined that in order for the Bay Area to meet AB 32 GHG reduction goals, the Bay Area would need to achieve an additional 2.3 percent reduction in GHG emissions from the land use driven sector.[145]

At a local level, the City has developed a number of plans and programs to reduce the City's contribution to global climate change. As identified in San Francisco's *Strategies to Address Greenhouse Gas Emissions*,[146] the City has implemented a number of mandatory requirements and incentives that have measurably reduced GHG emissions including, but not limited to, increasing the energy efficiency of new and existing buildings, installation of solar panels on building roofs, implementation of a green building strategy, adoption of a zero waste strategy, a construction and demolition debris recovery ordinance, a solar energy generation subsidy, incorporation of alternative fuel vehicles in the City's transportation fleet (including buses), and a mandatory recycling and composting ordinance. The strategy also identifies 42 specific regulations for new development that would reduce a project's GHG emissions.

San Francisco's *Strategies to Address Greenhouse Gas Emissions* identifies the City's actions to pursue cleaner energy, energy conservation, alternative transportation and solid waste policies, and concludes that San Francisco's policies have resulted in a reduction in GHG emissions below 1990 levels, exceeding statewide AB 32 GHG reduction goals. As reported, San Francisco's 1990 GHG emissions were approximately 8.26 MMTCO2E and 2005 GHG emissions are estimated at 7.82 MMTCO2E, representing an approximately 5 percent reduction in GHG emissions below 1990 levels.

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145 Bay Area Air Quality Management District (BAAQMD). *Revised Draft Options and Justification Report, California Environmental Quality Act Thresholds of Significance*. October 2009, p. 42.

146 San Francisco Planning Department. *Strategies to Address Greenhouse Gas Emissions in San Francisco.* 2010. Available online at http://www.sfplanning.org/index.aspx?page=2627.

The BAAQMD, the primary agency with regulatory authority over air quality regulation in the nine-county SFBAAB has reviewed San Francisco's *Strategies to Address Greenhouse Gas Emissions* and concluded that San Francisco's "aggressive GHG reduction targets and comprehensive strategies help the Bay Area move toward reaching the State's AB 32 goals, and also serve as a model from which other communities can learn."[147]

In summary, the two applicable GHG reduction plans, the AB 32 Scoping Plan and *Strategies to Address Greenhouse Gas Emissions*, are intended to reduce GHG emissions below current levels. Given that the City's local greenhouse gas reduction targets are more aggressive than the State's 2020 GHG reduction targets, and consistent with the long-term 2050 reduction targets, the City's GHG Reduction Strategy is consistent with the goals of AB 32. Therefore, projects that are consistent with the City's GHG Reduction Strategy would be consistent with the goals of AB 32 and would not conflict with either plan or generate GHG emissions that would make a considerable contribution to global climate change. As such, a project's impact with respect to GHG emissions is analyzed based on compliance with the City's *Strategies to Address Greenhouse Gas Emissions.*

Impact Evaluation

Impact C-GG-1: The proposed project would be consistent with the City's GHG Reduction Plan and the AB 32 Scoping Plan, and would therefore not result in cumulatively considerable greenhouse gas (GHG) emissions. (Less than Significant)

The most common GHGs resulting from human activity are CO_2, CH_4, and N_2O.[148] State law defines GHGs to also include hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride. These latter GHG compounds are usually emitted in industrial processes, and therefore not applicable to the proposed project. Individual projects contribute to the cumulative effects of climate change by directly or indirectly emitting GHGs during construction and operational phases. Direct operational emissions include GHG emissions from new vehicle trips and area sources (natural gas combustion). Indirect emissions include emissions from electricity providers, energy required to pump, treat, and convey water, and emissions associated with landfill operations.

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147 Letter from Jean Roggenkamp, BAAQMD, to Bill Wycko, San Francisco Planning Department. October 28, 2010. Available online at http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA%20Letters/San%20Francisco%20GHG%20Reduction%20Strategy_10_28_2010%20-%20AY.ashx, accessed March 8, 2011.

148 Governor's Office of Planning and Research. *Technical Advisory- CEQA and Climate Change: Addressing Climate Change through California Environmental Quality Act (CEQA) Review*. June 19, 2008. Available at the Office of Planning and Research's website at http://www.opr.ca.gov/ceqa/pdfs/june08-ceqa.pdf, accessed March 3, 2010.

The proposed project would involve increased activity on the project site as it includes construction of 34 dwelling units and a new paved, approximately 700-foot-long private street. Therefore, the proposed project would contribute to annual long-term increases in GHGs as a result of increased vehicle trips (mobile sources) and residential and commercial operations associated with energy use, water use and wastewater treatment, and solid waste disposal. Construction activities would also result in an increase in GHG emissions.

As discussed above, the significance of a project's GHG emissions are based on compliance with the City's GHG Reduction Strategy, as this strategy consistent is with AB 32 GHG reduction goals and would continue to reduce GHG emissions below current levels. As discussed in San Francisco's *Strategies to Address Greenhouse Gas Emissions*, new development and renovations/alterations for private projects and municipal projects are required to comply with San Francisco's ordinances that reduce GHG emissions. Applicable requirements are shown below in Table 12 on the following pages. A comprehensive analysis of the project's consistency with *San Francisco's Strategies to Address Greenhouse Gas Emissions* is detailed in the project's GHG Compliance Checklist.[149]

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[149] During Associates, *Compliance Checklist Table for Greenhouse Gas Analysis: Table 1. Private Development Projects*, February 28, 2012. This document is on file and available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, San Francisco, as part of Case No. 2004.0093E

Table 12
GHG Regulations Applicable to the Proposed Project

Regulation	Requirements	Project Compliance	Discussion
Transportation Sector			
Bicycle parking in Residential Buildings (*Planning Code*, Section 155.5)	(A) For projects up to 50 dwelling units, one Class 1 space for every 2 dwelling units. (B) For projects over 50 dwelling units, 25 Class 1 spaces plus one Class 1 space for every 4 dwelling units over 50.	☒ Project Complies ☐ Not Applicable ☐ Project Does Not Comply	The proposed project would include room for bicycle parking spaces in secure garages for all of the duplex buildings. The townhome building, with ten units, would provide at least six bicycle parking spaces. The project would therefore meet criterion (A) for those units. Criterion B does not apply to the proposed 34-unit project. The proposed project would comply with Section 155.5.
Energy Efficiency Sector			
San Francisco Green Building Requirements for Energy Efficiency (*San Francisco Building Code*, Chapter 13C)	Under the Green Point Rated system and in compliance with the Green Building Ordinance, all new residential buildings will be required to be at a minimum 15% more energy efficient than Title 24 energy efficiency requirements.	☒ Project Complies ☐ Not Applicable ☐ Project Does Not Comply	Construction of the proposed project would comply with San Francisco's Green Building requirements for energy efficiency and meet a minimum performance standard of 15 percent more energy efficient than Title 24 energy efficiency requirements.
San Francisco Green Building Requirements for Stormwater Management (*San Francisco Building Code*, Chapter 13C) Or San Francisco Stormwater Management Ordinance (*Public Works Code* Article 4.2)	Requires all new development or redevelopment disturbing more than 5,000 square feet of ground surface to manage stormwater on-site using low impact design. Projects subject to the Green Building Ordinance requirements must comply with either LEED® Sustainable Sites Credits 6.1 and 6.2, or with the City's Stormwater ordinance and stormwater design guidelines.	☒ Project Complies ☐ Not Applicable ☐ Project Does Not Comply	The proposed project would comply with San Francisco's Green Building requirements for stormwater management by following the City's stormwater design guidelines and preparing a Stormwater Control Plan (see Section IV.H. CEQA Checklist Update, on page 245).

Table 13 (Continued)
GHG Regulations Applicable to the Proposed Project

Regulation	Requirements	Project Compliance	Discussion
Residential Water Conservation Ordinance (*San Francisco Building Code*, *Housing Code*, Chapter 12A)	Requires all residential properties (existing and new), prior to sale, to upgrade to the following minimum standards: 1. All showerheads have a maximum flow of 2.5 gallons per minute (gpm) 2. All showers have no more than one showerhead per valve 3. All faucets and faucet aerators have a maximum flow rate of 2.2 gpm 4. All Water Closets (toilets) have a maximum rated water consumption of 1.6 gallons per flush (gpf) 5. All urinals have a maximum flow rate of 1.0 gpf 6. All water leaks have been repaired. Although these requirements apply to existing buildings, compliance must be completed through the Department of Building Inspection, for which a discretionary permit (subject to CEQA) would be issued.	☒ Project Complies ☐ Not Applicable ☐ Project Does Not Comply	The proposed project would comply with San Francisco's Residential Water Conservation Ordinance.
Water-Efficient Irrigation Ordinance (*San Francisco Building Code* Chapter 13C)	Projects that include 1,000 sf or more of new or modified landscape are subject to the San Francisco Water Irrigation Ordinance.	☒ Project Complies ☐ Not Applicable ☐ Project Does Not Comply	The proposed project, which would include over 1,000 sf of new or modified landscape, would be required to comply with the Water-Efficient Irrigation Ordinance. Enforceable through the building permit process.

Table 13 (Continued)
GHG Regulations Applicable to the Proposed Project

Regulation	Requirements	Project Compliance	Discussion
San Francisco Green Building Requirements for Water Efficiency (*San Francisco Building Code*, Chapter 13C)	Requires all new residential buildings and renovations to reduce overall use of potable water within the building by 20% for showerheads, lavatories, kitchen faucets, wash fountains, water closets, and urinals.	☒ Project Complies ☐ Not Applicable ☐ Project Does Not Comply	The proposed project would be required to comply with Requirements for Water Efficiency, and would reduce overall use of potable water within the project by 20%.
Waste Reduction Sector			
San Francisco Green Building Requirements for solid waste (*Environment Code* Chapter 19 and *San Francisco Building Code*, Chapter 13C)	All persons in San Francisco are required to separate refuse into recyclables, compostables, and trash. Pursuant to Section 1304C.0.4 of the Green Building Ordinance, all new construction, renovation and alterations subject to the ordinance are required to provide recycling, composting and trash storage, collection, and loading that is convenient for all users of the building.	☒ Project Complies ☐ Not Applicable ☐ Project Does Not Comply	The project sponsor would comply with San Francisco's Green Building requirements with respect to solid waste by providing adequate space for recycling, composting, and trash storage. Residents would be required by City law to separate recyclables and refuse into the bins provided.
San Francisco Green Building Requirements for construction and demolition debris recycling (*San Francisco Building Code*, Chapter 13C)	Projects that would include demolition are required to divert at least 75% of the project's construction and demolition debris to recycling.	☒ Project Complies ☐Not Applicable ☐ Project Does Not Comply	The project sponsor would comply with San Francisco's Green Building Requirements for construction and demolition debris recycling, enforceable through the project's building permit process.
Environment/Conservation Sector			
Street Tree Planting Requirements for New Construction (*Planning Code* Section 428)	*Planning Code* Section 428 requires new construction, significant alterations or relocation of buildings within many of San Francisco's zoning districts to plant a 24-inch box tree for every 20 feet along the property street frontage.	☒ Project Complies ☐ Not Applicable ☐ Project Does Not Comply	The project sponsor would comply with the City's Street Tree Planting Requirements for new construction, by planting approximately 33 street trees, enforceable through the project's building permit process.

Table 13 (Continued)
GHG Regulations Applicable to the Proposed Project

Regulation	Requirements	Project Compliance	Discussion
Wood Burning Fireplace Ordinance (*San Francisco Building Code*, Chapter 31, Section 3102.8)	Bans the installation of wood burning fire places except for the following: Pellet-fueled wood heater EPA approved wood heater Wood heater approved by the Northern Sonoma Air Pollution Control District	☒ Project Complies ☐ Not Applicable ☐ Project Does Not Comply	The proposed project would include gas-burning fireplaces, but no wood-burning fireplaces, thereby complying with the ordinance.
San Francisco Green Building Requirements for Low-VOC Paints (*San Francisco Building Code*, Chapter 13C)	Requires all construction to use low-VOC (volatile organic compound) paints and coatings.	☒ Project Complies ☐ Not Applicable ☐ Project Does Not Comply	The proposed project would be required to comply with Requirements for Low-VOC Paints, and would employ low-VOC paints during construction.
Regulation of Diesel Backup Generators (*San Francisco Health Code*, Article 30)	Requires (among other things): All diesel generators must be registered with the Department of Public Health (DPH). All new diesel generators must be equipped with the best available air emissions control technology.	☒ Project Complies ☐ Not Applicable ☐ Project Does Not Comply	No diesel generators are proposed or anticipated for the proposed project. However, should any generators be required in the future, they would be registered with the DPH and equipped with the best available air emissions control technology.

Depending on a proposed project's use, size, and location, a variety of controls are in place to ensure that a proposed project would not impair the State's ability to meet statewide GHG emissions reduction targets outlined in AB 32, nor impact the City's ability to meet San Francisco's local GHG emissions reduction targets. As shown above, the proposed project would be required to comply with a number of local requirements including the provision of bicycle spaces, fuel efficient vehicle parking, energy efficiency requirements, indoor and outdoor water conservation measures, waste reduction and recycling measures, low VOC building materials, and requirements for the planting of street trees. Therefore, as detailed above and in the project's GHG Compliance Checklist, the proposed project was determined to be consistent with San Francisco's *Strategies to Address Greenhouse Gas Emissions*.

Given that: (1) San Francisco has implemented mandatory and enforceable regulations to reduce GHG emissions specific to new construction and renovations of private development projects; (2) San Francisco's sustainable policies have resulted in the measured reduction of GHG emissions; (3) San

Francisco has met and exceeded AB 32 GHG reduction goals for the year 2020; (4) current and probable future state and local GHG reduction measures will continue to reduce a project's contribution to climate change; and (5) the proposed project was determined to be consistent with San Francisco's *Strategies to Address Greenhouse Gas Emissions*, the proposed project would not result in GHG emissions that would have a significant impact on the environment and would not conflict with applicable plans, policies and regulations adopted for the purpose of reducing GHG emissions. Therefore, the proposed project would not make a considerable contribution to global climate change and the project's GHG emissions would be ***less than significant***.

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F. GEOLOGY AND SOILS

INTRODUCTION

The Initial Study found that the proposed project could expose people or structures to major geologic hazards, including landslides (see Initial Study, on pages 41–42, Appendix A of this EIR). Therefore, this EIR includes discussion and analysis of the geological hazards and any changes to the existing topography of the project site and identifies appropriate mitigation measures. These topics are discussed below, based on a geotechnical investigation performed and updated for the project site (see Appendix C).[150,151] The investigation included a review of available documents, such as engineering studies for the project site and immediate surrounding area, City and County of San Francisco records of plans and permits, a variety of published sources, and aerial photographs from the period 1935 to 2000; several site visits; a total of 12 small diameter borings and four large diameter borings (see figures 21a and 21b on pages 180–181); and laboratory testing of a series of subsurface samples. A glossary of the technical terms used in this section is provided on page ix.

SETTING

HISTORY OF SITE AND VICINITY

The project site is located on the northwestern slope of Mount Sutro, in the Mount Sutro/Forest Knolls/Clarendon Heights area of San Francisco. Based on the earliest available aerial photographs, the surrounding areas and streets at the base of Mount Sutro (to about Seventh Avenue and Kirkham Street) had been developed by 1935. These aerial photographs also show that the upslope areas, including the project site, were undeveloped and had some tree cover. A swale, located at the base of the slope in the area of the existing Kirkham Heights apartment buildings (built in 1962) at the end of Fifth Avenue, extended upslope in a southeasterly direction, just east of the easternmost portion of the project site. The

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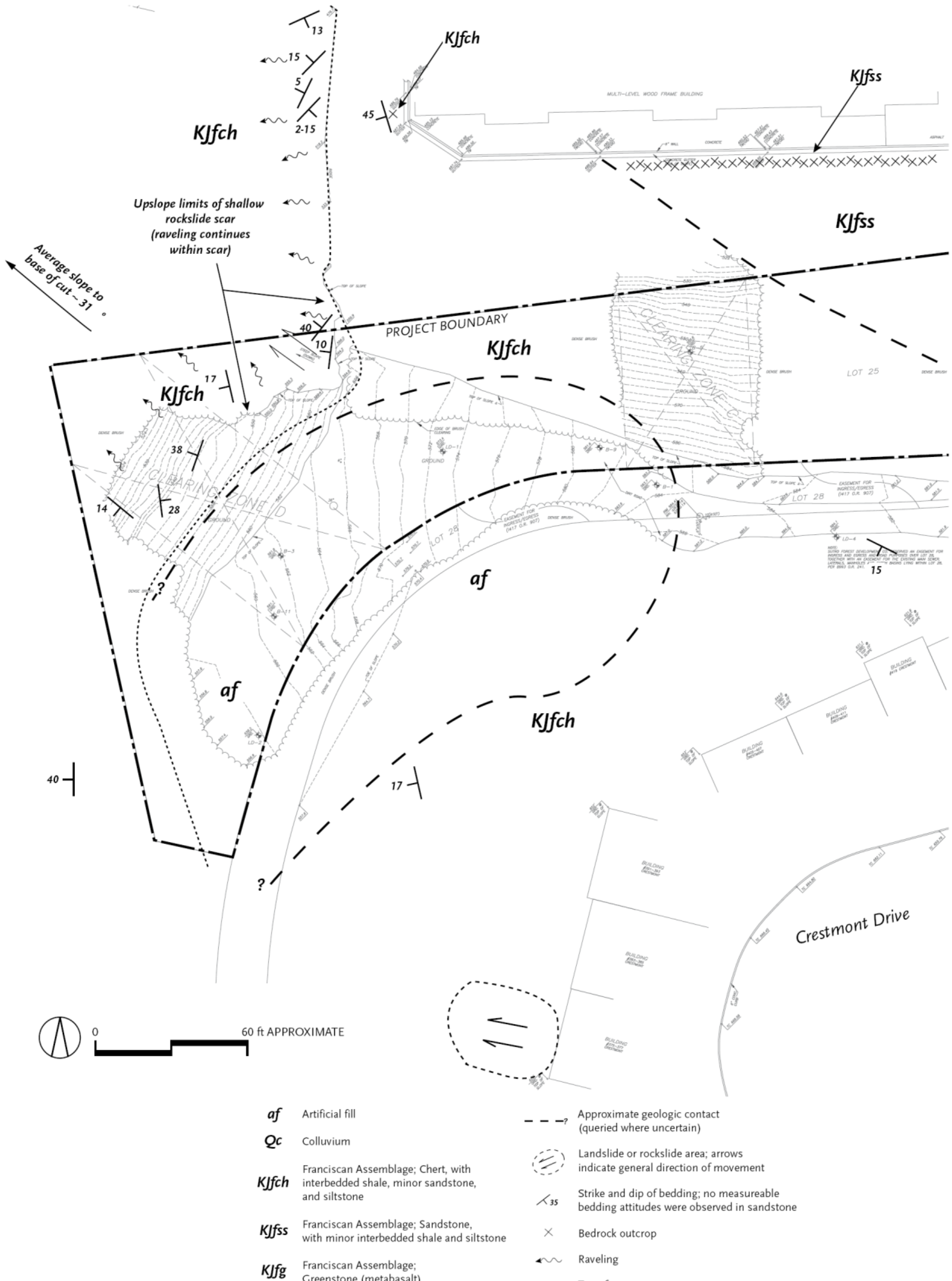
150 The information in this section is from the *Geotechnical Investigation, Crestmont Drive Project, San Francisco, California,* September 29, 2006, updated on December 7, 2010, prepared by Alan Kropp & Associates. Key portions of this report are included in Appendix C of this EIR. The entire report is on file and available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, San Francisco, as part of Case No. 2004.0093E.

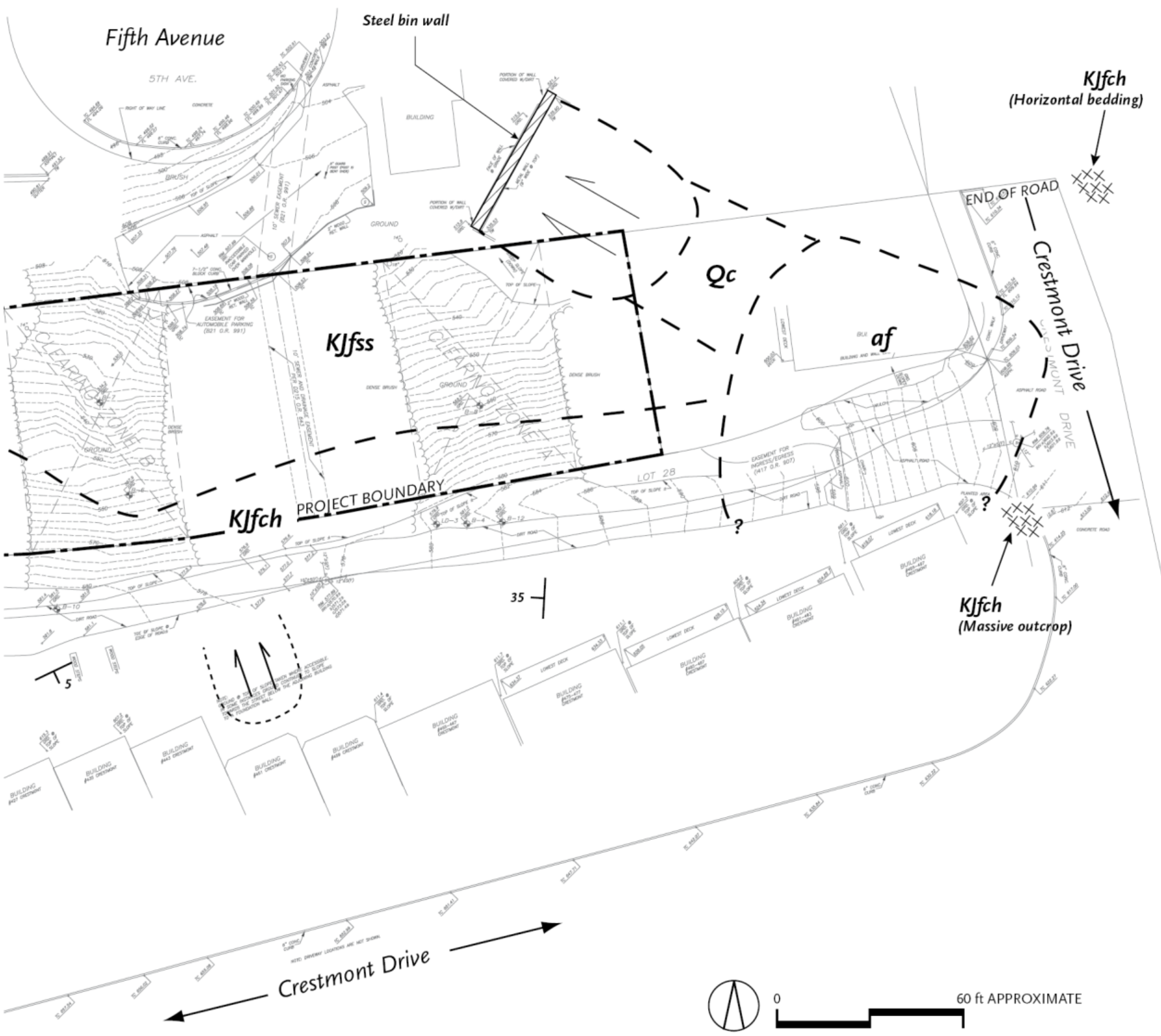
151 Alan Kropp, Principal Engineer, Alan Kropp & Associates, letter report to Gary Testa, San Francisco Overlook Development LLC, *Re: Geotechnical Update, San Francisco Overlook Project, San Francisco, California,* December 7, 2010. This letter is on file and available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, San Francisco, as part of Case No. 2004.0093E.



Source: Alan Kropp & Associates

1·11·12

Geologic Map Figure 21-A



af	Artificial fill
Qc	Colluvium
KJfch	Franciscan Assemblage; Chert, with interbedded shale, minor sandstone, and siltstone
KJfss	Franciscan Assemblage; Sandstone, with minor interbedded shale and siltstone
KJfg	Franciscan Assemblage; Greenstone (metabasalt)

— — —?	Approximate geologic contact (queried where uncertain)
	Landslide or rockslide area; arrows indicate general direction of movement
35	Strike and dip of bedding; no measureable bedding attitudes were observed in sandstone
×	Bedrock outcrop
	Raveling
....	Top of quarry cut

Source: Alan Kropp & Associates

1-11-12

Geologic Map Figure 21-B

swale appeared to be partially filled with colluvium.[152] In the aerial photographs from this time, no indications of instabilities were visible on or near the project site. A small quarry was located between Kirkham Street and Lawton Street in the area of present-day Locksley Avenue (figures 21a and 21b on pages 180–181).

By 1946, some rough grading had occurred in the area of the Kirkham Heights apartment buildings at the end of Fifth Avenue, and further grading had occurred by 1948. During this period, the project site was densely covered with trees. Aerial photographs from 1955 show that dirt haul roads had been excavated in the western portion of the project site and in the area south of the site, some side cast fill[153] had been placed along the edges of the haul roads, the apartments at the end of Fifth Avenue had been constructed, and Locksley Avenue was being roughly graded.

The following is the history of grading that resulted in the dirt road on the south portion of the project site. Grading operations in the vicinity of the project site began in 1958 with the Lawton Heights subdivision, in the area currently occupied by residential buildings at 104 to 184 Locksley Avenue, and 400 to 480 Warren Drive, and extended an additional approximately 360 feet south along Warren Drive. The west end of the existing dirt road on the project site had been graded by 1958, and the graded road extended south of the site. By 1961, the west end of the dirt road had undergone additional grading; however, the grading had not yet reached the eastern end of the dirt road where it currently meets Crestmont Drive. A small road (likely used as a haul road during grading in the vicinity) was observed to cross the north-facing slope of the project site in the area just above an existing bin wall[154] behind the Kirkham Heights apartments at the end of Fifth Avenue (discussed in Fifth Avenue Bin Wall, below on page 187). By 1969, aerial photographs show the area of Crestmont Drive upslope of the project site and that most of the land in this area had been developed. The 1969 aerial photographs show that the dirt road had been graded to approximately its current configuration.

Aerial photographs taken in 1977 indicate that fill had been placed above the dirt road below the 391-393 and 405-407 Crestmont Drive properties, to provide support to a nearly vertical cut just below the two buildings. No major changes were observed since that time, except that all structures on Crestmont Drive had been constructed by 1983, and the trees on the project site appeared to have been recently cleared in

152 C*olluvium:* Soil deposited at the base of a slope by gravity.

153 S*ide cast fill:* Unconsolidated excavated material pushed to the slope below the road, generally not used as part of the road, and steeper than the natural slope.

154 *Bin wall:* A wall consisting of a series of small bin or box-like structures constructed of concrete or corrugated steel, that when placed side by side create a wall. The bins are filled with sand or a similar material, which ultimately forms a gravity retaining structure.

the 2000 photographs. No significant changes in site conditions were observed during site visits in December 2004 and October 2006 by the geotechnical consultant Alan Kropp & Associates.

Quarry

Aerial photographs taken between 1935 and 1958 indicate quarry activities between Kirkham Street and Lawton Street, in the area currently occupied by the northern portion of Locksley Avenue, and eastward into the existing west-facing slope. The 1948 aerial photographs show nearly vertical cuts west of the project site, and by 1955, the quarry had been greatly expanded, and cuts along the east side of the quarry had extended into the project site. By 1958, the slope at the west end of the site had been excavated to a configuration similar to the current condition, a steep cut with small north-south-trending vertical cuts at the top. Some sloughing[155] and erosion on the lower portion of the quarry slope are visible on the 1958 aerial photographs. In addition, the photographs show that excavations at the base of the slope extend below adjacent grades and that a lake had formed. By 1961, the quarry excavation at the base of the slope had been filled and the apartment buildings at 6 and 8 Locksley Avenue had been constructed in approximately the same location. The 1961 aerial photographs indicate that the quarry slope at the west end of the project site had been freshly graded to an inclination of about 1.5:1 (horizontal:vertical), but appeared to be relatively loose.

The quarry slope near the western portion of the project site was described in a 1965 geotechnical report as about 150 feet high and having inclines of 0.75:1 in the upper 75 feet and about 1:1 or flatter in the lower portion of the slope.[156] The slope was reported as stable and free from deep-seated landslides; however, the report indicated that some shallow raveling[157] and sloughing could occur later.

Erosion was visible on the west-facing quarry slope in the 1969 aerial photographs. By 1977, the slope had become covered with brush.

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155 *Sloughing:* A minor collapse of a hill's face.

156 Woodward-Clyde-Sherard & Associates, *Soil Investigation, Sutro Forest Development, Unit 2, (443-495) Crestmont Drive & Sutro Drive, San Francisco, California*, November 8, 1965. This document is on file and available for public review at the Plan Review section of the Department of Building Inspection, Plan Review, 1660 Mission Street, Second Floor.

157 *Raveling:* Downslope movement of easily fractured rock.

A 1997 geologic investigation performed for 478-480 Warren Drive[158] documented that the quarry operations resulted in a gradually sloping area adjacent to Warren Drive and a steep cut bank that extended up the east half of the Warren Drive property from the west side of that property. No evidence of massive rock slides was observed, but the rock unit[159] under this area was intensely sheared and tightly folded with major joint shears[160] and bedding plane[161] shears visible on the rock units. Some slickensides[162] were noted between bedding plane shears in the rock slope. Water was seeping from many of the bedding planes in the rock face.

Aerial photographs taken in 1989 show a possible slide in the quarry cut located north of the western end of the project site. Aerial photographs taken in 1993 show a large shallow slide visible on the slope which may extend into the western end of the project site. The slide scar is still visible in the 1994 aerial photographs.

Miscellaneous Landslides

Several landslides[163] were documented[164] in the immediate vicinity of the project site. Small landslides have been documented[165] in the area downslope of the active springs located between Warren Drive and the northern terminus of Oak Park Drive. Evidence of a possible slide located above the project site's dirt road, about 100 feet south of the site, can be seen on the 1969 aerial photographs.

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158 Hallenbeck-McKay & Associates, *Geotechnical Engineering Inspection, Rear Slope – Sutro Terrace Apartment Buildings, 478-480 Warren Drive, San Francisco, California,* January 21, 1997.This document is on file and available for public review at the Plan Review section of the Department of Building Inspection, Plan Review, 1660 Mission Street, Second Floor.

159 *Rock unit:* The particular body of rocks being discussed, one with surrounding bodies of rock of different composition.

160 *Joint shear:* A fracture in the bedding planes causing a discontinuity in the layers of rock.

161 *Bedding plane:* The surface that separates one layer of stratified rock from the other.

162 *Slickensides:* Smoothed surfaces along planes of weakness in the bedding contributing to an adverse bedding condition.

163 *Landslide:* Large movement of soil and subsoil downslope relatively quickly. A deep-seated landslide could include weathered bedrock.

164 Smith-Emery Geoservices, *Report on Landslide Investigation, Hillside Between 400-402 Warren Drive & North End of Oak Park Drive, San Francisco California,* July 10, 1998. This document is on file and available for public review at the Plan Review section of the Department of Building Inspection, Plan Review, 1660 Mission Street, Second Floor.

165 Harding Associates, *Foundation Investigation, Proposed Apartment Buildings – Locksley Avenue, San Francisco, California*, February 15, 1961. This document is on file and available for public review at the Plan Review section of the Department of Building Inspection, Plan Review, 1660 Mission Street, Second Floor.

An earthflow[166] occurred in the vicinity of the 302 to 340 Warren Drive residential buildings (southwest of the project site) following the construction of Warren Drive in the fall of 1962.[167]

The 1975 aerial photographs show that small slides had occurred to the south of the western end of the site, both above and below the existing dirt road. These landslides were close to the south edge of the site but did not extend into the site. No additional landslide was visible within the site.

Some sloughing and raveling were noted on portions of the existing slope above the dirt road on the project site. A small slide having a depth of approximately 4 to 5 feet was observed just above the road at the bottom of the 451 Crestmont Drive property (south of the middle portion of the project site). This slide was about 40 feet long at the bottom of the lot on the slope just above the road. Shallow raveling was observed on the steep rock slope of the 375 to 411 Crestmont Drive properties (five lots south of the western portion of the project site). There was no indication of any large landsliding or major instability.

Indications of shallow landslides were observed on the steep slope behind the property of 375-377 Crestmont Drive, during the initial site visits conducted in 2004 before the winter of 2005/2006 as part of the geotechnical investigation for the project. The subsurface materials consisted of about one foot to four feet of soils overlying interbedded chert and shale bedrock. The landslides occurred within the upper four feet of surficial soils and were caused by the steep slope (approximately 1:1) and saturation of the surficial soils. During a subsequent site visit on October 2, 2006, the geotechnical consultant Alan Kropp & Associates noted that new slides had occurred on the steep slopes downhill of the home at 391 Crestmont Drive, south and upslope of the project site. The materials deposited by these slides appeared to be within the open space area controlled by the Mount Sutro Woods Homeowners Association, uphill of the San Francisco Overlook Development project site. This area of sliding was similar to the slippage downhill of the home at 375 Crestmont Drive, described above.

A shallow slide occurred on a private road behind the properties of 455, 475, and 485 Warren Drive (west and southwest of the project site). The likely causes of the slide were heavy precipitation, surface runoff from an upslope driveway, improper functioning of a concrete drainage ditch, and leaks of the sewer line beneath the driveway.

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166 *Earthflow:* Rapid movement of muddy or slippery soil mass, usually caused by high precipitation or snowmelt; mudflow.

167 Dames & More, *Geotechnical Investigation, Warren Drive Slide Area Stabilization, San Francisco California,* March 6, 1980. This document is on file and available for public review at the Plan Review section of the Department of Building Inspection, Plan Review, 1660 Mission Street, Second Floor.

In addition to the landslides documented in previous studies, a portion of an existing landslide located at the northeast corner of the project site was observed. This landslide is predominantly an off-site, upslope feature, but an approximately 400-square-foot area of the landslide extends into the northeast corner of the project site.

Warren Drive Landslide

An earthflow occurred in the vicinity of 302 to 340 Warren Drive, south of the project site, following the construction of Warren Drive in 1962. The earthflow was repaired by excavating a keyway,[168] by keying[169] and by benching[170] compacted fill materials, and excavating two benches on the slope. No drainage was installed as part of the repair. Shallow sloughing and several minor slides were identified after the slope repair. A landslide occurred in the same vicinity in 1979, during the excavation for building pads along Oak Park Drive. The slide was approximately 140 feet long, 160 feet wide, and extended as far as about 18 feet below grade. Following the slide, which destroyed the residence at 328 Warren Drive, the City and County of San Francisco engaged a contractor to place a buttress[171] from the edge of Warren Drive to the uphill limits of the landslide. Other temporary corrective measures included placing a buttress fill over the toe of the slope,[172] backfilling the tension cracks, installing survey points to monitor movement, temporarily evacuating residences at 332 Warren Drive and 505, 509, and 515 Oak Park Drive, demolishing the destroyed residence at 328 Warren Drive, and removing the foundation elements of 328 Warren Drive that were impinging on the house at 332 Warren Drive. Within one week after implementation of these measures, the monitoring points indicated that the slide had stabilized. A geotechnical report prepared after the 1979 slide called for a retaining wall system, which was subsequently installed.[173]

Warren Drive Rock Bolt Repair

Located west and downhill of the project site, the site of the 478-480 Warren Drive residential building was originally a hill from which rock had been quarried. The quarry operations resulted in a gradually

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168 *Keyway:* A channel dug into existing soil and addition of new soil. Its purpose is to provide a firm stable contact between the existing material and the new fill that is to be added.

169 Keying: Digging a channel (keyway) into existing soil and adding new soil.

170 *Bench:* A relatively level step, excavated into a slope on which fill is to be placed. Its purpose is to provide a firm stable contact between the existing material and the new fill that is to be placed.

171 *Buttress:* A structure built against a wall for support or reinforcement.

172 *Toe (of a slope):* The bottom of a slope or height, where the ground becomes horizontal, however briefly.

173 John V. Lowney & Associates, *Geotechnical Investigation, Warren Drive Slide, San Francisco California*, August 31, 1979.

sloping building area on the western half of the property and the steep cut bank that extends up the eastern half of the property. Excavations made at the toe of the rock slope during the construction of the 478-480 Warren Drive residences caused rockfalls and sloughing in the immediate area. The rock slope was considered safe against deep-seated or massive sliding, but could be prone to occasional rock fall. The terms "deep-seated" and "massive" in this context refer to slope failures occurring along planes of weakness at depths of five to ten feet, or deeper, within the bedrock. Due to the potential for rock fall near the surface, installation of rock bolts[174] was recommended in a 1974 geotechnical study.[175] Rock falls occurring in the winter of 1974/1975 highlighted the need for rock bolts in the lower portion of the slope and for maintenance of the slope to remove overhanging and/or loose rocks. A total of 83 rock bolts were installed, of which all but six were drilled to a depth of 15 feet or deeper. In addition, 38 hydraugers[176] were installed to a depth of ten feet at an upward angle and encased with a perforated pipe in order to facilitate the flow of water. Weep holes[177] also were installed at various locations, and a chain-link fence was installed above the rock bolt facing to contain debris from shallow raveling and sloughing on the slope above the rock wall.

Fifth Avenue Bin Wall

A bin wall is located downslope of the eastern end of the project site, behind the property of 1580 Fifth Avenue. The face of the bin wall is constructed of interlocking metal bin elements that are approximately ten feet long and one foot high. These elements form a bin wall that is approximately 40 feet wide and 15 feet tall relative to the adjacent pavement surface behind 1580 Fifth Avenue. It appears to have been constructed in the mid-1950s, most likely to restrain a landslide up to about 20 feet in depth that developed in the swale upslope of the bin wall. The landslide may have been triggered by the placement of fill within the swale area. The bin wall generally appears to be performing satisfactorily, with the exception of debris and/or colluvium deposits that have accumulated behind the wall.

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174 *Rock bolt:* Metal rod driven into a rock face to provide stability and prevent rock fall.

175 Hallenbeck-McKay & Associates, *Inspection of Slope and Recommended Treatment, Warren Drive Apartment Project, Mt. Sutro Terrace – San Francisco,* April 30, 1974.

176 *Hydrauger:* A small pipe installed horizontally inside earth embankments for the removal of water.

177 *Weep holes or weeper holes:* Small openings in masonry or concrete walls, typically located near the bottom of the wall, to permit water to pass through the structure without endangering structural integrity.

Kirkham Avenue Soil Nail Slope Repair

A slide developed downslope of the 1550 Fifth Avenue residential building (north and downhill of the project site) and extended partially behind an existing wood lagging[178] retaining wall. Aerial photographs suggest the slide occurred between 1993 and 2000. Plans called for a soil nail slope repair[179] to extend approximately 100 feet parallel (east-west) to the extension of Kirkham Street and up to 33 feet southward toward 1550 Fifth Avenue, with the eastern portion of the nail slope repair located upslope and behind the existing wood lagging retaining wall. The soil nail slope repair was to include three rows of soil nails spaced eight feet apart, with the nails in each row installed five feet on center horizontally. The soil nails were to extend 28 to 42 feet into the hillside at angles varying from 50 to 60 degrees downward relative to horizontal. The planned repair also included downhill and uphill keys consisting of perforated pipe embedded within drain rock, and two rows of weep holes. City records contain no permit for this repair, and the area of possible repair was not observed by the geotechnical consultant to determine if this recommended slope repair was implemented.[180]

Eighth Avenue Slope Stabilization

Residences were constructed along the east side of Eighth Avenue, between Moraga and Ortega streets (southwest of the project site), from the early 1900s through the 1930s. Several of the buildings have experienced downhill creep movements, and some moved as much as about six inches as a result of the 1957 Daly City earthquake. The Loma Prieta earthquake of 1989 triggered movements that resulted in both vertical and lateral displacements. The slope consists of a deep deposit of largely loose dune sand that had been undergoing creep movements prior to the Loma Prieta earthquake, which accelerated the rate of creep. A conceptual design study recommended a soldier pile/tie-back retaining wall as remediation, but documentation of construction of this remediation is not available. The geotechnical conditions at this area along Eighth Avenue, which is underlain by loose dune sand, are different from, and not applicable to, the project site, which is underlain by bedrock.

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178 *Lagging:* Lagging is a common earth retention system. Wooden piers (or soldier piers) are driven into the ground at even intervals, deep enough to reach bedrock or a soil layer that is competent (not unstable and able to provide resistance to soil movement above), and wooden planks are bolted across them to form an earth retaining wall.

179 *Soil nail slope repair:* Grouted steel reinforcing bars, called nails, inserted into closely spaced drilled holes in a slope or excavation to reinforce the ground. Normally, a construction facing of shotcrete reinforced with welded wire mesh is placed over the nailed area.

180 Alan Kropp, Alan Kropp & Associates, email to Adam Phillips, Adam Phillips Design, March 2, 2011. This document is on file and available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, San Francisco, as part of Case No. 2004.0093E.

Foundations of Existing Off-site Structures

In general, the existing residences located along Crestmont Drive, upslope of the project site, are supported either on foundations consisting of a combination of drilled piers[181] and footing[182] foundations, or entirely on drilled piers. Grade beams[183] are generally included. The apartment buildings at the base of the slope on Warren Drive, Locksley Avenue, and Fifth Avenue are supported on shallow footing foundations.

GEOLOGY OF SITE AND VICINITY

Regional Geologic Setting

The oldest widespread rocks within the region are the Franciscan Formation, which, within the city of San Francisco, consists chiefly of sheared sandstone and shale, greenstone (a metavolcanic rock), chert (a silicious sedimentary rock) and serpentinite. The Franciscan Formation has been extensively deformed by past episodes of faulting and folding. Geologic structure within the Franciscan rocks is typically complex and the rocks are commonly extensively sheared and fractured. In San Francisco, the Franciscan bedrock is locally overlain by sediments of the Quaternary age. These marine and non-marine deposits generally consist of clay, silt, sand, and gravel. In San Francisco, these deposits include large areas of Bay Mud, windblown dune sand, colluvium, and alluvium. In addition, large areas of man-made fill have been placed in many areas, including the project area.

Local Geology

The site and the upper portions of Mount Sutro are underlain by chert of the Franciscan Formation. These rocks consist of hard, brittle chert with thin interbeds of shale, having low to moderate fracture permeability, thin bedding, and closely spaced fracturing, and are considered to be non-expansive. The lower slopes to the west and north of the site consist of greenstone, chert, or sandstone, which are also considered part of the Franciscan Formation. The swale to the north of the site contains a deposit of slope

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181 *Drilled piers:* Columns placed into the ground to provide soil and slope stability. The pier shaft is excavated and the pier material poured in or installed.

182 *Footings:* Footing foundations typically include Spot Footings, which are a spot or pad footing is used to support a single point of contact, such as under a pier or post., and Continuous Spread Footings, which are used to provide a stable base around the entire perimeter of a structure.

183 *Grade beam:* A type of foundation system used to distribute the weight of a building over unstable soil, consisting of a continuous reinforced-concrete member. The grade beam may sit directly on the loose soil, or be supported by pipe pilings that extend deep underground. Builders then position a series of piers or foundation walls on top of the beam to support specific building components.

debris and ravine fill, consisting of rock fragments in a matrix of sand, silt, and clay. The low-lying areas west of the site are underlain by windblown dune sand.

Ground failures triggered by earthquakes have not been reported at the site or in the immediate vicinity during previous historic earthquakes.

Faulting and Seismicity

Seismicity in the San Francisco area is primarily related to activity on the San Andreas fault system, including major active faults both east and west of the site. The principal active faults in the vicinity are the San Andreas, 5 miles to the west; the San Gregorio, 7.5 miles to the west; the Hayward, 13.5 miles to the northeast; the Calaveras, 24 miles to the east; the Rogers Creek, 19 miles to the north; and the Concord-Green Valley, 27 miles to the east. The project site is not within an Alquist-Priolo Earthquake Fault Zone established around known active faults. The closest known active fault to the Mount Sutro/Forest Knolls/Clarendon Heights area is the San Andreas.

The California Geological Survey (CGS) released a map of the project vicinity that indicates areas that may be prone to earthquake-induced ground failure during a major earthquake.[184] The map indicates that sufficient concern exists in these designated areas to merit a site-specific evaluation. The project site is in an area that may be subject to earthquake-induced landslides.

SURFACE CONDITIONS

Surface Improvements

The project site is located on the northwest slope of Mount Sutro, south of the terminus of Fifth Avenue and north and west of Crestmont Drive. The site is accessible via a dirt road that extends from Crestmont Drive (between the 505-507 and 495-497 Crestmont Drive properties) to the west end of the project site. There is an existing sanitary sewer/storm drain under the dirt road area with an easement that extends down the slope in the east portion of the site to Fifth Avenue (see Storm Drain/Sanitary Sewer on Existing Road, below).

Existing residential structures, consisting predominantly of single-family residences and duplexes, are located upslope to the south of the site (375 through 497 Crestmont Drive). One two-unit residential

[184] California Geological Survey, *"Seismic Hazard Zone Report of the City and County of San Francisco 7.5-Minute Quadrangle, San Francisco County, California," Open File Report 2000-009*, 2001.

structure (505-507 Crestmont Drive) is east of the site. The foundations of these residences are discussed in History of Site and Vicinity, Foundations of Existing Off-site Structures, above, on page 189.

Topography

Elevations of the dirt road from mean sea level (msl) vary from about 560 feet msl at the southwest end of the road to about 610 feet msl at Crestmont Drive. To the north and west of the dirt road, the site has a steep downward slope with a gradient of about 1.5:1 (horizontal:vertical), with some steeper areas. North of the project site's dirt road, the slope drops down to approximately elevation 520 feet msl near the end of Fifth Avenue, north of the site. To the west, the site drops approximately 200 feet towards Warren Drive.

The topographic survey for the project indicates that Crestmont Drive above the west end of the project site is at elevation approximately 625 to 650 feet msl. Above the east end of the project site, Crestmont Drive is at elevation approximately 625 feet. The elevation difference between Crestmont Drive and the project site's dirt road is 65 to 90 feet in the west portion of the project site and 15 feet in the east portion of the project site. The toe of the slope below Crestmont Drive appears to vary relative to the edge of the project site's existing road. The estimated slope gradient generally varies from about 2:1 to 1:1, and may be steeper in some areas.

Vegetation

The slopes above and below the dirt road on the project site are covered with vegetation and trees, with the exception of four swaths approximately 50 feet wide on the lower slope below the dirt road, which were partially cleared in the summer of 2004 to facilitate the geotechnical investigation. In these areas, the ground surface is covered with abundant remnants of felled trees and accumulated organic debris, which suggest that they have been cleared previously.

Erosion

The east portion of the dirt road on the project site contains incised erosion gullies where surface waters flow from the concrete apron from Crestmont Drive at the east edge of the road onto the dirt section of the road. In December 2004, the project's geotechnical consultant team conducted a site reconnaissance, and found the erosion scars were approximately four to six inches deep and extended approximately 140 feet west from the concrete apron at the east end of the dirt road. There is some minor erosion occurring on the slopes above the dirt road, probably due to a concentration of water runoff. In addition, the steep slope contains some trenches with buried pipes, and has some erosion. In some locations, drain pipes are exposed on the slopes. During the December 2004 site reconnaissance, there was running water exiting the toe of the slope onto the dirt road below the residences at 465-467 and 475-477 Crestmont Drive. The sound of running water in a conduit was detected; hence, a ruptured lateral drain line in this area was suspected. During an October 2, 2006 site visit, the geotechnical consultant team found that the ruptured drain line had apparently been repaired: some excavations in the area were found, and there was no sound of flowing water.

Existing Fill

Portions of the site are underlain by fill soils, which were placed at various times, starting in the 1950s. As discussed below, fills are present along the dirt road and the temporary haul roads at the west end of the project site (noted above under History of Site Vicinity, beginning on page 179), and within a previous swale located off-site and immediately east of the project site.

The earliest grading activities on the project site, which occurred before 1955, consisted of haul roads in the west portion of the site. By 1958, the west section of the dirt road on the project site had been graded. The grading of the rest of the dirt road was completed by 1969. Grading for the Lawton Heights and Forest Knolls Unit No. 3 (which appears to include the project site and extends south at least to Devonshire Way) was completed in 1959. Apparently, this grading included fills on the project site along the downslope portion of the existing dirt road, and side cast fills for temporary haul roads.

The existing dirt road apparently was graded by cutting into the upslope portion of what would become the road's path and placing fill on the downslope portion. Borings conducted during the geotechnical investigation indicate that this fill varies up to about four feet in thickness.

Some temporary construction haul roads also were graded on the west-facing slope of the project site. These roads may have been created in a manner similar to the dirt road on the site, as they were graded for the same purpose and at roughly the same time. Minor fills associated with grading were not found at the subsurface exploration locations during the geotechnical investigation.

The discovery of fill overlying native soils in a test boring along the downslope margin of the dirt road suggests that the fill for the dirt road, described above, were not keyed into bedrock or placed in a manner that would be acceptable under current geotechnical engineering standards of practice.

Fill in the west portion of the site was found in several subsurface exploration locations, varying from about 7 to 11 feet in depth. Based on aerial photographs, this fill was placed during quarry operations prior to 1958, and additional fill was later placed to form a fill slope above the dirt road on the site and below the residences at 391 to 407 Crestmont Drive. The fill in this area appears to be moderately compacted but was not placed in thin lifts.[185] In addition, some wood debris is present in the fill. The project's geotechnical investigation concluded that the fill was not placed in accordance with generally accepted geotechnical engineering standards.

Fill was placed in the swale east of the project site, which extends from the current location of the bin wall at the south end of Fifth Avenue, downslope of the residences at 491-493 and 495-497 Crestmont Drive. Historic documentation suggests that the fill is as much as about 20 feet thick in this area. The majority of the swale fill is located off-site; however, a portion of the fill extends beneath the eastern portion of the dirt road. Documentation regarding placement of this fill is not available, but based on knowledge of other known fills in the area, the geotechnical investigation concluded that this fill likely was not placed in accordance with generally accepted geotechnical engineering standards.

In summary, the existing fills on the project site were not placed in accordance with current engineering standards. Fill soils improperly placed on moderate slopes will have a tendency to creep[186] downhill. In addition, these fill materials could settle[187] if loads were to be applied directly to them.

Outside the project site, a substantial amount of fill has been placed in the vicinity of the existing upslope structures on Crestmont Drive. The fill appears in aerial photographs which indicate that the fill had been placed in the late 1950s and 1960s, and is estimated to be about 15 feet thick. By 1969, the majority of the existing upslope residences had been constructed.

A shallow slide was previously documented by aerial photographs on the slope above the dirt road and below 451 Crestmont Drive. This slide may have been partially triggered by the existing fill placed for grading for the upslope development, and could reactivate and affect the proposed new private road.

A portion of the slope below the properties of 391 to 407 Crestmont Drive is composed of fill, which extends from the southern edge of the dirt road some distance up the slope. The fill may have been placed to support a steep cut formerly present in that area.

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185 *Lift:* A layer of soil, either excavated or fill. During lagging, a lift is an excavation downwards, followed by more lagging. During backfilling, a lift is a layer of soil added to the excavation and then compressed, followed by another layer.

186 *Creep:* Movement of soil and subsoil downslope that is invisible to the naked eye.

187 *Settling:* Compaction of soil from a downward load placed on it, such as gravity or a structure above.

Information regarding handling of spoils[188] during pier drilling operations for the upslope residences could not be found. However, the geotechnical investigation states that if the spoils were left in a loose condition on the slope, this would create a ground condition prone to accelerated erosion and shallow instability in the project area.

Native Soils

In the project area, the native soils form a relatively thin mantle over the underlying bedrock materials, generally less than five feet thick. Because of the steepness of the slopes, there will be some tendency for the native soils to creep downslope, and there may also be some shallow sloughing[189] within the native soils.

SUBSURFACE CONDITIONS

A subsurface investigation consisting of twelve small diameter borings and four large diameter borings found that the site is underlain by two distinct bedrock units, both of which are a part of the Franciscan Assemblage of the Mesozoic Age. In all borings, Franciscan Assemblage bedrock was encountered within 11 feet of the existing ground surface, and was present at much shallower depths than 11 feet in most portions of the site. The test borings conducted at the site typically extended to depths of 50-65 feet and always encountered one or both of the bedrock units; no other bedrock units were encountered. The upper bedrock unit consists principally of very thin-bedded chert with some interbedded shale, siltstone, claystone, and sandstone. Rocks within this unit typically range from weak to moderately strong and are closely to intensely fractured. The lower bedrock unit consists of brown to yellowish-brown sandstone with small amounts of interbedded shale. Typically, the sandstone is moderately to closely fractured, weak to moderately strong, and very thick bedded. The amount of interbedded shale is relatively minor in most areas and the shale typically consists of dark gray shale that is weak, closely to intensely fractured, and very thin bedded.

The contact between the chert and sandstone units appears to be a depositional contact.[190] There is little or no evidence of shearing along this contact. In addition, very little shearing was observed within either of the bedrock units. Very little clay is present within either bedrock formation. Clay seams were not found

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188 *Spoils:* Refuse material removed by drilling or excavating.

189 *Shallow sloughing*: Surficial sloughing.

190 *Depositional contact:* Material that will eventually form a sandstone bedding layer has been directly deposited on the underlying bedding layer and then undergone concretization (consolidation) to become the overlying sandstone rock unit. The sandstone rock layer has not been formed elsewhere, and arrived by tectonic faulting and folding movement.

along bedding planes within either unit. Occasional discontinuous seams of clay were observed along some fractures and bedding planes; however, these clay seams do not appear to be laterally continuous. The lack of continuous clay seams, the paucity of clay deposits, and the lack of shearing contribute to slope stability.

The test borings indicate that the contact between the chert and sandstone is relatively flat-lying in the central and east portions of the site and typically ranges from about 10 to 30 feet below the ground surface in that area. In the west portion of the site, the chert unit thickens abruptly and the contact between the chert and sandstone plunges steeply to the west. The site reconnaissance found that chert is present along the entire cut slope in the west end of the site, and extends down to the parking lot of the Avalon Sunset Towers Apartments. The geotechnical investigation concluded that although the orientation is adverse with respect to the cut slope at the western end of the project site, the chert has been folded, resulting in an undulating bedding surface, and that stability of the entire slope is not a concern.

HYDROLOGIC CONDITIONS

Groundwater

Groundwater was recorded in 8 of the 16 test borings (groundwater observations were not made in the remaining borings due to the rotary wash drilling method used). Groundwater was not found in five of the borings. In the other three borings, the overall amount of water was relatively minor and was limited to isolated zones of seepage, which appear to be flowing along fractures in the rock at depths ranging from 9 to 56 feet.

Springs and Seepage

No spring or area of seepage was observed during a geologic reconnaissance of the project site.

Historically, active springs were observed off-site during exploration and grading activities in the late 1950s for the Lawton Heights and Forest Knolls subdivisions (south of the project site), and seepage was observed in the upper 8 feet of borings drilled downslope of the active spring area. Several small landslides were documented in this area.

A geologic investigation for the development of the 478-480 Warren Drive residences, located due west and downhill from the project site, documented water seeping from many of the bedding planes in the rock face above the apartment building.[191]

Several seepages were observed on the slope between the residential buildings of 128 through 140 Locksley Avenue and 455 through 385 Warren Drive, which are located southwest of 478-480 Warren Drive.

Storm Drain/Sanitary Sewer on Existing Road

The geotechnical investigation noted that a 10- to 12-inch diameter sewer/storm drain main appears to be present underneath the dirt road on the project site, within the private easement. Three manholes are located along this alignment, one at an eastern high point on Crestmont Drive, the second at the low point in the middle of the dirt road, and the third at the western high point on the dirt road. A 12-inch diameter pipe extends from the east manhole and slopes west, generally to the underground area of the middle manhole, and a 10-inch diameter pipe extends from the west manhole and slopes east, generally to the middle manhole underground area. A 12-inch diameter pipe extends from the middle manhole underground area and slopes north (downslope) toward Fifth Avenue.

Several lateral pipes enter the three manhole junctions. A six-inch diameter lateral pipe enters the west manhole from the upslope properties. A 10-inch diameter lateral pipe enters the middle manhole from the upslope properties. Three 12-inch diameter lateral pipes enter the east manhole from the north, east and south.

REGULATORY SETTING

Existing laws and regulations that stipulate a regulatory process to address seismic and geologic safety of new construction are described below.

California Regulations to Address Seismic Hazards

Introduction

California has passed several laws regulating development and construction in areas susceptible to seismic hazards. One of the first was the Field Act in 1933, which required public schools to be

191 Hallenbeck-McKay & Associates, *Geologic Investigation, 99-Unit Apartment Development – Warren Drive, San Francisco, California,* 21 December 1972.

constructed to withstand earthquake shaking without collapse. More recently, the Alquist-Priolo Earthquake Fault Zoning Act of 1972 prohibited construction over active fault traces. In 1990, the State passed the Seismic Hazards Mapping Act (SHMA) to protect public safety from the effects of strong ground shaking, liquefaction, landslides, or other ground failures or hazards caused by earthquakes. Although the proposed San Francisco Overlook Project site is not within an Alquist-Priolo Earthquake Fault Zone, it is in an area designated by the California Geological Survey (CGS) as an area that may be prone to earthquake-induced ground failure during a major earthquake. Because of this, site design and construction must comply with the SHMA and guidelines for evaluating and mitigating seismic hazards prescribed under Special Publication 117A of the California Department of Conservation. In addition to the SHMA, adequate investigation and mitigation of failure-prone soils is also required by the mandatory provisions of the *California Building Code* (CBC, California Code of Regulations, Title 24). The City and County of *San Francisco Building Code* has adopted the CBC with certain local amendments.

These stringent state and local regulatory requirements exist to ensure the exposure of people or structures to substantial risk of loss, injury, or death due to significant damage or collapse of a newly constructed building in a seismic event is less than significant. The requirements have been developed after years of study and the observed performance of structures throughout history during previous significant earthquakes such as Loma Prieta and others around the world. The codes provide a methodology for assessing the potential ground shaking at a particular project site using the relative distance to known active faults.

The following sections describe the relevant requirements of the SHMA, the CBC, and local ordinances.

Seismic Hazard Mapping Act

The purpose of the SHMA is to protect public safety from the effects of strong ground shaking, liquefaction, landslides, or other ground failure. The SHMA establishes a statewide public safety standard for reduction or avoidance of earthquake hazards. This means that the minimum level of hazard reduction measures for a project should reduce the risk of ground failure during an earthquake to a level that does not cause the collapse of a building intended for human occupancy, but in most cases, not to a level of no ground failure at all.[192]

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192 In this context, "minimum" does not imply the least amount of reduction. Reduction or avoidance measures and design requirements must meet the state's high standard of protecting public safety. This standard is the minimum requirement and the guideline for state and local code requirements under the SHMA and the CBC. Projects must meet, but can exceed, the comprehensive and exacting requirements necessary to meet this high, minimum standard.

Special Publication 117A (SP-II7A) is the guideline for evaluating seismic hazards related to ground shaking and for determining reduction or avoidance measures as required by the Public Resources Code Section 2695(a). The objectives of the guideline are to assist in the evaluation and reduction or avoidance of earthquake-related hazards for projects within designated zones of required investigations and to promote uniform and effective statewide implementation of the evaluation and reduction or avoidance elements of the SHMA. SP-117A assists owners or developers seeking approval of specific development projects within a Seismic Hazard Zone and assists the lead agency's technical review of a project's geotechnical conditions and reduction or avoidance measures. The methods and procedures contained in SP-II7A are those which the State Mining and Geology Board, the Seismic Hazard Mapping Act Advisory Committee, and its Working Groups have determined are currently representative of quality practice.

The State's criteria that meet the standard required for project approval within zones of required investigation are defined in CCR Title 14, Section 3724, from which the following has been excerpted:

> "The following specific criteria for project approval shall apply within seismic hazard zones and shall be used by affected lead agencies in complying with the provisions of the Act:
>
> (a) A project shall be approved only when the nature and severity of the seismic hazards at the site have been evaluated in a geotechnical report and appropriate mitigation[193] measures have been proposed.
>
> (b) The geotechnical report shall be prepared by a registered civil engineer or certified engineering geologist, having competence in the field of seismic hazard evaluation and mitigation. The geotechnical report shall contain site-specific evaluations of the seismic hazard affecting the project, and shall identify portions of the project site containing seismic hazards. The report shall also identify any known off-site seismic hazards that could adversely affect the site in the event of an earthquake. The contents of the geotechnical report shall include, but shall not be limited to, the following:
>
> > (1) Project description.
> >
> > (2) A description of the geologic and geotechnical conditions at the site, including an appropriate site location map.
> >
> > (3) Evaluation of site-specific seismic hazards based on geological and geotechnical conditions, in accordance with current standards of practice.
> >
> > (4) Recommendations for appropriate mitigation measures as required in Section 3724(a), above.

193 In the context of the SHMA, "mitigation" refers to measures that reduce earthquake hazards, rather than the Mitigation Measures that are identified in this EIR, which are required by the California Environmental Quality Act (CEQA) to reduce or avoid environmental impacts of the proposed project.

(5) Name of report preparer(s), and signature(s) of a certified engineering geologist and/or registered civil engineer, having competence in the field of seismic hazard evaluation and mitigation.

(c) Prior to approving the project, the lead agency shall independently review the geotechnical report to determine the adequacy of the hazard evaluation and proposed mitigation measures and to determine the requirements of Section 3724(a), above, are satisfied. Such reviews shall be conducted by a certified engineering geologist or registered civil engineer, having competence in the field of seismic hazard evaluation and mitigation."

California Building Code, Title 24

The CBC is part (Part 2) of the California Code of Regulations, Title 24, also referred to as the California Building Standards Code. Title 24 sets forth the fire, life-safety and other building-related regulations applicable to any structure fit for occupancy statewide for which a building permit is sought. Title 24 establishes general standards for the design and construction of buildings, including provisions related to seismic safety. The CBC provides standards that must be met to safeguard life or limb, health, property, and public welfare by regulating and controlling the design, construction, quality of materials, use and occupancy, location, and maintenance of all buildings and structures within its jurisdiction. Title 24 applies to all occupancies in California except for modifications adopted by state agencies and local governing bodies. The current 2010 CBC incorporates, by adoption, the 2009 edition of the International Building Code of the International Code Council with the California amendments. These amendments include significant building design and construction criteria that have been tailored for California earthquake conditions.

The California Building Standards Commission (CBSC), established in 1953 by the California Building Standards Law, is an independent commission within the State and Consumer Services Agency. Commission members are appointed by the Governor, confirmed by the State Senate, and include building and construction design professionals. The CBSC is charged with many tasks associated with the CBC including review and approval of building standards proposed and adopted by state agencies, codifying and publishing approved building standards in one state building standards code (California Code of Regulations, Title 24), administering California's building code adoption processes, and resolving conflict, duplication, and overlap in building standards.

Chapter 18 of the CBC, Soils and Foundations, specifies the level of soil investigation, required by law in California, with which the San Francisco Overlook Project must comply. Requirements in Chapter 18 apply to building and foundations systems and consider reduction of seismic hazards. The provisions outlined in the following excerpted sections apply to the regulatory context of the proposed project and its geotechnical characteristics.[194]

Section 1802.1: Foundation and soils investigations shall be conducted in conformance with Section 1802.2 through 1802.8. Where required by the building official, the classification and investigation of soil shall be made by a registered design professional.

Section 1802.2: The owner or applicant shall submit a foundation and soils report to the building official if certain conditions exist on the project site or certain foundation strategies are proposed. These conditions/foundations include questionable soils (Section 1802.2.1), groundwater table (Section 1802.2.3), pile and pier foundations (Section 1802.2.4) and Rock Strata (Section 1802.2.5).

Section 1802.7 Engineering Geologic Reports

Section 1802.7.1 Geologic and earthquake engineering reports shall be required for all proposed construction. The purpose of the engineering report shall be to identify geologic and seismic conditions that may require mitigations. The reports shall contain data which provide an assessment of the nature of the site and potential for earthquake damage based on appropriate investigations of the regional and site geology, project foundations conditions and potential seismic shaking at the site. The report shall be prepared by a California certified engineering geologist in consultation with a California-registered geotechnical engineer.

The preparation of the engineering geologic report shall consider the most recent California Geological Survey (CGS) Note 48 (Checklist for the Review of Engineering Geology and Seismology Reports California Public Schools, Hospitals, and Essential Services Buildings). In addition, the most recent version of CGS Special Publication 42: Fault Rupture Hazard Zones in California, shall be considered for projects sites within an Alquist-Priolo Earthquake Fault Zone. The most recent version of CGS Special Publication 117A: Guidelines for Evaluating and Mitigating Seismic Hazard in California, shall be considered for project sites proposed within a Seismic Hazard Zone. All conclusions shall be fully supported by satisfactory data and analysis.

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194 Please note that the CBC Sections provided in this chapter is a partial selection that represents those most relevant to the mitigation of the potential seismic hazards.

The report shall include, but not be limited to, the following:

1. Geologic investigation.
2. Evaluation of the known active and potentially active faults, both regional and local.
3. Ground motion parameters, as required by Section 1613 and ASCE 7.
4. Evaluation of slope stability at or near the site, and
5. The liquefaction and settlement potential of the earth materials in the foundation.

Section 1802.8 Geotechnical and Supplemental Ground-Response Reports

1802.8.1 Geotechnical Report. The geotechnical report shall provide completed evaluations of the foundation conditions of the site and the potential geologic/seismic hazards affecting the site. The geotechnical report shall include, but shall not be limited to, site-specific evaluations of design criteria related to the nature and extent of foundation materials, groundwater conditions, liquefaction potential, settlement potential and slope stability. The report shall contain the results of the analysis of problem areas identified in the engineering geologic report. The geotechnical report shall incorporate estimates of the characteristics of site ground motion provided in the engineering geologic report. The geotechnical report shall be prepared by a geotechnical engineer registered in the state of California with the advice of the certified engineering geologist and other technical experts, as necessary. The approved engineering geologic report shall be submitted with or as part of the geotechnical report.

City and County of San Francisco Building Ordinances and Review

Ordinances for Seismic Hazards

The City and County of San Francisco has ordinances aimed at mitigating seismic and other geologic hazards relevant to the project. The City's subdivision ordinance (Section 1358) requires that developers file soil reports indicating any soil characteristics which may create hazards, and identifying measures to avoid soil hazards and prevent grading from creating unstable slopes. The ordinance requires that a state-registered civil engineer prepare the soils report.

The City's building construction standards are based on the California Building Standards. Local amendments to the *California Building Code* to reflect local conditions. are found in the Appendices to the Building Inspection Commission (BIC) Codes of the Municipal Code. Local procedures may also be included in local building codes to address local conditions and issues. Applicable local procedures required by the *San Francisco Building Code* are explained below.

Northwest Mount Sutro Slope Protection Area

The project site is located within the Northwest Mount Sutro Slope Protection Area identified in an ordinance that was incorporated into the *San Francisco Building Code* as Section 106A.4.1.3. This section, among other geotechnical and structural provisions, requires permit applications for new construction within the Northwest Mount Sutro Slope Protection Area to be reviewed by the Structural Advisory Committee for structural integrity and effect on hillside stability. In addition, the Planning Department, Department of Public Works, and Fire Department must provide written approval after making a visit to the project site. The requirements of the Northwest Mount Sutro Slope Protection Area are in addition to all other applicable laws and regulations, including CEQA.

The Structural Advisory Committee is defined in Section 105A.6.2 of the Building Code for projects within the Northwest Mount Sutro Slope Protection Area as a structural engineer, a geologist, and a geotechnical engineer. In addition, the Committee shall consult with an architect, who shall be a voting member of the Committee.

In the event that the Structural Advisory Committee determines that there is a reasonable likelihood that the proposed design and construction would result in unsafe conditions or would increase the likelihood of hillside instability, and such unsafe conditions or instability cannot be mitigated to the satisfaction of the Structural Advisory Committee, the building permit shall be denied. The decision to deny the permit is appealable only to the Board of Appeals.

Slope Protection Act

The Slope Protection Act (*San Francisco Building Code* Section 106A.4.1.4) requires rigorous review of projects on steeply sloped areas in order to avoid geologic hazards associated with slope stability. The Slope Protection Act applies to properties within certain mapped geologic hazard areas, with the exception of properties already subject to the Edgehill Mountain Slope Protection Area or the Northwest Mount Sutro Slope Protection Area. Because the project site is within the Northwest Mount Sutro Slope Protection Area, the Slope Protection Act does not apply to the proposed project.

IMPLEMENTATION OF REGULATORY REQUIREMENTS AND RESPONSIBILITIES

The preceding sections presented the state and local laws that are currently in effect to ensure that proposed development sites are adequately investigated and that earthquake effects are evaluated and mitigated in the project design and construction. This section discusses the roles and responsibilities of the engineers and building officials and processes that ensure site investigations, grading, and construction is completed in accordance with the state and local laws developed to protect the public and property from adverse effects of earthquake-induced ground shaking and ground failure.

Implementing the regulatory requirements in the CBC and San Francisco ordinances and ensuring that a building is constructed in compliance with the law is the responsibility of the project engineers and, in San Francisco, the DBI. The geotechnical engineer, as a registered professional with the State of California, is required to comply with the CBC and local codes while applying standard engineering practice and the appropriate standard of care for the particular region in California, which, in the case of the proposed project, is the San Francisco Bay Area.[195] The California Professional Engineers Act (Business and Professions Code Sections 6700-6799), and the Codes of Professional Conduct, as administered by the California Board of Professional Engineers and Land Surveyors, provides the basis for regulating and enforcing engineering practice in California. In San Francisco, DBI is responsible for inspections and ensuring CBC compliance.

The geotechnical engineer is responsible for investigating the underlying soils and bedrock on a site and, if necessary, developing remedies to improve soil conditions based on standard, accepted, and proven engineering practices. The geotechnical investigation must characterize, log, and test soils and bedrock conditions and determine the response of those underlying materials to ground shaking generated during an earthquake.

The geotechnical investigation and the recommendations developed during the investigation are presented in a report, which is reviewed, signed, and stamped by the professional engineer in charge. Based on the site's geotechnical conditions, the geotechnical report includes methods and materials for all aspects of the site development, including the site preparation, building foundations, structural design, utilities, sidewalks and roadways, to remedy any geotechnical conditions related to seismic impacts. Once finalized, the geotechnical report is submitted to the local permitting agency, in this case the DBI, for review and comment. The DBI then works with the applicant and the geotechnical engineer to resolve

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195 A geotechnical engineer (GE) specializes in structural behavior of soil and rocks. GEs conduct soil investigations, determine soil and rock characteristics, provide input to structural engineers, and provide recommendations to improve problematic soils.

inconsistencies and ensure that the investigation complies with the CBC and local ordinances. In connection with grading, foundation, building, and other site development permits, DBI reviews the geotechnical investigation and recommendations and impose permit requirements based on the geotechnical recommendations and CBC provisions. On certain projects, especially larger scale development, the City and County of San Francisco relies on expertise of outside professionals to peer review geotechnical studies, conclusions, and recommendations.

While the geotechnical report is a required element for the project review and issuance of a building permit, it also provides the necessary soil and foundation information required by the structural engineer designing the building. A structure cannot be designed without adequate information on the underlying soils and response of those soils to earthquake ground motion. Grading plans, foundation designs, and structural designs are also prepared based on the geotechnical recommendations and other pertinent requirements of the CBC.

Geologic/Geotechnical Investigations

For certain projects, such as the proposed San Francisco Overlook Project, the applicant would conduct a preliminary or "Master Plan" geotechnical investigation to determine the overall engineering feasibility of site development and to inform the preliminary designs. The objective of the preliminary geologic/geotechnical investigation is to compile existing information and develop enough new data to establish a Master Plan of the proposed development. At the Master Plan stage, geotechnical engineers would acquire a broad understanding of the site conditions while identifying areas on the site that are especially favorable for development or could be problematic from a soils engineering perspective. The scope of the preliminary geotechnical studies is intended to develop a general understanding of the site; however, this level of investigation is not rigorous enough to generate the adequate "design-level" data needed to complete final grading or structural designs.[196] Furthermore, it is typically not prudent or effective to conduct a design-level design at the Master Plan stage of a project because the project layout or density may change considerably due to the outcome of the CEQA project review of other issues. Nevertheless, in most cases, a preliminary geotechnical study is adequate to complete necessary CEQA analyses because the level of detail and information obtained on the subsurface effectively evaluates whether geologic or seismic impacts exist and whether mitigation would be required. Remedial measures

[196] "Design-level" investigations provide seismic and engineering parameters for specific building sites and proposed building footprints. The design-level data and analysis are used by the structural engineer to complete final foundation and structural design.

developed by the geotechnical engineers in the preliminary geotechnical study may be identified as mitigation measures in the EIR.

The typical geotechnical investigation and review process in the City and County of San Francisco (CCSF) is summarized in the following outline.

1. Applicant prepares a Preliminary Geotechnical Investigation or a Master Plan Geotechnical Investigation.
2. City and County of San Francisco fulfills environmental review requirements under CEQA, including approval of any relevant mitigation measures.
3. City approves project entitlements.
4. Applicant prepares Site-Specific Geotechnical Investigations, which entail the following:
    a. Conduct subsurface exploration of project site;
    b. Submit soil samples for laboratory analysis;
    c. Review results of soil sample engineering properties;
    d. Conduct seismic hazards evaluation based on site location and engineering properties of site soils;
    e. Assess effects of seismic hazards;
    f. Identify appropriate strategies to address seismic hazards.
5. Applicant submits Site-Specific Geotechnical Investigation report and plans to DBI.
6. DBI reviews Site-Specific Geotechnical Investigation report and plans and recommendations for adherence to the DBI and the California and San Francisco Building codes requirements.
7. Applicant addresses DBI’s comments.
8. Applicant resubmits modified construction plans based on DBI’s comments.
9. DBI approves grading and foundation permit.

Geotechnical Investigation for the San Francisco Overlook Project

The geology and soils analysis in this EIR relies upon the Preliminary Geotechnical Investigation prepared for the San Francisco Overlook Project (geotechnical investigation) prepared in 2006, and updated in 2010, by Alan Kropp & Associates, Inc.[197,198] The methodology of this investigation was reviewed by DBI on May 27, 2005. As discussed in the geotechnical investigation, the draft geotechnical investigation report was subject to a peer review process under the direction of the DBI. Meetings with the project peer review consultant (PRC), a qualified geotechnical consultant selected by DBI, were held on November 22, 2004, and May 27, 2005, to discuss and obtain comments regarding the field investigation program and comments regarding the completion of the geotechnical investigation.[199] PRC comments requested additional subsurface exploration, review of foundation supporting conditions for existing upslope structures, cross-sections which extend off-site and depict the relationship of the project to existing structures, photographic documentation of existing conditions, and information on the existing sewer on the site, the landslide on the west side of the site, the Fifth Avenue bin wall, the tie-back wall at the end of Kirkham Street, and the Seventh Avenue retaining wall. Following the meetings with the PRC, and based upon the requirements of the PRC, the geotechnical investigation report was modified to address the PRC comments as outlined in a PRC memorandum from Frank L. Rollo of Treadwell & Rollo, Inc., dated December 21, 2004.[200] The evaluation and conclusions in this section, Section IV.F. Geology and Soils, incorporate these modifications.

The Alan Kropp & Associates document is not a final site-specific, design-level geotechnical study; rather, it determines project feasibility in light of the site geotechnical conditions and identifies areas of development opportunity and areas of development constraint. The geotechnical investigation included a review of available documents, several site visits, a total of 12 small diameter borings and four large diameter borings, and laboratory testing of subsurface samples. Seismic considerations examined in the geotechnical investigation included strong ground shaking, ground rupture, landslides, geologic instability including shallow sloughing/raveling of soils and debris, erosion, existing fill, creep and sloughing of native soils, and soil and rock movement. The geotechnical investigation identified geologic factors that could cause significant ground failure hazards beneath proposed structures during an earthquake, which include existing landslide areas, shallow sloughing/raveling of soils and debris,

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197 Alan Kropp & Associates *Geotechnical Investigation, Crestmont Drive Project, San Francisco, California,* September 29, 2006, and updated on December 7, 2010, Appendix C. This report is on file and available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, San Francisco, as part of Case No. 2004.0093E.

198 Alan Kropp, Principal Engineer, Alan Kropp & Associates, letter report to Gary Testa, San Francisco Overlook Development LLC, *Re: Geotechnical Update, San Francisco Overlook Project, San Francisco, California,* December 7, 2010. This letter is on file and available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, San Francisco, as part of Case No. 2004.0093E.

199 This meeting pre-dated the enactment of the Northwest Mount Sutro Slope Protection Area, and thus was not conducted according to their requirements.

200 Alan Kropp & Associates, *Geotechnical Investigation, Crestmont Drive Project, San Francisco, California*. Op.cit.

erosion, the presence of fill that was not placed in accordance with current geotechnical engineering standards, native soils at the site have the potential for creep and sloughing, and downslope or lateral soil and/or rock movements. Based on the data collected and engineering analysis, the geotechnical investigation identified geotechnical design features, including deep-drilled pier foundations. Numerous requirements for installing these foundations are contained in the geotechnical investigation depending on the specifics of the final project design. Additionally, the geotechnical investigation calls for use of appropriate design parameters, landslide protection measures, stitch piers, debris walls, drainage and erosions control, recompaction of existing fill, appropriate maintenance of drainage and erosion control measures, soil nails, retaining walls, minimization of grading, appropriate foundation design, and a variety of specific design and construction recommendations. All of the remedial methods and design measures contained in the geotechnical investigation are standard, accepted and proven engineering practices used throughout the Bay Area to overcome unfavorable soil and geologic conditions.

As discussed above, the remedial methods and materials must be verified, and adjusted if necessary, and additional investigation and engineering analysis performed for the final development plans. Consequently, subsequent “site-specific investigations” would be required, before final project design, to develop further specificity about site conditions. These recommended site-specific investigations will be incorporated as mitigation measures in this EIR, and will include more detailed evaluations for foundation systems needed for individual structures. The site-specific investigations completed in the design phase of the project would identify which measures would be most appropriate for each specific building, and soils and geology conditions. Through mitigation measures identified in this EIR, the project sponsor will be required to implement one or more of the design measures identified in the geotechnical investigation, pursuant to existing state and local regulatory requirements.

The site-specific investigations recommended by the geotechnical study and incorporated as mitigation measures would be used for final design of the foundations systems for each structure. The foundation system for each building must be designed with consideration of the engineering properties beneath the proposed structure and the projected loads (weight of the structure). These design criteria can only be developed with information obtained from a site-specific geotechnical investigation. The site-specific investigations would more precisely determine the depth of the fill, native soil, and bedrock at the site, which influences the distribution of deep foundation piers. In addition, site-specific information would specify exact design coefficients that are needed by structural engineers to determine the type and sizing of structural building materials.

REGULATION OF SEISMIC HAZARDS

State laws and local ordinances require that, prior to construction, seismic hazards be identified and remedied to protect public health and safety from substantial risks through appropriate engineering practices. A California-registered geotechnical engineer who is responsible, under professional registration, to conduct a thorough investigation and provide recommendations to remedy unfavorable geologic and seismic conditions is required to recommend how to address site conditions. Mitigation measures recommended must be consistent with the laws regulating seismic risk reduction contained in CBC (Title 24), the Seismic Hazard Mapping Act, the California Code of Regulations (CCR) Title 14, and City and County of *San Francisco Building Code*.

It is common practice to initially investigate the site broadly to determine project development feasibility, opportunities, and constraints before detailed design-level data is obtained at each building site. The initial broad geotechnical investigation is adequate to comply with CEQA requirements for identifying impacts and mitigation measures. The geotechnical investigation will typically recommend a list of various possible mitigation approaches, because it may not be possible to predict the most effective remedy without more detailed study at the construction design stage. Possible remedies to correct unfavorable soil conditions use standard engineering approaches, which are accepted in the geotechnical engineering community and proven on sites throughout California.[201] Identified possible measures will be evaluated during the site-specific geotechnical investigation and the most effective and practical methods will be used at the project site. Prior to incorporation into the project, the specific geotechnical engineering recommendations selected for the site regarding the mitigation and reduction of liquefaction are reviewed for compliance with the CGS Geology Guidelines,.the purpose of which is to protect the public safety from seismic effects.

IMPACTS

SIGNIFICANCE THRESHOLDS

The project would have a significant effect on the environment in terms of geology and soils if it would:

- Expose people or structures to substantial adverse effects, including the risk of loss, injury, or death involving:

[201] California Geological Survey, *Special Publication 117A, Guidelines for Evaluating and Mitigating Seismic Hazards in California, 2008,* which contains guidelines for mitigation measures developed by experienced geotechnical practitioners based on extensive research about effective geotechnical solutions.

  - Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault (Refer to California Geological Survey Publication 42);
  - Strong seismic ground shaking;
  - Seismic-related ground failure, including liquefaction; or
  - Landslides.
- Result in substantial soil erosion or the loss of topsoil;
- Be located on geologic unit or soil that is unstable, or that would become unstable as a result of the project, and result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse;
- Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code, creating substantial risks to life or property;
- Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater; or
- Change substantially the topography or any unique geologic or physical features of the site.

As discussed in Section IV. H. CEQA Checklist Update, on page 233, the Planning Department revised its CEQA Initial Study Checklist since the publication of the Initial Study (Appendix A) on May 27, 2006. The significance criteria in the Initial Study differ from the criteria above, which reflect the current Checklist. The Initial Study did not evaluate impacts on geology and soils, stating that these impacts would be evaluated in the EIR. All of the current criteria above are addressed in the evaluation of geology and soils impacts below.

IMPACT ANALYSIS

Approach to Analysis

Conceptual project geotechnical features, which correspond to the geologic and seismic characteristics of the project site, are identified and discussed in Section II. Project Description, Geotechnical Features of Project, on page 44. The conceptual level of detail of these geotechnical features is adequate for CEQA analysis of geologic and soils impacts in this EIR, but does not provide the "design-level" data needed to complete final grading or structural designs[202] that would be required if the project is approved. In the discussion of geologic and soils impacts below, impacts are identified assuming implementation of the

202 "Design-level" investigations provide seismic and engineering parameters for specific building sites and proposed building footprints. The design-level data and analysis is used by the structural engineer to complete final foundation and structural design.

proposed conceptual project geotechnical features. Mitigation measures are identified as needed to reduce geologic and soils impacts to less-than-significant levels. These mitigation measures address the same set of project-related geologic and soils issues as the conceptual project geotechnical features identified in Section II. Project Description, Geotechnical Features of Project, but the mitigation measures below provide additional detail necessary to ensure that adequate design-level geologic mitigation measures are designed and implemented in the event the project is approved.

Seismic Hazards

Impact GE-1: Construction of the project would expose people and structures to substantial seismic-related hazards including the risk of loss, injury, or death involving strong seismic ground shaking. (Less than Significant with Mitigation)

There is no mapped active or inactive fault in the immediate vicinity of the site. Therefore, the likelihood of fault rupture directly below the proposed structures is remote.

The historic performance of the existing slopes, even with the adverse bedding conditions on the west-facing slope, validates the findings of the subsurface exploration that the bedrock is not prone to instability and has increased strength as a result of the interlocking nature of the chert bedrock and the undulating bedding and contact surfaces within the bedrock unit. The *San Francisco Building Code* requires the design of all structures to incorporate provisions for strong ground-shaking. The proposed project's geotechnical investigation report contains recommendations for geotechnical engineering features of the project, which have been included in the project's conceptual design, and are identified in Section II., Project Description, Geotechnical Features of Project, on page 44. The recommendations are designed to satisfy the Building Code requirements. In addition, the final design would be required to satisfy Building Code provisions. However, failure to implement these recommendations, given the site slope conditions, could expose people or structures to substantial adverse effects including the risk of loss, injury, or death, involving strong seismic ground shaking. This would be a ***significant*** impact.

Implementation of Mitigation Measure M-GE-1a (Seismic Design Parameters) and Mitigation Measure M-GE-1b (Detailed Design Plans), by requiring compliance with the recommendations of the preliminary and site-specific geotechnical investigations, would ensure that the final design satisfies the regulatory standard and that the significant impact of seismic hazards, including seismic ground shaking, on the proposed project would be reduced to a ***less-than–significant*** level.

Mitigation Measure M-GE-1a (Seismic Design Parameters):

The following parameters for seismic design from the 2010 California Building Code shall be used in calculations for the final project design:[203]

- Site Location: Latitude = 37.75889 degrees; Longitude = -122.46131 degrees, in order for the project design to be appropriate to its location
- Site Class = C, in order for the project design to be appropriate to its region
- Mapped Spectral Acceleration for Short Period (S_S, Site Class B) = 1.658g, in order to incorporate mapped short-period earthquake forces that are anticipated
- Mapped Spectral Acceleration for 1-Second Period (S_1, Site Class B) = 0.842g, in order to incorporate mapped one-second earthquake forces that are anticipated
- Maximum Considered Earthquake Spectral Response Acceleration for Short Period (S_{MS}, Site Class C) = 1.658g, in order to incorporate maximum anticipated short-period earthquake forces
- Maximum Considered Earthquake Spectral Response Acceleration for 1-Second Period (S_{M1}, Site Class C) = 1.094g, in order to incorporate maximum anticipated one-second earthquake forces
- Design Spectral Response Acceleration for Short Period (S_{DS}, Site Class C) = 1.106g, in order to incorporate anticipated short-period earthquake forces adjusted for design purposes
- Design Spectral Response Acceleration for 1-Second Period (S_{D1}, Site Class C) = 0.730g, in order to incorporate anticipated one-second earthquake forces adjusted for design purposes

Seismic design criteria for the project also shall comply with the recommendations in Section 5.07, on pages 53–54 of the geotechnical investigation.

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[203] Alan Kropp, Principal Engineer, Alan Kropp & Associates, letter to Gary Testa, San Francisco Overlook Development LLC, *RE: Geotechnical Update San Francisco Overlook Project, San Francisco California*, December 7, 2010. This report is on file and available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, San Francisco, as part of Case No. 2004.0093E.

Mitigation Measure M-GE-1b (Detailed Design Plans)

Prior to the issuance of a building permit for the project site, the project sponsor shall:

1. Submit to the DBI a site-specific, design-level geotechnical investigation prepared for the proposed project by a registered geotechnical engineer. The investigation shall comply with all applicable state and local code requirements and:

    a) Include an analysis of the expected ground motions at the site from known active faults using accepted methodologies;

    b) Determine structural design requirements as prescribed by the most current version of the California Building Code, including applicable City amendments, to ensure that structures can withstand ground accelerations expected from known active faults;

    c) Determine the final design parameters for walls, foundations, foundation slabs, utilities, roadways, parking lots, sidewalks, and other surrounding related improvements;

2. Project plans for foundation design, earthwork, and site preparation shall incorporate all of the mitigations in the site-specific investigations.

3. The project structural engineer shall review the site-specific investigations, provide any additional necessary mitigation to meet Building Code requirements, incorporate all applicable mitigations from the investigation in the structural design plans, and ensure that all structural plans for the project meet current Building Code requirements.

4. The DBI registered geotechnical engineer or third-party registered engineer retained to review the geotechnical reports shall review each site-specific geotechnical investigation, approve the final report, and require compliance with all geotechnical mitigations contained in the investigation in the plans submitted for the grading, foundation, structural, infrastructure and all other relevant construction permits.

5. The DBI shall review all project plans for grading, foundations, structural, infrastructure and all other relevant construction permits to ensure compliance with the applicable geotechnical investigation and other applicable Code requirements.

Landslides

Impact GE-2: Construction of the project would expose people and structures to substantial adverse effects, including the risk of loss, injury, or death involving landslides. (Less than Significant with Mitigation)

The geotechnical investigation's evaluation of ground conditions at the project site found that it is likely that most of the site would not be susceptible to ground failure during an earthquake, with the exception of the existing landslide area located near the northeast corner of the project site and extending off-site to the north and east. In this area, the proposed private road is vulnerable to landslide, in the event of an earthquake or other conditions such as periods of heavy precipitation or unanticipated breaks in water pipes or underground utilities. Given these site conditions, development of the project could result in increased landslide risks. This would be a ***significant*** impact.

The proposed project's geotechnical investigation report contains recommendations for geotechnical engineering features of the project to address landslide hazards, which have been included in the conceptual project design (subject to the approval of DBI). These include Geotechnical Feature 2: Existing Landslides, on page 45, Geotechnical Feature 4: Stitch Piers, on page 46, Geotechnical Feature 5: Debris Walls, on page 46, Geotechnical Feature 8: Drainage and Erosion Control, on page 47, Geotechnical Feature 10: Existing Fill, on page 48, Geotechnical Feature 11: Creep and Sloughing of Native Soils, on page 48, and Geotechnical Feature 13: Maintenance, on page 49.

Stitch piers are closely spaced, drilled piers designed to resist lateral loads[204] such as those associated with sloughing/raveling and landslide movements. Stitch piers are below-grade features. "Re-entrant" stitch piers consist of a stitch pier wall that would follow the property line of the site. The stitch pier wall would function as a buried retaining wall where the primary movement of any future landslides would be toward the project site. The stitch pier wall would keep landslide movement from impacting the project site in two ways: (1) the piers would hold landslide materials in place by resisting the lateral, downhill forces of a landslide, and (2) the piers would be extended above the ground surface and this top portion of the piers would deflect any landslide materials sliding toward the site.

The complete final scope of drainage and erosion control improvements ultimately would be detailed in a Site Grading and Drainage Plan, a Drainage Management Plan, and a Sediment and Erosion Control Plan.

Implementation of Mitigation Measure M-GE-1b (Detailed Design Plans), on page 212, as well as the following mitigation measures: Mitigation Measure M-GE-2a (Protection of Private Road From

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[204] *Loads, loading*: Weight or pressure on soil, as from overlying structures or earth movement.

Landslides); Mitigation Measure M-GE-2b (Stitch Piers); Mitigation Measure M-GE-2c (Debris Walls); Mitigation Measure M-GE-2d (Drainage and Erosion Control); Mitigation Measure M-GE-2e (Existing Fill); Mitigation Measure M-GE-2f (Creep and Sloughing of Native Soils); and Mitigation Measure M-GE-2g (Maintenance); would eliminate the risks, identified above, posed by the portions of the site susceptible to landslides and reduce the impact associated with landslides to a ***less-than-significant*** level.

Mitigation Measure M-GE-2a (Protection of Private Road From Existing Landslides):

To protect the proposed private road and new residences, a qualified geotechnical engineer shall determine and design appropriate protective measures, after the grading in this area has been better defined during the final design stage. Potential measures could include removal and recompaction of the existing fills beneath the new private road in accordance with Mitigation Measure M-GE-2e (Existing Fill), installation of a retaining wall along the downslope (north) portion of the new private road, and a deepened drilled pier foundation system for the road's retaining wall, the depth of which shall be determined once grading is better defined. The design of measure(s) for protecting the new private road shall be subject to the review of the project geotechnical consultant, DBI, and a geotechnical study peer review panel (consisting of a structural engineer, a geologist, and a geotechnical engineer, as required by Section 106A.4.1.3 of the *San Francisco Building Code* for sites located within the Northwest Mount Sutro Slope Protection Area), and shall be completed before issuance of a building permit for the project.

Mitigation Measure M-GE-2b (Stitch Piers):

As noted in the project description, the project includes stitch piers[205] to minimize fill instabilities. Stitch piers shall be installed near the property lines in accordance with the recommendations of the project's geotechnical investigation. The stitch piers shall be designed to resist the soil loads due to shallow instabilities that result in lateral pressure on the piers.

Stitch piers shall be installed along the west property line and along the west portion of the north property line in the vicinity of the previous quarry activities to mitigate soil loss on the project site due to off-site sloughing and raveling. Re-entrant stitch piers[206] shall be installed

205 *Stitch piers:* Closely spaced, below-grade, drilled piers designed to resist lateral loads such as those associated with sloughing/raveling and landslide movements. *Loads, loading*: Weight or pressure on soil, as from overlying structures or earth movement.

206 *Re-entrant stitch piers*: A stitch pier wall that follows the property line of the site.

on the south portion of the site to protect against undermining the west property line stitch piers by potential on-site soil movements. Stitch piers shall be installed near the northeast corner of the site in order to help deflect slide movements, and prevent encroachment of potential slide debris onto the project site, from the existing landslide area northeast and uphill of the site. Where appropriate, lagging[207] shall be installed from the upslope side of the stitch piers. If slope materials move over time, which would expose the stitch piers, additional lagging shall be installed to provide continued containment. Long-term maintenance for the site shall include observations of the slope conditions below the stitch piers, as stipulated in Mitigation Measure M-GE-2g (Maintenance), on page 218.

To provide the best overall performance, stitch piers shall be placed as close as possible to the property line while conforming to criteria established by Section J108 of the 2010 California Building Code (which is the basis for the *San Francisco Building Code*) and/or other governing codes and regulations requiring improvements to be offset from the property line.[208]

All stitch piers shall be designed and installed in conformance with the recommendations in Section 5.03.3 Stitch Piers, on page 48 of the geotechnical investigation.

Mitigation Measure M-GE-2c (Debris Walls):

As noted in the project description, the project includes installation of a debris wall in combination with stitch piers to protect the project site from the shallow soil instabilities and ongoing sloughing/raveling near the western property line and along the western portion of the north property line, which could undermine the project site. This is in accordance with Mitigation Measure M-GE-2b (Stitch Piers), on page 214.

The debris wall shall be installed near the upslope edge of the new private road. In the portion of the new private road located below documented landslides, the debris wall shall be taller and stronger than other project debris walls in order to resist the potentially larger landslide debris loads. In addition, an access path shall be constructed behind the wall to

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207 *Lagging:* A common earth retention system. Wooden piers (or soldier piers) are driven into the ground at even intervals, deep enough to reach bedrock or a soil layer that is competent (not unstable and able to provide resistance to soil movement above), and wooden planks are bolted across them to form an earth retaining wall.

208 Section J108 of the 2010 *California Building Code* (which is the basis for the *San Francisco Building Code*) provides for setbacks of graded slopes from property lines. Although the intent of a stitch pier wall is to protect a property from encroachment by adjacent properties and the code section applies to the reverse situation (i.e., where the property in question would encroach on or impact adjacent properties), some jurisdictions have included stitch piers walls within the same constraints as graded slopes.

allow for collection and removal of accumulated debris from the area behind the wall. Because of the steep slopes, the access path uphill from the debris wall shall be as narrow as practical while still allowing for access to remove accumulated debris. If necessary, the access path shall include installation of a retaining wall along the upslope edge of the path in order to maintain a path that has sufficient width to allow for access for clearing operations. Methods for clearing the debris shall be considered in the design of the access path.

The locations and lengths of debris walls, including the debris wall near the downslope property line stipulated in Mitigation Measure M-GE-2f (Creep and Sloughing of Native Soils), on page 218, shall be determined and designed by a qualified geotechnical engineer, in accordance with the recommendations of the project's geotechnical investigation report and applicable California and San Francisco Building codes and regulations, after the final site plan and building and improvement/maintenance layout are determined. The design of the debris walls shall be reviewed by the project geotechnical consultant, DBI, and a geotechnical study peer review panel (consisting of a structural engineer, a geologist, and a geotechnical engineer, as required by Section 106A.4.1.3 of the *San Francisco Building Code* for sites located within the Northwest Mount Sutro Slope Protection Area), and shall be completed before issuance of a building permit for the project. All debris walls shall be designed and installed in conformance with the recommendations in Section 4.04.2.02, Footings, on page 39, Section 4.04.3, Retaining Walls, on pages 39–40, and Section 5.04.2 Debris Walls, on pages 50–51 of the geotechnical investigation.

Mitigation Measure M-GE-2d (Drainage and Erosion Control):

The following drainage and erosion control measures shall be installed to maintain slope stability and to reduce the risk of downslope migration of slope debris:

- Concrete v-ditches[209] for the collection and routing of surface water flows;
- Swales[210] and catch basins[211] for the collection and direction of the flow of surface water;

209 *V-ditch:* A vee-shaped ditch.

210 *Swale:* A wide shallow depression in the ground to form a channel for storm water drainage, which may provide some groundwater recharge.

211 *Catch basin:* (1) A receptacle at the entrance to a drainage system designed to keep out large or obstructive matter, or (2) a reservoir for collecting surface drainage or runoff.

- Collection of water on roofs using downspout connected to a system of pipes that would extend into a drainage system in the new private road or a v-ditch located on the project site downstream of the structures; and
- Subdrains[212] located uphill from and behind proposed retaining walls and debris walls.

Erosion-resistant vegetation shall be planted on the finished slopes, and, if the construction period spans the rainy season, the vegetation shall also be planted on temporary slopes. Erosion control for temporary slopes shall include, as determined to be appropriate by a qualified geotechnical engineer: grading to prevent water from flowing over the top of any slope; planting vegetation, including quick-growing native grasses and plants; and installing netting, hay wattles, and silt fences. Erosion control for finished slopes shall consist of vegetation that is deeply rooted, has dense growth at or near ground surface, and requires minimum irrigation.

Drainage and erosion control measures shall include, and shall be designed and installed in conformance with, the recommendations in Sections 5.06.1 Subsurface Drainage, 5.06.2 Surface Drainage, and 5.06.3 Erosion Control, on pages 52–53 of the geotechnical investigation.

Mitigation Measure M-GE-2e (Existing Fill):

Where there is existing fill beneath the proposed new private road, the fill shall be removed and recompacted. For the fill below the east portion of the new private road, the boundary for fill removal and recompaction may be dictated by the limits of the grading activities for project development, as determined by a qualified geotechnical engineer. Where fills are located beneath proposed new structures, such as the proposed buildings and retaining walls, drilled pier foundations extending through the fill soils into competent[213] underlying bedrock materials shall be installed. Due to the potential for downward creep of the fill, the piers shall be designed to resist a substantial creep load[214] in addition to the creep load from native soils.

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212 *Subdrain:* A perforated or plain underground drain.

213 *Competent:* Stable and able to provide resistance to soil movement above.

214 *Creep, substantial creep*: Creep is movement of soil and subsoil downslope that is invisible to the naked eye. Substantial creep is creep that causes sloughing, or soil stability failure. *Creep loads, loading*: Weight or pressure on soil from overlying structures or earth movement.

Mitigation Measure M-GE-2f (Creep and Sloughing of Native Soils):

Deep drilled pier[215] foundations that extend well below the anticipated depth of creep movement and into the zone of passive resistance[216] shall be installed. The depth shall be determined by a qualified geotechnical engineer. Drilled piers for the proposed residential buildings shall have a wider diameter than typically used (a minimum of 16 inches) in order to provide sufficient reinforcement to resist the anticipated lateral loading.

Drilled piers into competent bedrock materials underlying the native soils shall be installed to protect the proposed structures from the potential creep and/or sloughing of the native soils. Erosion control measures, such as the installation of netting and erosion-resistant vegetation on the slope, shall be used to reduce the risk of sloughing, in accordance with Mitigation Measure M-GE-2d (Drainage and Erosion Control), on page 216, and city ordinances which are discussed in Chapter III. Plans and Policies on pages 53–54 and Section IV.H. CEQA Checklist Update on page 245. A debris wall shall be constructed, in accordance with the requirements of Mitigation Measure M-GE-2c (Debris Walls) on page 215, near the downslope north property line to prevent movement of potential slough material onto the adjacent downslope properties, where more significant sloughing could occur.

Mitigation Measure M-GE-2g (Maintenance):

The project sponsor shall provide for the ongoing maintenance of elements of the final geotechnical and structural design by including in the project's Declaration of Covenants, Conditions and Restrictions (CC&Rs) an obligation for the future homeowners association (or for the Mount Sutro Woods Homeowners Association should the project be annexed to that association) to maintain such elements as a common area maintenance obligation of the association.[217] Prior to the first issuance of a final subdivision map or temporary or final certificate of occupancy, the project sponsor shall record a deed restriction against the title to the property committing all owners of the property to participating in a homeowners

215 *Piers, drilled piers*: Columns placed into the ground to provide soil and slope stability. The pier shaft is excavated and the pier material poured in or installed.

216 *Passive resistance:* The force of soil and slope pushing against each other due to gravity (as opposed to active means such as a retaining wall).

217 *Declaration of Covenants, Conditions, and Restrictions (CC&Rs)*: A CC&R is the declaration of private covenants, conditions, and restrictions that control a condominium or planned development, and is required of all condominiums. Once completed, they are recorded with the county and become a part of public record. Each CC&R is different depending on the owners and the properties involved. Generally, CC&Rs address issues such as boundaries, definition of common areas, responsibilities, and processes required of each owner, and protocol for property usage, building rules and regulations, and communication and resolution of problems and disputes.

association that contains this obligation. If for any reason the property is developed but not subdivided, all owners shall be responsible for the maintenance obligation. Such maintenance obligations shall include:

- Monitoring and clearing of drain outlets, v-ditches, catch basins, and above-grade piping;
- Monitoring and clearing of subdrain outlet pipes and cleanouts;
- If downslope sloughing/raveling exposes stitch piers, installation of lagging (piers installed with planks bolted across them) to prevent loss or movement of soil upslope from the stitch piers;
- Monitoring and clearing of debris from debris walls;
- If ground/soil/debris material moves away from a debris wall, installation of lagging as needed;
- Monitoring of the slope conditions below the stitch piers; and
- Repairs and partial to full replacement of any of the above items as needed.

Post-construction maintenance shall comply with the recommendations in Section 5.10 Post Construction Maintenance, on page 56 of the geotechnical investigation.

Erosion and Soil Stability

Impact GE-3: Construction of the project would expose people or structures to substantial adverse impacts, including the risk of loss, injury, or death involving on- and off-site geologic instability, including shallow sloughing/raveling of soils, debris and erosion. (Less than Significant with Mitigation)

Because of the steep slopes at the project site, some project construction access roads likely would be required to have foundations, retaining walls, and other geotechnical structures to provide safe access conditions. Depending on the locations of the temporary access roads, some grading may be required to provide a stable finished slope. The geotechnical investigation provides recommendations for grading, fill placement, and compaction, including minimizing the amount of grading for temporary construction access in order to reduce disturbance to the hillside.

The existing steep slopes above and below the project site currently may experience some shallow sloughing and/or raveling, as well as erosion. Development of the site could increase these instabilities, which would expose people or structures to substantial adverse effects, including the risk of loss, injury, or death involving on- and off-site geologic instability, including shallow sloughing/raveling of soils and debris. Therefore, this would be a ***significant*** impact.

For closely spaced buildings, and/or stairs, decks, or other surficial features between buildings, the risks associated with shallow sloughing/raveling or erosion are low, because the smaller or more constrained the area that receives rainfall or irrigation watering, the less water-induced sloughing/raveling/erosion that would occur. The proposed site plan incorporates relatively small distances between the proposed structures (approximately five feet or less, except for approximately 20 feet between the easternmost four duplexes and the duplexes to the west, which would contain a stairway and supporting foundations). Thus, the impact of building spacing on sloughing and erosion would be less than significant.

The proposed project's impact on soil and slope instability, including shallow sloughing/raveling of soils and debris and soil erosion, and the risk of damage to structures and injury or death to occupants, both on- and off-site, would be reduced to ***a less-than-significant*** level by Implementation of Mitigation Measure M-GE-3a (Slope Stability); Mitigation Measure M-GE-3b (Soil Nails); Mitigation Measure M-GE-3c (Design of Retaining Walls); Mitigation Measure M-GE-3d (Construction on Steep Slopes); Mitigation Measure M-GE-1b (Detailed Design Plans), on page 212; Mitigation Measure M-GE-2a (Protection of Private Road From Existing Landslides), on page 214; Mitigation Measure M-GE-2b (Stitch Piers), on page 214; Mitigation Measure M-GE-2c (Debris Walls), on page 215; Mitigation Measure M-GE-2d (Drainage and Erosion Control), on page 216; and Mitigation Measure M-GE-2f (Creep and Sloughing of Native Soils), on page 218. These measures incorporate the recommendations in the geotechnical report to address erosion and soil instability concerns.

Mitigation Measure M-GE-3a (Slope Stability):

The proposed conceptual design of the project structures shall incorporate the factors of safety identified in Section 4.03, Slope Stability, on page 33 in the project's geotechnical investigation. (The factor of safety is the ratio of the strength of the hillside resisting land sliding, divided by the forces—colluvial[218] and alluvial[219]—that would destabilize the hillside.)

Mitigation Measure M-GE-3b (Soil Nails):

After site clearing has been completed, a geotechnical analysis shall be performed by a qualified geotechnical engineer, in accordance with the recommendations of the project's geotechnical investigation, to determine if installation of soil nails would be required to provide stabilization of localized areas of adverse bedding conditions.[220] If soil nails would be required, their

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218 *Colluvium:* Soil deposited at the base of a slope by gravity.

219 *Alluvium:* Soil deposited at the base of a slope by water movement.

220 *Bedding, bedding attitude, adverse bedding conditions:* The strata of soil and layered rock and their orientation (e.g. flat, vertical, 45 degree slope, etc.). When the orientation of the bedding is at steep slope and therefore prone to earth movement, it is called adverse bedding.

installation shall be based on the locations of the slope repair, the exposed adverse bedding conditions, and the inclination of the finished slope. Where appropriate, the design shall consist of rows of soil nails extending down into the slope, with a slope facing consisting of wire mesh and gunite that would cover the slope area, and installation of drains behind the slope facing. The design of the soil nails shall be completed before initiation of construction of the project structures.

Mitigation Measure M-GE-3c (Design of Retaining Walls):

The design of all retaining walls (including those stipulated in Mitigation Measure M-GE-2a (Protection of Private Road From Existing Landslides), on page 214, and Mitigation Measure M-GE-2c (Debris Walls), on page 215, shall incorporate the recommendations of the project's geotechnical investigation (Sections 4.04.2.02, Footings, and 4.04.3, Retaining Walls). Where debris walls are constructed on top of retaining walls, the retaining walls shall be designed to resist the impact loads associated with the debris wall.

All retaining walls shall be designed and installed in conformance with the recommendations in Section 5.04.1 Retaining Walls, on pages 48-50 of the geotechnical investigation.

Mitigation Measure M-GE-3d (Construction on Steep Slopes):

The amount of grading for temporary access shall be minimized in order to reduce disturbance to the hillside. All grading activities shall conform to the recommendations in the geotechnical investigation, including Section 5.02.8 slopes, on page 45 of the geotechnical investigation, and the geotechnical consultant shall provide guidance and recommendations regarding grading of finished slopes, which may include fill placement and compaction.

Impact GE-4: Existing fill at the site would not provide acceptable ground support for the proposed project, which would expose people or structures to substantial adverse effects, including the risk of loss, injury, or death. (Less than Significant with Mitigation)

As discussed under Existing Fill, on page 192, the existing fills on the project site were not placed in accordance with current geotechnical engineering standards. As such, these fills would not provide acceptable supporting conditions for the proposed project, including the proposed new private paved road.[221] This would be a ***significant*** impact due to inadequate existing fill. Implementation of Mitigation Measure M-GE-1b (Detailed Design Plans), on page 212; and Mitigation Measure M-GE-2e (Existing Fill), on page 217, would reduce the impact of inadequate fill at the project site to a ***less-than-significant*** level.

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221 Alan Kropp Associates, op cit, pp 23, 27 of extended report.

Impact GE-5: Existing native soils at the site have the potential for creep and sloughing, which would expose people or structures to substantial adverse effects, including the risk of loss, injury, or death. (Less than Significant with Mitigation)

As discussed under Native Soils, on page 194, there would be some tendency for the native soils to creep downslope. There could also be some shallow sloughing within the native soils. This could cause damage to structures and injury or death to occupants, and therefore would be a ***significant*** impact. Implementation of Mitigation Measure M-GE-1b (Detailed Design Plans), on page 212; Mitigation Measure M-GE-2c (Debris Walls), on page 215; Mitigation Measure M-GE-2d (Drainage and Erosion Control), on page 216; and Mitigation Measure M-GE-2f (Creep and Sloughing of Native Soils), on page 218, would reduce the impact of creep and sloughing of native soils on the project site to a ***less-than-significant*** level.

Impact GE-6: The foundations of the proposed project would be adversely affected by downslope or lateral soil and/or rock movements, which would expose people or structures to substantial adverse effects, including the risk of loss, injury, or death. (Less than Significant with Mitigation)

Another effect of creep movement is that the subsurface materials tend to move away from the foundation, leaving a portion of the foundation unsupported. This could cause damage to structures and injury or death to occupants. The proposed project's closely spaced buildings, decks, and external staircases would provide some protection from erosion and sloughing due to rainfall.

Drilled piers, if installed on a steep slope such as the project site, would have significantly reduced passive resistance. This is because the upper portions of drilled piers, which are surrounded by more shallow soil and/or rock that are closer to the surface and more prone to movement, do not have sufficient space to mobilize full passive resistance to lateral loading, unlike the full passive resistance achieved by the lower portions of the piers, which are embedded in deeper, more stable soil and/or rock. Therefore, for passive resistance calculations, the upper portion of drilled piers would not be included.

Soil and/or rock movements could cause damage to structures and injury or death to occupants, which would be a ***significant*** impact. Implementation of Mitigation Measure M-GE-6a (Foundations); Mitigation Measure M-GE-1b (Detailed Design Plans), on page 212; Mitigation Measure M-GE-2a (Protection of Private Road From Existing Landslides), on page 214; and Mitigation Measure M-GE-2e (Existing Fill), on page 217,would reduce the impact of subsurface materials to move away from the project buildings' foundations because of the steep-sloping site to a ***less-than-significant*** level.

Mitigation Measure M-GE-6a (Foundations):

The project buildings' foundations shall consist of deep-drilled pier foundations, drilled into competent bedrock materials underlying the native soils, and designed to resist the additional pressure induced by downslope or lateral soil and/or rock movements, in accordance with the geotechnical investigation report (Section 4.04.2.01, Drilled Pier and Grade Beams, on page 37). As determined by a qualified geotechnical engineer, deep-drilled pier foundations shall extend well below the anticipated depth of creep movement and into the zone of passive resistance, to compensate for creep loading and reduced lateral resistance at the project site.[222] Drilled piers shall also have a wider diameter than typically used (a minimum of 16 inches) in order to provide sufficient reinforcement to resist the anticipated lateral loading.

The unsupported portion of the buildings' foundations shall be designed as freestanding columns. Because drilled piers installed on a steep slope such as the project site have significantly reduced passive resistance, the upper portion of drilled piers shall be not be included for passive resistance calculations.

To strengthen the ability of drilled pier foundations to resist lateral loads, the slide debris within the northeast corner of the project site shall be excavated and recompacted. Subdrains also shall be installed to enhance drainage of water from uphill areas and the project site in order to reduce the lateral load on the piers.

Design and installation of drilled piers and grade beams shall conform to the recommendations in the geotechnical investigation, including Section 5.03.1 Drilled Pier and Grade Beams, on page 45 of the geotechnical investigation.

Design and installation of footing foundations (which may be used as an alternative to drilled piers in areas where site excavations have removed the surficial soils and exposed underlying non-expansive bedrock) shall conform to the recommendations in the geotechnical investigation, including Section 5.03.2, Footing Foundations, on page 47 of the geotechnical investigation.

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222 *Resistance, active or passive:* Soil, slope, and structure push against each other (see loading). Passive resistance relies on gravity to hold a retaining wall in place; the upslope soil presses on the foot of the retaining wall. In active resistance, the retaining wall has other means, such as bracing or being tied into the slope, to resist the lateral, downward pressure provided by the retained slope.

Impact GE-7: The proposed project would adversely affect drainage or result in substantial soil erosion or loss of topsoil. (Less than Significant with Mitigation)

Most of the existing vegetation on the project site would be removed for construction of the proposed project, which could increase erosion on the site, degrade water quality, and increase the intensity of storm water flows. This would be a ***significant*** impact on drainage and water quality.

Compliance with existing regulations including the San Francisco Landscape Ordinance, Stormwater Management Ordinance, and Stormwater Design Guidelines, along with implementation of Mitigation Measure M-GE-1b (Detailed Design Plans), on page 212; and Mitigation Measure M-GE-2d (Drainage and Erosion Control), on page 216, would reduce the impact of the proposed project on drainage and erosion to a ***less-than-significant*** level.

Septic Tanks and Alternative Wastewater Disposal Systems

Impact GE-8: The proposed project would not have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater. (No Impact)

The proposed project would connect to the existing sewer system. No septic tank or alternative wastewater disposal system would be used. Thus, there would not be an impact from septic tanks or an alternative wastewater disposal system.

Topography and Unique Geologic Features

Impact GE-9: The proposed project would not have a substantial adverse effect on topography or unique geologic features. (Less than Significant)

The proposed project would involve excavation and filling on the site for construction of the proposed residential project, but would not substantially alter the existing topographical features, consisting of a steeply sloped site with a roadway bench (a level area cut from the slope). No unique geologic or physical features exist on the site. Therefore, the project would not substantially change the area's topography, and would result in a ***less-than-significant*** impact.

Adequacy of Project Design, Construction, and Maintenance

Impact GE-10: Adverse geology and soils impact on the project site and adjacent project area would result from inadequate project design, construction, and maintenance of the project. (Less than Significant with Mitigation)

The geotechnical investigation found that the site is suitable for the proposed project from a geotechnical engineering standpoint, provided that modern hillside engineering techniques and construction methods are used, and that the conclusions and recommendations of the geotechnical investigation, prepared by Alan Kropp & Associates on September 29, 2006, and updated on December 7, 2010,[223] are incorporated into the design and construction of the project. These conclusions and recommendations include a variety of detailed design elements and construction methods for the proposed project, as well as geotechnical and structural maintenance measures for the project site and buildings on an ongoing basis. As discussed in the Regulatory Setting beginning on page 196, the project design would be subject to review by DBI's Structural Advisory Committee at the time the project is submitted for a building permit, because of the *San Francisco Building Code* Section 106A.4.1.3 requirements for projects located within the Northwest Mount Sutro Slope Protection Area. Failure to implement these design, construction, and maintenance recommendations would result in a ***significant*** impact to geology and soils. Implementation of Mitigation Measure M-GE-10a (Design, Construction, and Maintenance Recommendations), and Mitigation Measure M-GE-2g (Maintenance), on page 218, along with review by DBI and the Structural Advisory Committee, would reduce the impact of inadequate project design, construction, and maintenance of the project, on the project site and adjacent project area, to a ***less-than-significant*** level.

Mitigation Measure M-GE-10a (Design, Construction, and Maintenance Recommendations):

The design and construction of the project shall incorporate all design, construction, and maintenance recommendations of the project's geotechnical investigation (contained in Section 5.00, Preliminary Recommendations, on pages 42–56), including, but not limited to, the recommendations for:

- Site clearing and grubbing[224] (see page 42 of the geotechnical investigation);
- Fill placement on slopes (see page 43 of the geotechnical investigation);
- Excavations (see page 43 of the geotechnical investigation);
- Specification of fill materials (see page 44 of the geotechnical investigation);
- Subgrade preparation (see page 44 of the geotechnical investigation);
- Placement and compaction of fill (see page 44 of the geotechnical investigation);
- Trench backfill (see page 44 of the geotechnical investigation);
- Grading, and drainage and erosion control, for new cut or fill slopes (see page 45 of the geotechnical investigation);

223 Alan Kropp & Associates, op cit.

224 *Grubbing:* Digging up and removing all plants (roots and stem or trunk) in order to clear the land.

- Design and installation of any exterior slabs-on-grade[225] (and garage slabs as applicable) (see page 51 of the geotechnical investigation);
- Design and installation of pavement (see page 52 of the geotechnical investigation);
- Plan review (see page 54 of the geotechnical investigation);
- Construction observation and testing (see page 54 of the geotechnical investigation);
- Wet weather construction (see page 55 of the geotechnical investigation);
- Cost contingencies (see page 55 of the geotechnical investigation); and
- Informing future owners and residents of their responsibilities for proper maintenance of on-site drainage measures to reduce the risk of landslides (see page 56 of the geotechnical investigation).

Cumulative

Impact C-GE-1: The proposed project, in combination with other past, present, and reasonably foreseeable future projects, could result in cumulatively considerable impacts on geology and soils. (Less than Significant with Mitigation)

At the time this EIR was prepared, no other new project construction proposal in the vicinity of the project site had been submitted to the City that could contribute to a cumulative impact on geology and soils. Past projects in the immediately surrounding area have affected geologic and soils conditions on the project site and in the surrounding area. The proposed project could worsen those conditions, which would be a ***cumulatively considerable*** impact.

Cumulative conditions could result in substantial seismic-related hazards. Implementation of Mitigation Measures M-GE-1a (Seismic Design Parameters), described on page 210; and M-GE-1b (Detailed Design Plans), described on page 212, would reduce the impact to a less-than-significant level.

The proposed project, in combination with past projects, could result in substantial adverse effects involving landslides. Implementation of Mitigation Measures M-GE-2a (Protection of Private Road From Existing Landslides), described on page 214; M-GE-2b (Stitch Piers), described on page 214; M-GE-2c (Debris Walls), described on page 215; M-GE-2d (Drainage and Erosion Control), described on page 216; M-GE-2e (Existing Fill), described on page 217; M-GE-2f (Creep and Sloughing of Native Soils), described on page 218; and M-GE-2g (Maintenance), described on page 218, would reduce this impact to a less-than-significant level.

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225 *Slab on grade:* A reinforced concrete slab placed directly on the ground to provide the foundation for the superstructure (the part of a building above its foundation.).

The proposed project, in combination with adjacent and immediately surrounding properties, could result in substantial adverse effects involving on- and off-site geologic instability. Mitigation Measures M-GE-3a (Slope Stability), described on page 220; M-GE-3b (Soil Nails), described page 220; M-GE-3c (Design of Retaining Walls), described on page 221; and M-GE-3d (Construction on Steep Slopes), described on page 221, would reduce this impact to a less-than-significant level.

The existing fill at the site, which would not provide acceptable ground support for the proposed project, would result in a cumulatively considerable impact in combination with past projects. Implementation of Mitigation Measures M-GE-1b (Detailed Design Plans), described on page 212; and M-GE-2e (Existing Fill), described on page 217, would reduce this impact to a less-than-significant level.

Cumulative conditions would adversely affect drainage or result in substantial soil erosion of loss of topsoil. Implementation of Mitigation Measures M-GE-1b (Detailed Design Plans), described on page 212; and M-GE-2d (Drainage and Erosion Control), described on page 216 ,would reduce this impact to a less-than-significant level.

In sum, the project could make a considerable contribution to cumulative impacts resulting from other past projects; however, the mitigation measures identified above would reduce the proposed project's contribution to cumulative impacts to ***less-than-significant*** levels.

Conclusion

Based on the above analysis, all impacts of the proposed project on the geology and soils of the project site and immediately surrounding area, including impacts of seismic hazards; landslides; geologic instability, including shallow sloughing/raveling of soils, debris and erosion; existing fill; creep and sloughing of native soils; downslope or lateral soil and/or rock movements on the foundations of the proposed project; drainage; septic tanks; alternative wastewater disposal systems; topography; unique geologic or physical features; and cumulative impacts on geology and soils would be less than significant or would be reduced to less-than-significant levels by implementation of mitigation measures identified in this EIR.

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G. EMERGENCY ACCESS

The Initial Study (Appendix A of this EIR, Topic 12, Hazards) analyzed emergency access impacts of the proposed project on page 45 and concluded that the project would not have any significant impact. Due to the concerns raised by the public regarding this issue, the discussion is included below for informational purposes.

SETTING

Fire protection services to the project area are currently provided by the San Francisco Fire Department (SFFD). The closest fire station is Station No. 12, at 1145 Stanyan Street, about 1.6 miles from the project site. Fire trucks and other emergency vehicles currently access the area on Crestmont Drive without significant delays.[226]

San Francisco ensures fire safety primarily through provisions of the Building Code and the Fire Code. New and existing buildings are required to meet standards contained in these codes. Code provisions related to fire safety include Building Code Section 1.11.1, which requires that all fire alarm system installations, repairs, alterations, and upgrades of existing systems be approved by the San Francisco Fire Department; Building Code Sections 903.3.1.1 and 903.3.5.2, which establish requirements for sprinkler protection of car stackers; Fire Code Section 503.2.1, which stipulates street widths and dimensions of turnarounds in dead-end fire access roads; and Fire Code Section 1029, which establishes safety guidelines for the installation of bars, grills, gates, and similar devices on bedroom windows.

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226 Captain Mario Ballard of the Bureau of Fire Prevention was involved in a pre-application meeting with the sponsor of the former Crestmont Hills project on March 3, 2005. The project as presented met all Fire Code requirements, but an emergency vehicle drive test was requested at that time by the project sponsor. On March 14, 2005, Lieutenant Brendan O'Leary of the Bureau of Fire Prevention conducted a series of tests and measurements with Engine 20 to evaluate access along Crestmont Drive to the proposed project. It was determined that emergency access met all SFFD standards with respect to physical access as well as response time along Crestmont Drive and onto the proposed private street of the project site. Brendan O'Leary, Bureau of Fire Prevention, email to Adam Phillips, December 8, 2006. This email is on file and available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, San Francisco, as part of Case No. 2004.0093E.

IMPACTS

SIGNIFICANCE THRESHOLDS

The project would have a significant effect on the environment in terms of emergency access if it would:

- Impair implementation or physically interfere with an adopted emergency response plan or emergency evacuation plan.

IMPACTS ON EMERGENCY ACCESS

Impact HZ-1: The project would not result in substantial adverse impacts on emergency access. (Less than Significant)

The Initial Study concluded that, although the project could increase the number of calls received from the area or increase the level of regulatory oversight that must be provided as a result of the increased activity on the site, the increase in responsibilities would not be substantial in light of the existing demand for fire protection services provided on the west and north slopes of Mount Sutro. The increase in fire protection demand would not require the construction of any new fire stations, and would not result in any substantial service degradation (see the Initial Study, Topic 7. Utilities/Public Services, on pages 29–30, Appendix A of this EIR).

In 2005, the SFFD preliminarily reviewed the schematic road design for the former Crestmont Hills project (see discussion of project history on page 24) and the junction of the existing Crestmont Drive and the proposed private road, and found that the project design is in compliance with the SFFD's standards with respect to emergency vehicle access.[227] The SFFD also stated that on-street parking would not be permitted on the new private road in order to keep clear the 20-foot road width. The restriction on on-street parking would be enforced through the CC&Rs for the new homeowners association. In addition, the SFFD determined that the new 20-foot-wide private road, including the turn-around at the end, could accommodate their largest vehicles, and provide adequate access to the project site from Crestmont Drive for emergency vehicles and personnel.[228] The SFFD also determined that the former project would conform to the fire safety provisions of the Building Code and the Fire Code.[229] The revised project design submitted to the Planning Department on December 9, 2010 for the current Overlook project did not alter the size or configuration of the proposed emergency vehicle turn-around, and SFFD standards have not

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[227] Michie Wong, SFFD, letter to Alex Novell, August 4, 2005. A copy of this letter is available for public review in Case No. 2004.0093E at the Planning Department, 1650 Mission Street, Suite 400, San Francisco.

[228] Ibid.

[229] Ibid.

changed since the 2005 review. Therefore, the conclusions of the 2005 SFFD review apply to the currently proposed project. As noted above in the Emergency Access Setting section, fire trucks and other emergency vehicles currently access the area on Crestmont Drive without significant delays. The project would not alter the current width or parking controls on Crestmont Drive or cause a high volume of new traffic on Crestmont Drive, and emergency vehicles would be able to travel on Crestmont Drive in the same manner as is done currently.

Fire hazards (including those associated with hillside development) would be reduced through the DBI building permit application review process, which includes Fire Code requirements, and the DPW street permit review process, which includes emergency vehicle access requirements. In addition, the project sponsor's plan would be reviewed by the Office of Emergency Services before the DPW issues a final permit for a new curb cut between the project's private road and the Crestmont Drive right-of-way. The impact on emergency access would be ***less than significant***.

CUMULATIVE

Impact C-HZ-1: The proposed project, in combination with other past, present, and reasonably foreseeable future projects, would not result in cumulatively considerable impacts on emergency access. (Less than Significant)

At the time this EIR was prepared, the Fire Department assessed existing conditions and determined that the site and project area is accessible without significant delays. The project has been designed to meet all Fire and Building Code safety provisions. No other new construction project proposal had been submitted to the City in the vicinity of the project site that, in combination with the proposed project, could generate significant cumulative impacts on emergency access in the project vicinity. For this reason, the proposed project would not contribute to any significant cumulative impacts on emergency access.

CONCLUSION

As noted above, the SFFD has determined that Crestmont Drive provides adequate emergency access to the site, the project design is in compliance with the SFFD's standards with respect to emergency vehicle access, that on-street parking would not be permitted on the new private road in order to keep clear the 20-foot road width, that the new 20-foot-wide private road could accommodate their largest vehicles and provide adequate access for emergency vehicles and personnel, and that the proposed project would conform to the fire safety provisions of the Building Code and the Fire Code. Fire hazards would be reduced through the DBI building permit application review process and the DPW street permit review process, and the project sponsor's plan also would be reviewed by the Office of Emergency Services.

Therefore, the impact of the proposed project on emergency access, both project-specific and cumulative, would be less than significant.

H. CEQA CHECKLIST UPDATE

Since the publication of the Initial Study and NOP (Appendix A) on May 27, 2006, the Planning Department revised its CEQA Initial Study Checklist. On May 23, 2006, the Board of Supervisors adopted Ordinance 116-06, amending San Francisco Administrative Code Section 31.10, which directs the City to use a CEQA Initial Study Checklist based on the form included in Appendix G of the State CEQA Guidelines. Accordingly, the Planning Department adopted a new Initial Study Checklist, which is consistent with Appendix G but also incorporates additional questions and significant impact criteria specific to the urban environment of San Francisco. Subsequently, in response to the State Governor's Office of Planning and Research (OPR) changes to the CEQA Guidelines, the Planning Department updated its Initial Study Checklist, to be effective March 18, 2010. Both updates resulted in the inclusion of some questions and criteria which were not included in the San Francisco Overlook Development project's Initial Study, published on May 27, 2006, before the Planning Department updated the Initial Study Checklist. The following discussion updates the analysis regarding the proposed project's environmental effects with respect to those issues that have been added to the Planning Department's CEQA Checklist since the publication of the Initial Study in 2006. Under each topic below, the checklist questions that are new or revised are listed, followed by discussion of the associated impacts.

Since the 2006 publication of the Initial Study, the Board of Supervisors has approved a series of amendments to the Building and Health Codes generally referred to as the Construction Dust Control Ordinance (Ordinance 176-08, effective July 30, 2008), with the intent of reducing fugitive dust generated during site preparation, demolition and construction work in order to protect the health of the general public and of on-site workers, minimize public nuisance complaints, and to avoid orders to stop work by the DBI, which effectively codifies the measures included in Initial Study Mitigation Measure 2 (Construction Air Quality). Therefore, it is no longer necessary to identify this mitigation measure for the proposed project because it is required by law for all projects. The proposed project's effects on construction air quality would remain less than significant (see Section IV.D. Air Quality, Impact AQ-1, on page 143, for additional discussion).

Other updates have been added due to requirements related to environmental topics that have been implemented since 2006 and/or revised mitigation measures. For instance, new City requirements include the Stormwater Management Ordinance (2010), which was enacted to require that development resulting in ground disturbance of 5,000 square feet or more incorporate on-site stormwater control measures through the incorporation of elements described in the City's Stormwater Design Guidelines (SDGs). The discussion in this chapter updates the analysis regarding the proposed project's environmental effects with respect to those issues.

CULTURAL AND PALEONTOLOGICAL RESOURCES

Would the project:

c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

d) Disturb any human remains, including those interred outside of formal cemeteries?

Impact CP-1: The excavation associated with the proposed project may destroy, directly or indirectly, a unique paleontological resource or site or unique geologic feature. (Less than Significant With Mitigation)

Paleontology is a multidisciplinary science that combines elements of geology, biology, chemistry, and physics in an effort to understand the history of life on earth. Paleontological resources, or fossils, are the remains, imprints, or traces of once-living organisms preserved in rocks and sediments. Paleontological resources include vertebrate, invertebrate, and plant fossils or the trace or imprint of such fossils. The fossil record is the only evidence that life on earth has existed for more than 3.6 billion years. Fossils are considered non-renewable resources because the organisms from which they derive no longer exist. Thus, once destroyed, a fossil can never be replaced. Paleontological resources are lithologically dependent; that is, deposition and preservation of paleontological resources are related to the lithologic unit in which they occur. If the rock types representing a deposition environment conducive to deposition and preservation of fossils are not favorable, fossils will not be present. Lithological units that may be fossiliferous include sedimentary and volcanic formations.

The site is underlain by chert of the Franciscan Formation, a sedimentary rock that may contain fossils. The excavation for the proposed project could penetrate this fossiliferous material. Thus, there is a possibility of encountering paleontological resources and the impact would be ***significant***. Mitigation Measure M-CP-1 addresses the possibility of inadvertent discovery of paleontological resources, reducing this impact to a ***less-than-significant*** level.

Mitigation Measure M-CP-1 (Paleontological Assessment):

In the event that any project soils-disturbing activities reveal evidence of a paleontological resource (fossilized vertebrate, invertebrate, and plant remains or the trace or imprint of such remains), the project sponsor shall contact the ERO and a qualified paleontologist[230] to undertake

230 Qualified Paleontologist: A paleontologist meeting the professional qualifications standards of the Society of Vertebrate Paleontology.

an appropriate assessment of the discovery and, if warranted, further field evaluation, data recovery, documentation, recordation, and curation in accordance with the Standard Guidelines for the Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontological Resources of the Society of Vertebrate Paleontology (SVP).

Impact CP-2: The excavation associated with the proposed project may disturb buried human remains. (Less than Significant With Mitigation)

As discussed in the Initial Study in Topic 13. Cultural Resources, on pages 46–47, Appendix A of this EIR, no evidence is apparent to suggest that archeological resources, including human remains, are present within the project site. However, it is possible that human remains could be discovered during excavation at the project site, resulting in a ***significant*** impact. While accidental discovery is not likely, if any human remains are found, implementation of Mitigation Measure M-CP-2, described below, which stipulates compliance with California law regarding the discovery of human remains during construction, would mitigate adverse impacts to a ***less-than-significant*** level.

Mitigation Measure M-CP-2 (Buried Human Remains):

The treatment of human remains and of associated or unassociated funerary objects discovered during any soils disturbing activity shall comply with applicable State and Federal laws. This shall include immediate notification of the Coroner of the City and County of San Francisco and in the event of the Coroner's determination that the human remains are Native American remains, notification of the California State Native American Heritage Commission (NAHC) who shall appoint a Most Likely Descendant (MLD) (Pub. Res. Code Sec. 5097.98). The archeological consultant, project sponsor, and MLD shall make all reasonable efforts to develop an agreement for the treatment of, with appropriate dignity, human remains and associated or unassociated funerary objects (CEQA Guidelines. Sec. 15064.5(d)). The agreement should take into consideration the appropriate excavation, removal, recordation, analysis, custodianship, curation, and final disposition of the human remains and associated or unassociated funerary objects.

Impact C-CP-1: The proposed project, in combination with past, present, and reasonably foreseeable future projects, would not result in cumulatively considerable impacts to cultural or paleontological resources. (Less than Significant)

Given that there is no building on the project site nor is the project site within an adopted or potential historic district, the proposed project would not result in a cumulatively considerable impact to historic architectural resources. As detailed above, the proposed project's effect on potential paleontological resources and buried human remains would be less than significant.

Therefore, the project would not result in a cumulatively considerable impact on paleontological resources or buried human remains. At the time of preparation of this EIR, no other new project proposal had been submitted to the City in the vicinity of the project site that would be expected to create a cumulatively considerable impact to cultural or paleontological resources. Therefore, the proposed project, in combination with existing development and reasonably foreseeable future projects, would not result in a cumulatively considerable impact to cultural and paleontological resources.

NOISE

Would the project:

e) For a project located within an airport land use plan area, or, where such a plan has not been adopted, in an area within two miles of a public airport or public use airport, would the project expose people residing or working in the area to excessive noise levels?

g) Be substantially affected by existing noise levels?

Impact NO-1: Construction of the proposed project would not generate excessive groundborne vibration or groundborne noise levels. (Less than Significant)

As discussed in the Initial Study, on pages 20–21, Appendix A of this EIR, construction vibrations are generally assessed by the maximum rate of ground movement, or peak particle velocity (ppv), which is typically expressed in terms of inches per second (in/sec). The greatest vibration-generating construction activities would include use of bulldozers and caisson drilling. Based on published data, these activities produce ppv vibration levels of 0.089 in/sec.[231] While construction–generated vibration would be barely to distinctly perceptible to people in the residences nearest the project site, Caltrans reports that there would be virtually no risk of "architectural" damage to normal buildings at levels of 0.10 in/sec. Therefore, there would be virtually no risk of damage to nearby structures. The impact of groundborne vibration and noise would be ***less than significant***.

Impact NO-2: Construction activities of the proposed project could generate noise in excess of applicable construction noise standards. (Less than Significant with Mitigation)

As discussed in the Initial Study, on pages 19–20, demolition, excavation, and building construction would temporarily increase noise in the project vicinity. Construction equipment would generate noise that could be considered an annoyance by occupants of nearby properties.

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231 Illingworth and Rodkin, *Crestmont Hills, San Francisco – Noise and Construction Vibration Assessment*, February 9, 2005. A copy of this letter is available for public review in Case No. 2004.0093E at the Planning Department, 1650 Mission Street, Suite 400, San Francisco.

According to the project sponsor, the construction period would last approximately 23 months. Construction noise levels would fluctuate depending on the construction phase, equipment type and duration of use, distance between noise source and listener, and presence or absence of barriers. Impacts would generally be limited to the period during which new foundations and exterior structural and façade elements would be constructed. Pile driving would not occur. Interior construction noise would be substantially reduced by newly constructed exterior walls.

Construction noise is regulated by the San Francisco Noise Ordinance (Article 29 of the Police Code), amended in November 2008, after the Initial Study was prepared. The ordinance requires that noise levels from individual pieces of construction equipment, other than impact tools, not exceed 80 dBA at a distance of 100 feet from the source. Impact tools (jackhammers, hoe-rammers, impact wrenches) must have both intake and exhaust muffled to the satisfaction of the Director of Public Works or the Director of Building Inspection. Section 2908 of the Ordinance prohibits construction work between 8:00 p.m. and 7:00 a.m., if noise would exceed the ambient noise level by 5 dBA at the project property line, unless a special permit is authorized by the Director of Public Works or the Director of Building Inspection. The project must comply with regulations set forth in the Noise Ordinance.

The closest sensitive noise receptors to the project site that may be adversely affected by construction noise are residents located near the project site, including residents of the Kirkham Heights Apartments and the Avalon Sunset Towers Apartment complex below the site's north portion, the apartment buildings and single-family residences downhill to the west and southwest along Warren Drive, the single-family and two-family residences built into the hill on Crestmont Drive to the south and uphill from the project site, and the two-unit residential building at 505-507 Crestmont Drive, northeast of the project site. Construction activities (other than pile driving) typically generate noise levels no greater than 90 dBA (for instance, for excavation) at 50 feet from the activity, while other activities, such as concrete work, are much less noisy. Because noise generally attenuates (decreases) at a rate of 6 to 7.5 dBA per doubling of distance, the exterior noise level at the nearby sensitive receptors, as listed above, would be no greater than about 75 dBA during the noisiest activities, and less during other aspects of construction. At this noise level, closed windows usually can reduce daytime interior noise levels to an acceptable level. Nevertheless, construction noise could be a ***significant*** impact, which would be reduced to a ***less-than-significant*** level by complying with the San Francisco Noise Ordinance (Article 29 of the Police Code). In addition, implementation of Mitigation Measure 1 (Construction Noise) identified in the Initial Study, Appendix A of this EIR, stipulates that specific construction noise control measures are required. This measure is presented in Table S-2, beginning on page S-43.

Impact NO-3: The proposed project would not expose people to excessive airport noise levels. (Less than Significant)

The project site is not within an airport land use plan area, nor is it in the vicinity of a private airstrip, and therefore, would not expose people residing or working in the area to excessive airport-related noise levels. The impact of airport noise would be ***less than significant***.

Impact C-NO-1: The proposed project, in combination with past, present, and reasonably foreseeable future projects, would not result in a cumulatively considerable noise impact. (Less than Significant)

At the time of preparation of this EIR, no other new project construction proposal in the vicinity of the project site had been submitted to the City. The proposed project, in combination with past, present, and reasonably foreseeable future projects, would not result in a cumulatively considerable noise impact.

If a new development or major rehabilitation application is received that could generate substantial construction noise, its construction would not be expected to occur at the same time as the proposed project's construction. Similar to the proposed project, operational noise for any future uses in the vicinity of the project would be expected to be less than significant. In light of the above, the proposed project would not result in a cumulatively considerable contribution to construction or operational noise impacts.

RECREATION

Would the project:

a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facilities would occur or be accelerated?

b) Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?

c) Physically degrade existing recreational resources?

Impact RE-1: Development of the proposed project would not increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facilities would occur or be accelerated. (Less than Significant)

In 1998, the City of San Francisco initiated the Great Parks for a Great City Assessment Project to determine the condition of the park system as well as to determine future needs. In August of 2004, the San Francisco Recreation and Park Department published a Recreation Assessment Report that presented the results of that evaluation and a five-year action plan to enhance the City's recreational facilities and services.[232] Nine service area maps were developed for the Recreation Assessment Report. The service area maps were intended to help the Recreation and Park Department assess service delivery standards, effectiveness, and equity. The *San Francisco General Plan*'s Recreation and Open Space Element contains an evaluation of neighborhoods' needs for recreation and open space resources.[233] The project vicinity and surrounding areas are not identified as underserved, although the project vicinity is assessed as a protected area where street space for recreation and landscaping should be undertaken where possible.

Recreation properties near the project site include UCSF's Mount Sutro Open Space Reserve (on the opposite side of Crestmont Drive to the east) and the Recreation and Park Department's Golden Gate Park (located approximately 0.7 mile to the north of the project site, although travel from the project site to the Park would involve descending a hill and travelling a greater distance due to the local topography and pedestrian and roadway network). The project would not include any public recreational facilities, but it would be within walking distance of the Mount Sutro Open Space. Thus, project residents would have convenient access to public open space. The additional residents of the project would not substantially increase demand for or use of Mount Sutro Open Space Reserve or citywide facilities, such as Golden Gate Park, to the extent that substantial physical deterioration would occur. The incremental addition of up to 80 residents[234] of the proposed project would not require the construction of new recreational facilities or the expansion of existing facilities. The project would not have a direct effect on existing recreational facilities.

The *Planning Code* requires 100 square feet of private open space for each dwelling unit, or 133 square feet of common usable open space per dwelling unit, totaling 3,400 square feet of private open space, or 4,522 square feet of common usable open space, for the whole project. The project sponsor proposes a total of 10,300 square feet of decks and roof decks to provide private open space for 28 of the dwelling units, which would exceed the private open space requirement of 100 square feet per unit (2,800 square feet for

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232 San Francisco Recreation and Park Department, Recreation Assessment Report, August 2004. This document is on file and available for public review at the Planning Department, 1650 Mission Street, Suite 400. This document is available on the internet at: http://sf-recpark.org/ftp/uploadedfiles/wcm_recpark/Notice/SFRP_Summary_Report.pdf. Accessed 16 September , 2011.

233 *San Francisco General Plan*, Recreation and Open Space Element, Map 9, Neighborhood Recreation and Open Space Improvement Priority Plan. This document is available for review on the Planning Department's website (http://www.sf-planning.org/).

234 Based on 2.34 residents per owner-occupied dwelling unit in Census Tract 301.02, per Table QT-H3 Household Population and Household Type by Tenure: 2010, available on the internet at: http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC_10_SF1_QTH3&prodType=table. Accessed 16 September 2011.

28 units). For the other six units, 800 square feet of common usable open space would be provided, which would meet the *Planning Code* requirement for common open space of 133 square feet per unit.

The impact on parks and recreational facilities would be ***less than significant***.

Impact RE-2: Development of the proposed project would not include the construction of recreational facilities nor require the expansion of existing recreational facilities. (No Impact)

The proposed project would not include the construction of new recreational facilities, and the proposed project's 34 residential units would not require the expansion of existing facilities. There would be ***no impact***.

Impact RE-3: The proposed project would not physically degrade existing recreational resources. (Less than Significant)

As discussed in Impact RE-1, on page 238, the proposed project would not substantially increase demand for or use of recreational resources, such as neighborhood parks, and regional and citywide recreational facilities, to the extent that substantial physical deterioration would occur. The proposed project's impact on existing recreational resources would be ***less than significant***.

Impact C-RE-1: The proposed project, in combination with past, present, and reasonably foreseeable future projects, would not result in a cumulatively considerable impact to recreational facilities. (Less than Significant)

At the time of the preparation of this EIR, no other new development proposal in the project vicinity had been submitted to the City. Given this fact and in light of the discussions above, the proposed project, in combination with existing development and reasonably foreseeable future development, would not result in a cumulatively considerable impact to recreational parks and facilities.

UTILITIES AND SERVICE SYSTEMS

Would the project:

a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?

g) Comply with federal, state, and local statutes and regulations related to solid waste?

The Initial Study, prepared in 2006 (see Appendix A), evaluates impacts of the proposed project on water supply facilities on pages 32–33, based on San Francisco's 2000 and 2005 *Urban Water Management Plans*. In June 2011, the *2010 Urban Water Management Plan* was adopted.[235] The updated information contained

[235] The *2010 Urban Water Management Plan* for San Francisco is available online at http://sfwater.org/index.aspx?page=75, accessed December 2, 2011.

in the *2010 Urban Water Management Plan* does not alter the conclusions of the Initial Study that project water demand could be accommodated by the existing and planned supply, and that the project would incorporate best-practices water conservation devices and therefore would not result in a substantial increase in water use.

The Initial Study, on page 32 (see Appendix A), states that the project sponsor and project building contractor must comply with Ordinance 175-91, which requires that non-potable water be used for dust control activities, and that reclaimed water from the Clean Water Program shall be obtained for this purpose. At the time this EIR was prepared, recycled water was provided by the San Francisco Public Utilities Commission's Wastewater Enterprise, which operates a recycled water truck-fill at the Southeast Water Pollution Control Plant. This change does not alter the conclusion of the Initial Study that the proposed project would not result in a significant impact on water use.

Impact UT-1: Implementation of the proposed project would not exceed wastewater treatment requirements of the Regional Water Quality Control Board. (Less than Significant)

Wastewater generated by the subject residential project would consist of typical domestic wastewater. Project-related wastewater and stormwater under the proposed project would flow through the City's combined stormwater and sewer system to the Oceanside Water Pollution Control Plant. There, it would be treated to meet the standards contained in the City's National Pollutant Discharge Elimination System (NPDES) Permit prior to discharge into the Bay. Because the Regional Water Quality Control Board (RWQCB) sets NPDES permit standards, the proposed project would not conflict with RWQCB requirements. The impact on wastewater treatment requirements would be ***less than significant***.

Impact UT-2: The proposed project would comply with federal, state, and local statutes and regulations related to solid waste. (No Impact)

The California Integrated Waste Management Act of 1989 (Assembly Bill [AB] 939) requires municipalities to adopt an Integrated Waste Management Plan (IWMP) to establish objectives, policies, and programs relative to waste disposal, management, source reduction, and recycling. Reports filed by the San Francisco Department of the Environment showed that the City generated 1.88 million tons of waste material in 2002. Approximately 63 percent (1.18 million tons) was diverted through recycling, composting, re-use, and other efforts while 700,000 tons went to a landfill.[236] San Francisco residents currently divert approximately 72 percent of their solid waste to recycling and composting, which met

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236 San Francisco Office of the Controller, Community Indicators Report. This document is available for public review online at http://www.sfgov.org/wcm_controller/community_indicators/physicalenvironment/index.htm, accessed February 29, 2012.

the goal of 75 percent diversion by 2010 and brought the City's residents closer to the goal of 100 percent by 2020.[237]

The solid waste associated with construction of the proposed project would be required to divert 65 percent of all non-hazardous construction waste for recycling and re-use, as required by the Construction, Demolition, and Debris Ordinance, San Francisco Ordinance No. 27-06. Furthermore, the proposed project would be required to comply with City's Ordinance 100-09, the Mandatory Recycling and Composting Ordinance, which requires everyone in San Francisco to separate and store their refuse into recyclables, compostables, and trash for pick-up service. The project would comply with applicable laws and regulations related to solid waste. Therefore, the proposed project would not have an impact related to solid waste.

Impact C-UT-1 The proposed project, in combination with past, present, and reasonably foreseeable future projects, would not result in a cumulatively considerable impact to utilities and service systems. (Less than Significant)

At the time of the preparation of this EIR, no other project development proposal in the project vicinity had been submitted to the City. Existing service provision plans address anticipated growth in the region. Existing and future development would generally be considered as part of growth forecast in the 2005 *Urban Water Management Plan*. In light of the discussions above, the proposed project, in combination with existing development and reasonably foreseeable future development, would not result in cumulatively considerable impact on water supply. The proposed project, in combination with existing development and reasonably foreseeable future projects would not exceed the growth projections of the Urban Watershed Plan.

Since no other project development proposals in the project vicinity had been submitted to the City at the time of the preparation of this EIR, cumulative development is not expected to exceed the wastewater requirements of the RWQCB. Any potential cumulative development would be required to comply with federal, state, and local statutes and regulations related to solid waste. Evaluation of the City's sewer system is under Section IV.H. Hydrology and Water Quality, beginning on page 244, which discusses the combined stormwater/wastewater system capacity.

For the reasons discussed above, the proposed project would not result in a cumulatively considerable impact to utilities and service systems.

237 San Francisco Department of the Environment. Zero Waste. This document is on file and available for public review at the Planning Department, 1650 Mission Street, 4th Floor. Also, http://sfgov.org/site/frame.asp-u=http://www.sfenvironment.org.

PUBLIC SERVICES

Would the project:

a) Result in substantial adverse physical impacts associated with the provision of, or the need for, new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any public services such as fire protection, police protection, schools, parks, or other services?

Impact PS-1: The proposed project would not result in substantial, adverse physical impacts associated with the provision of or the need for new or physically altered governmental facilities such as fire and police protection, schools, parks, or other services. (Less than Significant)

The Initial Study, Appendix A of this EIR, on pages 29–31, evaluated impacts on fire protection, police protection, and schools, but did not evaluate impacts on parks because this issue was not specifically included under the Public Services topic in the previous checklist. As discussed in Recreation, on pages 238–240, the proposed project would have a less-than-significant impact on parks. In addition, the proposed project would also have a ***less-than-significant*** impact on governmental facilities, such as fire and police stations, and public schools.

Impact C-PS-1: The proposed project, in combination with other past, present, or reasonably foreseeable future projects, would not result in cumulatively considerable public services impacts. (Less than Significant)

At the time of the preparation of this EIR, no other project development proposals in the site vicinity had been submitted to the City. Given this fact and in light of the discussions above, the proposed project, in combination with existing development and reasonably foreseeable future development, would not result in a cumulatively considerable impact to public services.

BIOLOGICAL RESOURCES

Would the project:

f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

As noted in the Initial Study, on page 40, Appendix A of this EIR, the project site and project area do not include any riparian habitats or wetlands, and the proposed project would not interfere substantially with the movement of any native or migratory species or their migration corridors. Implementation of Mitigation Measure 3 on page S-45 of this EIR, and on pages 51–52 of the Initial Study, in Appendix A of this EIR, which stipulates protections for nesting birds, would reduce the project's effect on potential nesting and nursery sites to a less-than-significant level.

Impact BI-1: The proposed project would not conflict with an adopted habitat conservation plan. (Not Applicable)

The project site and project area are not part of any adopted habitat conservation plans. The issue of habitat conservation plans is ***not applicable*** to the proposed project.

Impact C-BI-1: The proposed project, in combination with other past, present, or reasonably foreseeable future projects, would not result in a cumulatively considerable impact to biological resources. (Less than Significant)

At the time of the preparation of this EIR, no other project development proposals in the site vicinity had been submitted to the City. Given this fact, and the fact that the proposed project would avoid or minimize impacts to biological resources with implementation of Mitigation Measure 3 (Pre-Construction Nest Survey), on pages S-45–S-47 of this EIR, and on pages 51–52 of the Initial Study, in Appendix A of this EIR, the proposed project, in combination with past projects and reasonably foreseeable future projects, would not result in a cumulatively considerable impact to biological resources.

HYDROLOGY AND WATER QUALITY

Would the project:

a) Violate any water quality standards or waste discharge requirements?

b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted)?

c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?

d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?

e) Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

f) Otherwise substantially degrade water quality?

g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other authoritative flood hazard delineation map?

h) Place within a 100-year flood hazard area structures that would impede or redirect flood flows?

i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?

j) Expose people or structures to a significant risk of loss, injury or death involving inundation by seiche, tsunami, or mudflow?

As discussed in greater detail in Section IV.F Geology and Soils, on page 195, groundwater was observed in eight test borings. Groundwater was not found in five of the borings. In the other three borings, the overall amount of water was relatively minor and was limited to isolated zones of seepage, which appear to be flowing along fractures in the rock at depths ranging from nine to 56 feet. No spring or area of seepage was observed on the project site during a geologic reconnaissance. Historically, active springs were observed at several off-site locations. A 10- to 12-inch diameter sewer/storm drain main, connected to several laterals extending in various directions, appears to be present underneath the dirt road on the project site, within the private easement.

Several landslides were documented in the immediate vicinity of the project site. On page 185 of this EIR, it is noted that a shallow slide occurred on a private road behind the properties of 455, 475, and 485 Warren Drive, west and southwest of the project site. The likely causes of the landslides were heavy precipitation, surface runoff from an upslope driveway, improper functioning of a concrete drainage ditch, and/or leaks of the sewer line beneath the driveway. Other landslides have been noted in the vicinity of the 302 to 340 Warren Drive area, at the bottom of the 451 Crestmont Drive property, south of the middle portion of the project site, and 375 to 411 Crestmont Drive.

In addition to the landslides documented in previous studies, a portion of an existing landslide located at the northeast corner of the project site was observed. This landslide is predominantly an off-site, upslope feature, but an approximately 400-square-foot area of the landslide extends into the northeast corner of the project site.

On May 22, 2010, after the Initial Study was distributed, the Stormwater Management Ordinance (SMO) was enacted to improve San Francisco's environment by reducing stormwater runoff and runoff pollution in areas of new development and redevelopment through compliance with the Stormwater Design Guidelines (SDG). The San Francisco Public Utilties Commission (SFPUC) and the Port of San Francisco (Port) administer stormwater management programs developed in accordance with the federal Clean Water Act (CWA) and a State of California National Pollutant Discharge Elimination System (NPDES) permit. In November 2009, the Port and SFPUC released new guidelines for the management of stormwater. The new guidelines describe the planning, sizing approaches, and regulatory framework for developing new infrastructure in a manner that retains, reuses, or treats stormwater runoff on site. These guidelines apply to any development or redevelopment project disturbing more than 5,000 square feet of ground surface in both the separate storm sewer (MS4) areas as well as combined sewer areas under either SFPUC or Port jurisdiction. The project would comply with the Stormwater Management Ordinance.[238]

The San Francisco Stormwater Design Guidelines encourage the use of Low Impact Design approaches to comply with stormwater management requirements. Low Impact Design solutions apply decentralized site strategies to manage the quantity and quality of stormwater runoff and include, but are not limited to, best management practices (BMPs) such as cisterns, green roofs, bioretention basins and planters, permeable pavements, infiltration trenches, and constructed wetlands. The SDGs require the development of a Stormwater Control Plan (SCP) that identifies responsible parties, funding sources, maintenance activities, and schedules for all BMPs, including an operations and maintenance plan. The SFPUC Urban Watershed Management Group must approve the SCP and associated operations and maintenance plan. The project would incorporate low-impact design strategies, such as water-efficient landscaping and irrigation.

Impact HY-1: The proposed project would not violate any water quality standards or waste discharge requirements. (Less than Significant)

As discussed on page 27 of the Initial Study (see Appendix A), project-related wastewater and stormwater would flow to the Oceanside Water Pollution Control Plant, where it would be treated to the standards in the City's National Pollutant Discharge Elimination System (NPDES) permit prior to discharge. Construction of the proposed project would comply with requirements in the *California Building Code* to control erosion. During occupancy, the project would comply with all local wastewater discharge requirements, including treatment standards contained in the City's National Pollutant Discharge Elimination System (NPDES). For these reasons, the project would have ***less-than-significant*** impacts on water quality and waste discharge.

Impact HY-2: The proposed project would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level. (Less than Significant)

The proposed project would not use groundwater. The proposed project, consisting of 34 dwelling units and a new private cul-de-sac street, would add impervious surfaces on the project site, but would not substantially interfere with groundwater recharge such that there would be a net deficit in aquifer

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238 Erik P. Scheller, PE, QSD, KCA Engineers, Inc., *Letter to Adam Phillips, Project Manager, San Francisco Overlook Development, LLC, RE: San Francisco Overlook off Crestmont Drive*, September 19, 2011. This letter is available for public review in Case No. 2004.0093E at the Planning Department, 1650 Mission Street, Suite 400, San Francisco.

volume or a lowering of the local groundwater table level. The impact on groundwater supplies and groundwater recharge would be ***less than significant***.

Impact HY-3: The proposed project could substantially alter the existing drainage pattern of the site or area in a manner which would result in substantial erosion or siltation on- or off-site. (Less than Significant with Mitigation)

As discussed on page 42 of the Initial Study (see Appendix A), the drainage system of the proposed project would comply with the *California Building Code*, Chapter 33 stipulation for an Engineered Grading Permit, which requires, among other items, identification of drainage plans including walls and other protective devices, estimation of runoff from the project site, and a sequence of cut and fill operations in a manner that assures interim stability of the site during project construction. The Initial Study (see Appendix A), indicated that the proposed new sewer lines on the project site, in combination with the existing sewer lines serving the site, would be adequate to accommodate the additional stormwater and wastewater generated by the proposed project. Subsequent analysis of the estimated project-generated stormwater and wastewater flow volumes was conducted by the SFPUC and DPW, Bureau of Engineering Hydraulics Section. These agencies concluded that the existing combined stormwater and wastewater main system in the project area has adequate capacity to handle the projected flows, provided that the project would comply with the City's Stormwater Design Guidelines.[239] The project would comply with these required guidelines. Therefore, the project operation would have a ***less-than-significant*** effect on the existing capacity of the combined stormwater and wastewater main system. More detailed analysis of the project-generated stormwater and wastewater flows would be conducted during the subsequent building permit application review process.

Most of the existing vegetation on the project site would be removed for construction of the proposed project, which could increase erosion on the site. This would be a ***significant*** impact on erosion.

Construction of the proposed project would comply with requirements in the *California Building Code* to control erosion. As noted in Chapter II. Project Description, the proposed project would include Geotechnical Feature 8: Drainage and Erosion Control, which consists of various measures to control drainage and erosion on the site, and Geotechnical Feature 13: Maintenance, for ongoing maintenance of the drainage and erosion control measures. Mitigation Measure M-GE-2d (see Section IV.F. Geology and

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239 Irina Torrey, Bureau of Environmental Management, San Francisco Public Utilities Commission, to Bill Wycko, Environmental Review Officer, San Francisco Planning Department, *Interoffice Memorandum, San Francisco Overlook Residential Development, April 12, 2012.* This memorandum is on file and available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, San Francisco, as part of Case No. 2004.0093E

Soils, page 216) stipulates the types and design of drainage and erosion control measures, and Mitigation Measure M-GE-2g (see Section IV.F. Geology and Soils, page 218) stipulates the monitoring and maintenance requirements for those drainage and erosion control measures, that would be required to reduce the project's drainage and erosion impacts to less than significant levels. With compliance with *California Building Code* requirements for erosion control, and implementation of the Geotechnical Features and Mitigation Measures identified above, the project would have a ***less-than-significant*** impact on erosion, both on- and off-site.

Impact HY-4: The proposed project could substantially alter the existing drainage pattern of the site or area, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site. (Less than Significant with Mitigation)

As discussed on page 42 of the Initial Study (see Appendix A) and above under Impact HY-3, the drainage system of the proposed project would comply with the *California Building Code* stipulation for an Engineered Grading Permit, which requires, among other items, identification of drainage plans and estimation of runoff from the project site. As noted under Impact HY-3, the proposed new sewer lines on the project site, in combination with the existing sewer lines serving the site, would be adequate to accommodate the additional stormwater and wastewater generated by the proposed project provided that the project would comply with the required Stormwater Management Ordinance and Stormwater Design Guidelines. The project wwould comply with the Ordinance and the required Guidelines.

As noted in Chapter II. Project Description, pages 47–49, the proposed project would include Geotechnical Feature 8: Drainage and Erosion Control, which contains various measures to control drainage on the site, and Geotechnical Feature 13: Maintenance, for ongoing maintenance of the drainage control measures. Mitigation Measure M-GE-2d (see Section IV.F. Geology and Soils, page 216) stipulates the types and design of drainage control measures, and Mitigation Measure M-GE-2g (see Section IV.F. Geology and Soils, page 218) stipulates the monitoring and maintenance requirements for those drainage control measures, that would be required to reduce the project's drainage impacts to less–than-significant levels. Compliance with the requirements for an Engineered Grading Permit, and implementation of the Geotechnical Features and Mitigation Measures identified above, in addition to compliance with the Stormwater Design Guidelines, would control drainage and flooding on- and off-site. Therefore, the project would have a ***less-than-significant*** impact on drainage and flooding.

Impact HY-5: The proposed project would not create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff. (Less than Significant)

As discussed on pages 42-43 of the Initial Study (see Appendix A), project-related wastewater and stormwater would flow to the Oceanside Water Pollution Control Plant, where it would be treated to the standards in the City's National Pollutant Discharge Elimination System (NPDES) permit prior to discharge. The drainage system of the proposed project would comply with the *California Building Code* stipulation for an Engineered Grading Permit, which requires, among other items, identification of drainage plans and estimate of runoff from the project site. As discussed on pages 28-29 of the Initial Study (see Appendix A), the proposed project would contribute stormwater runoff and wastewater to the City's existing combined stormwater – wastewater system. As noted under Impacts HY-3 and HY-4, the estimated project-generated stormwater and wastewater flow volumes would not be substantial, and there would be adequate capacity for the existing system to collect the project-generated flow volumes, provided the project complies with the City's required Stormwater Management Ordinance and Stormwater Design Guidelines.

Compliance with the City's Stormwater Management Ordinance and the Stormwater Design Guidelines, thus reducing its contribution to the existing combined system. Stormwater design guidelines that the project would incorporate or implement include development of a Stormwater Control Plan (SCP) that identifies responsible parties, funding sources, maintenance activities, and schedules for all best management practices (BMPs), including an operations and maintenance plan. Examples of BMPs include cisterns, green roofs, bioretention basins and planters, permeable pavements, infiltration trenches, and constructed wetlands. The SFPUC Urban Watershed Management Group must approve the SCP and associated operations and maintenance plan.

Given the required compliance and implementation described above, the project would have a less-than-significant impact on the capacity of stormwater drainage systems, and would not create substantial additional sources of polluted runoff. This impact would be ***less than significant***.

Impact HY-6: The proposed project would not otherwise substantially degrade water quality. (Less than Significant)

As discussed under Impact HY-1 above, the project would comply with all local wastewater discharge requirements. The proposed project would not otherwise generate substantial water contaminants. For these reasons, the project would have a ***less-than-significant*** impact on water quality.

Impact HY-7: The proposed project would not place housing within a 100-year flood hazard area. (No Impact)

Flooding hazard is not an issue because the project area is not subject to flooding. The proposed project would construct housing but it would not be within a 100-year flood hazard area. There would be ***no impact*** related to housing within a 100-year flood hazard area.

Impact HY-8: The proposed project would not place structures within a 100-year flood hazard area that would impede or redirect flood flows. (No Impact)

Flooding hazard is not an issue because the project area is not subject to flooding. The proposed project would not place structures within a 100-year flood hazard area that would impede or redirect flood flows. There would be ***no impact*** related to structures within a 100-year flood hazard area affecting flood flows.

Impact HY-9: The proposed project would not expose people or structures to risk of flooding, including flooding as a result of the failure of a levee or dam. (No Impact)

The project site is not subject to inundation in the event of reservoir failure or levee failure. There would be ***no impact*** related to flooding, including failure of a levee or dam.

Impact HY-10: The proposed project could expose people or structures to risk of inundation by seiche, tsunami, or mudflow. (Less than Significant with Mitigation)

The project site is not in an area prone to seiche or tsunami. There would be ***no impact*** related to seiche or tsunami.

Most of the existing vegetation on the project site would be removed, and excavation would occur as part of project construction, which could increase the risk of mudflow on- and off-site. The risk associated with mudflow would be a ***significant*** impact. Implementation of Mitigation Measure M-GE-1b (Detailed Design Plans), on page 212; Mitigation Measure M-GE-2a (Protection of Private Road From Landslides), on page 214; Mitigation Measure M-GE-2b (Stitch Piers), on page 214; Mitigation Measure M-GE-2c (Debris Walls), on page 215; Mitigation Measure M-GE-2d (Drainage and Erosion Control), on page 216; Mitigation Measure M-GE-2e (Existing Fill), on page 217; Mitigation Measure M-GE-2f (Creep and Sloughing of Native Soils), on page 218; Mitigation Measure M-GE-2g (Maintenance), on page 218; and Mitigation Measure M-GE-1b (Detailed Design Plans), on page 212, would reduce risk associated with mudflow to a ***less-than-significant*** level.

Impact C-HY-1: The proposed project, in combination with other past, present, or reasonably foreseeable future projects, could result in cumulatively considerable hydrology impacts. (Less than Significant with Mitigation)

As discussed above, the proposed project could have significant impacts by altering the existing drainage pattern of the site or area such that substantial erosion or siltation could result on- or off-site, resulting in a ***cumulatively considerable*** impact. However, with implementation of mitigation measures, M-GE-2d (Drainage and Erosion Control), on page 216, in Section IV.F. Geology and Soils, and M-GE-2g (Maintenance), on page 218, in Section IV.F. Geology and Soils, the project's contribution to cumulative drainage and erosion impacts would be reduced to *less-than-significant* levels.

In addition, the proposed project could substantially increase the rate or amount of surface run-off in a manner that would result in flooding on- or off-site, resulting in a ***cumulatively considerable*** impact. However, with implementation of mitigation measures, M-GE-2d (Drainage and Erosion Control), and M-GE-2g (Maintenance), the project's impacts on drainage and flooding on- and off-site would be reduced to less-***than-significant*** levels.

At the time of preparation of this EIR, no other proposed new project development in the project area had been submitted to the City that could result in impacts to on- and off-site drainage, erosion and flooding.

In summary, the project could make a considerable contribution to cumulative impacts resulting from other past projects; however, the implementation of the mitigation measures identified above and described in Section IV.F Geology and Soils would reduce the proposed project's contribution to cumulative impacts to less-than-significant levels.

HAZARDS AND HAZARDOUS MATERIALS

Would the project:

c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?

f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?

Impact HZ-3: The proposed project would not generate hazardous emissions or handle hazardous materials in the vicinity of a school. (Less than Significant)

As discussed in the Initial Study in Topic 12. Hazards, on pages 44–45, Appendix A of this EIR, (1) hazards and hazardous materials, such as manufactured asbestos materials and lead-based paint, are not present on the undeveloped project site; (2) serpentine rock containing asbestos is not present on the project site; (3) hazardous building materials, such as electrical equipment containing PCBs or mercury, would not be used nor installed; and (4) the use by project residents of relatively small quantities of hazardous materials typically used in routine household activities are not anticipated to pose any substantial public health or safety hazards related to hazardous materials. Schools within 0.25 mile of the proposed project include Clarendon Alternative Elementary School at 500 Clarendon Avenue and Cross Cultural Environmental Leadership (XCEL) Academy at 1350 Seventh Avenue. For the reasons discussed above, the project would not generate hazardous emissions or require handling hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school. The impact of hazardous materials on schools within 0.25 miles of the project site would be ***less than significant***.

Impact HZ-4: The proposed project site is not included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. (No Impact)

The project site is not on the list of hazardous materials sites compiled by the California Department of Toxic Substances Control (DTSC) pursuant to Government Code Section 65962.5, commonly called the "Cortese List;" and hence, there would be no resulting significant hazard to the public or the environment. There would be ***no impact*** related to listed hazardous materials sites.

Impact HZ-5: The proposed project site would not expose people to airport-related safety hazards. (No Impact)

As noted above in the Noise discussion, the project site is not within an airport land use plan area, nor is it in the vicinity of a private airstrip. Hence, the project would not expose people residing or working in the area to airport-related safety hazards. There would be ***no impact*** related to airport hazards.

Impact C-HZ-1: The proposed project, in combination with other past, present, or reasonably foreseeable future projects, would not result in significant hazards and hazardous materials impacts. (Less than Significant)

At the time of the preparation of this EIR, no other new project construction proposal in the vicinity of the project site had been submitted to the City. The proposed project would be required to follow applicable hazardous materials regulations. Any future development projects also would be required to follow applicable hazardous materials regulations. Given this fact and that the proposed project, itself, would have less-than-significant hazardous materials impacts, the proposed project, in combination with existing development and reasonably foreseeable future development, would not result in a cumulatively considerable impact related to hazards and hazardous materials.

MINERAL AND ENERGY RESOURCES

Would the project:

a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?

Impact ME-1: The proposed project would not result in the loss of availability of a known mineral resource or a locally important mineral resource recovery site. (No Impact)

All land in San Francisco, including the project site, is designated Mineral Resource Zone 4 (MRZ-4) by the California Division of Mines and Geology (CDMG) under the Surface Mining and Reclamation Act of 1975 (CDMG, Open File Report 96-03 and Special Report 146 Parts I and II). This designation indicates that there is inadequate information available for assignment to any other MRZ and thus the site is not a designated area of significant mineral deposits. There are no operational mineral resource recovery sites in the project area whose operations or accessibility would be affected by the construction or operation of the proposed project. Thus, the proposed project would not result in the loss of availability for a locally- or regionally-important mineral resource recovery site, and the project would have ***no impact*** on mineral resources.

Impact C-ME-1: The proposed project, in combination with other past, present or reasonably foreseeable future projects, would not result in cumulatively considerable impacts to mineral and energy resources. (No Impact)

San Francisco lands are designated MRZ-4, indicating that the project site, and the site of any future development within San Francisco, are not within a designated area of significant mineral deposits. For this reason, there would not be a cumulative mineral resources impact.

AGRICULTURE AND FOREST RESOURCES

Would the project:

a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?

c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)) or timberland (as defined by Public Resources Code Section 4526)?

d) Result in the loss of forest land or conversion of forest land to non-forest use?

e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland of Statewide Importance, to non-agricultural use or forest land to non-forest use?

Impact AF-1: The proposed project would not result in the conversion of farmland or forestland to non-farm or non-forest use, nor would the proposed project conflict with existing agricultural or forest use or zoning. (No Impact)

The project site is located in the City and County of San Francisco, an urban area, and not in agricultural use. The California Department of Conservation's Farmland Mapping and Monitoring Program does not identify any land in the County as agricultural. Since the project site does not contain agricultural uses and it is not zoned for such uses, the proposed project would not convert any prime farmland, unique farmland, or Farmland of Statewide Importance to non-agricultural use, and would not conflict with any existing agricultural zoning or Williamson Act contracts.[240] No agricultural resource is located near the project site. As a result, the proposed project would not involve the direct or indirect conversion of agricultural land to non-agricultural uses. In addition, the project site is not forestland or timberland, and is not zoned as such.

The project site is adjacent to the UCSF Mount Sutro Open Space Reserve. This forested area is a reserve and is zoned as Open Space Public Use. Development of the project site would not directly or indirectly result in the conversion of the UCSF Mount Sutro Open Space Reserve forest land to non-forest land uses. Therefore, the project would have no effect on agricultural or forest resources.

Impact C-AF-1: The proposed project, in combination with other past, present or reasonably foreseeable future projects, would not result in cumulatively considerable impacts to agriculture and forest resources. (No Impact)

As described above, the project would have no impact with respect to agriculture and forestry resources; therefore, the project would not contribute to any cumulatively considerable impact to agricultural and forest resources.

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240 San Francisco is identified as "Urban and Built Up Land" on the California Department of Conservation Important Farmland of California Map, 2002. This map is available for viewing on-line at the Department of Conservation website (www.consrv.ca.gov).

V. OTHER CEQA ISSUES

This chapter discusses other CEQA-required topics, including growth inducement, significant and unavoidable environmental effects of the proposed project, significant irreversible changes involved in the proposed project, and areas of controversy and issues to be resolved.

A. GROWTH INDUCING IMPACTS

A project would be growth inducing if (1) its construction and use would encourage a substantial population increase; (2) it would indirectly stimulate new development that would not occur without the proposed project; and (3) it would involve new infrastructure (such as water or sewer utilities) with capacity to serve other projects.

The proposed project would entail construction of 13 new buildings providing 34 residential units and 68 parking spaces, on the currently undeveloped site which is within an RM-1 (Residential, Mixed, Low Density) District.

Census 2010 data indicates an average household size of roughly 2.34 persons per owner-occupied household in Census Tract 301.02, within which the project site is located.[241] Based on this average household size of 2.34 persons, the proposed 34-dwelling-unit project could have up to about 80 residents. The project would not include commercial use or industrial use on the project site.

There is a strong demand for housing in San Francisco. The proposed project would not be the factor that would induce substantial growth or concentration of population beyond that which would have occurred

241 Data are extrapolated from Table QT-H3 Household Population and Household Type by Tenure: 2010. Census Tract 301.02, San Francisco County, California. This table is available for public review in Case No. 2004.0093E at the Planning Department, 1650 Mission Street, Suite 400, San Francisco, and available on the internet at: http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC_10_SF1_QTH3&prodType=table. Accessed 16 September 2011

without the project. Some project residents may relocate from other parts of the Bay Area to be closer to their employment in San Francisco. To the extent that this occurs, the project would result in reduced commuting distances to work.

Construction of the project's private road would bring closer access to the adjoining parcel Lot 27 in Assessor's Block 2636, which is a steeply sloping lot west of the project site and adjacent to Oakhurst Lane. The proposed project's new access road from Crestmont Drive on Lot 28 extends nearly to Lot 27, but the proposed road would not connect to Lot 27. Lot 27 currently has no vehicular access to or any public or private street. Oakhurst Lane, a public right-of-way stairway that runs between Crestmont and Warren drives, provides pedestrian access to Lot 27. Lot 27 is also within the same RM-1 District as the project site. Under the RM-1 residential density maximum limit of one unit per 800 square feet of lot area, it is possible that in the future up to 27 residential units could be proposed for construction on Lot 27, which is 22,000 square feet. Based on an average household size of 2.34 persons per owner-occupied household,[242] the 27 potential residential units could have a total of up to about 63 residents. Twenty-seven additional units would not be substantial in comparison to the existing development in the area or the City.

Growth inducement may constitute a significant adverse impact if the growth is not consistent with the land use plans and growth management plans and policies for the area affected. Since Lot 27 is within a residential zoning district, and the proposed project would include construction of a road (although private) to provide access to the proposed residential buildings, there could be future road extension and residential construction on the lot. Hence, the proposed project could induce additional residential development and an increase in the number of residents in the project area. Any such residential growth on Lot 27 would be required to comply with the *Planning Code* and be consistent with the *General Plan.* In addition, any possible future residential development on Lot 27 would be within ABAG 2020 housing projections for San Francisco. Therefore, any growth-inducing potential of the proposed project would be consistent with the *General Plan*, and would not be considered a substantial adverse impact.

Future proposals for development of Lot 27 would require separate environmental review(s) that would include evaluation of impacts on land use, aesthetics, biological resources, etc.

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242 Table QT-H3 Household Population and Household Type by Tenure: 2010, Census Tract 301.02, San Francisco County, California. This table is available for public review in Case No. 2004.0093E at the Planning Department, 1650 Mission Street, Suite 400, San Francisco, and available on the internet at: http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC_10_SF1_QTH3&prodType=table. Accessed 16 September 2011.

B. UNAVOIDABLE SIGNIFICANT IMPACTS

In accordance with CEQA, this section identifies environmental impacts that could not be avoided by implementation of mitigation measures, or reduced to a less-than-significant level as described in Chapter IV. Environmental Setting and Impacts, on pages 55 through 254 (CEQA Statutes Section 21100(b)(2)(A), and CEQA Guidelines Section 15126.2). This chapter is subject to final determination by the Planning Commission as part of its certification of the EIR, and staff will revise it to reflect the findings of the Planning Commission, if necessary.

The proposed project, with mitigation measures, would have no unavoidable significant impacts. Implementation of the mitigation measures outlined in Table S-1 Summary of Impacts and Mitigation Measures Identified in EIR and Table S-2 Summary of Significant Impacts and Mitigation Measures Identified in Initial Study, in the Summary Chapter of this EIR would reduce all significant impacts of the proposed project to a less-than-significant level.

C. AREAS OF KNOWN CONTROVERSY AND ISSUES TO BE RESOLVED

This Draft EIR analyzes the impacts on land use, aesthetics, transportation, air quality, greenhouse gas emissions, geology and soils, hydrology, and emergency access. The Initial Study, published on May 27, 2006, analyzed the impacts on population and housing, cultural resources, noise, wind and shadow, utilities and service systems, public services, biological resources, hydrology and water quality, hazards and hazardous materials, and energy and mineral resources, and delineated required mitigation measures for those impacts determined to be significant. The project sponsor has agreed to implement the mitigation measures.

On June 23, 2004, the Planning Department mailed a Notice of Project Receiving Environmental Review to property owners within 300 feet of the San Francisco Overlook Development project site, tenants adjacent to the site, and other potentially interested parties. A number of groups and individuals commented and expressed concerns regarding effects of the proposed project on its surroundings. These concerns, and where the issues are discussed in the Initial Study and/or EIR, are identified in Notice of Project Receiving Environmental Review on page 3. Of these concerns, the following are the key areas of controversy and issues to be resolved:

- Changes in land use and neighborhood character, proposed project density, and proximity to adjacent residences (addressed in this EIR in Section IV.A. Land Use and Land Use Planning, beginning on page 61, and in the Initial Study in Topic 1. Land Use, on pages 13–14, in Appendix A of this EIR);

- Visual impacts, including scenic views (addressed in this EIR in Section IV.B. Aesthetics beginning on page 75; see also the Initial Study, Topic 2. Visual Quality, on pages 14–16, in Appendix A of this EIR);
- Geologic issues, including seismic safety, landslides, and slope stability near adjacent residences during construction (addressed in this EIR in Section IV.F. Geology and Soils, beginning on page 179; see also the Initial Study, Topic 9. Geology/Topography, on pages 41–42, in Appendix A of this EIR); and
- Impacts on fire safety and emergency access (addressed in this EIR in Section IV.G. Emergency Access, on page 229; see also the Initial Study, Topic 12. Hazards, on pages 45–46, in Appendix A of this EIR).

Impacts to the physical environment identified in public comments are addressed in the Initial Study or in this EIR, as noted above.

Several comments were also received concerning the history of the project site's zoning. Past zoning of the project site is not relevant to the project's environmental analysis since it does not pertain to CEQA physical environmental issues. Hence, it has not been analyzed in the Initial Study or in this EIR. This issue will be discussed in the case report for the project application for Conditional Use Authorization for the proposed PUD.

NOTICE OF PREPARATION, INITIAL STUDY, AND PUBLIC COMMENTS

The Planning Department distributed a "Notice of Preparation of an Environmental Impact Report" (NOP) with an Initial Study (IS) on May 27, 2006, announcing its intent to prepare and distribute an EIR. In response to the NOP, a number of groups and individuals commented and expressed concerns regarding effects of the proposed project on its surroundings. These concerns, and where the issues are discussed in the Initial Study and/or EIR, are identified in Notice of Preparation, Initial Study, and Public Comments starting on page 4. Of these concerns expressed in response to the NOP, the following are the key areas of controversy and issues to be resolved:

LAND USE AND LAND USE PLANNING

Effects on Neighborhood Character

This topic is addressed in this EIR, in Section IV.A. Land Use and Land Use Planning, on pages 71–72, and in the Initial Study in Topic 1. Land Use, on pages 13–14, in Appendix A of this EIR.

Loss of "Publicly Accessible" Open Space and Children's Play Area

The project would involve construction of a residential development on an undeveloped, wooded and vegetated site. Although the privately owned site is used on an informal basis by the public, including nearby residents, it is not a designated public open space or children's play area. As mentioned in Section II.C. Project Characteristics, on page 43, the private road of the proposed project would not be gated, and the public would have access for recreational purposes (such as dog walking), similar to the access now afforded on the dirt road on the site. The project would not result in loss of any public open space. As noted in the Initial Study in Topic 13. Cultural Resources, on page 47 in Appendix A of this EIR, the project would not conflict with established recreational uses of the area. As discussed in Section IV.H. CEQA Checklist Update, on pages 238–240 of this EIR, the project would not substantially increase demand for or use of neighborhood or citywide parks, because the residents of the project would not substantially increase demand for or use of Mount Sutro Open Space Reserve, or citywide park facilities and public open space, such as Golden Gate Park, to the extent that substantial physical deterioration would occur. Therefore, the project would have a less-than-significant effect on recreation and open space.

Size of Project

This topic is addressed in this EIR, in Section IV.A. Land Use and Land Use Planning, on pages 69–73, and in the Initial Study in Topic 1. Land Use, on pages 13–14, in Appendix A of this EIR.

AESTHETICS

Effects on Views from Lawton Avenue and Golden Gate Park

This topic is addressed in this EIR, in Section IV.B. Aesthetics, on pages 89–90.

Effects on Views, Including Views from Nearby Residences

This topic is addressed in this EIR, in Section IV.B. Aesthetics, on pages 86–90.

Buffering of Light from Areas Below that is Provided by Existing Trees on the Project Site

As discussed in the Initial Study, in Topic 2. Visual Quality, on pages 15–16, in Appendix A of this EIR, the project would have exterior lighting typical of residential buildings in the project vicinity, which would be similar to the exterior lighting of nearby residential buildings. The project would comply with Planning Commission Resolution 9212, which prohibits the use of mirrored or reflective glass. Although the project would include removal of existing trees on the site, it would not generate obtrusive light or glare that would substantially impact other properties for the reasons noted above; and thus, this impact would be less than significant.

Light and Glare Effects of Street Lights on the Private Road

As discussed in the Initial Study, in Topic 2. Visual Quality, on pages 15–16, in Appendix A of this EIR, the project's exterior lighting, including street lights on the private road, would be similar to residential buildings' lighting and street lights in the project vicinity. The project would not generate obtrusive light or glare that would substantially impact other properties; and thus, this impact would be less than significant.

UTILITIES/PUBLIC SERVICES

Impact on Recreation and Recreational Space

As discussed in Section IV.H. CEQA Checklist Update, on pages 238–240, the project would not substantially increase demand for or use of neighborhood or citywide parks and public open space, or conflict with established recreational uses of the area.

The proposed project would involve construction of a residential development on the privately owned, undeveloped, vegetated and wooded project site. Although the project site is used on an informal basis by the public, including nearby residents, it is not a designated public open space. As noted in Section II.C. Project Characteristics, on page 43 of this EIR, the private road of the proposed project would not be blocked with a gate, and the public would have access for recreational purposes (such as dog walking), similar to the access now afforded on the private dirt road on the site. The project would not result in loss of any public open space, and would not affect the large open space of the Mount Sutro Open Space Reserve of the University of California, San Francisco, located on the east side of Crestmont Drive.

The proposed project's impact on recreation and recreational space would be less than significant.

GEOLOGY AND SOILS

The Geology and Soils topic is a main area of controversy expressed in comments on the "Notice of Preparation of an Environmental Impact Report," which was distributed on May 27, 2006.

Existing Slope Stability and Effect of the Project On Slope Stability

This topic is addressed in this EIR in Section IV.F. Geology and Soils, on pages 184–186, 188, and 192–195, 201, and 213–221.

Implementation of Mitigation Measure M-GE-1 (Seismic Design Parameters), on page 210; and Mitigation Measure M-GE-1b (Detailed Design Plans), on page 212, would ensure compliance with the recommendations of the preliminary and site-specific geotechnical investigations, and would ensure that the impact of seismic hazards, including seismic ground shaking, on the proposed project would be less than significant.

Implementation of Mitigation Measure M-GE-1b (Detailed Design Plans), on page 212; Mitigation Measure M-GE-2a (Protection of Private Road From Landslides), on page 214; Mitigation Measure M-GE-2b (Stitch Piers), on page 214; Mitigation Measure M-GE-2c (Debris Walls), on page 215; Mitigation Measure M-GE-2d (Drainage and Erosion Control), on page 216; Mitigation Measure M-GE-2e (Existing Fill), on page 217; Mitigation Measure M-GE-2f (Creep and Sloughing of Native Soils), on page 218; and Mitigation Measure M-GE-2g (Maintenance), on page 218, would eliminate the risks posed by the portion of the site susceptible to landslides and reduce the impact associated with landslides to a less-than-significant level.

The proposed project's impacts on soil and slope instability, including shallow sloughing/raveling of soils and debris and soil erosion, and the risk of damage to structures and injury or death to occupants, both on- and off-site, would be reduced to less-than-significant levels by implementation of Mitigation Measure M-GE-3a (Slope Stability), on page 220; Mitigation Measure M-GE-3b (Soil Nails), on page 220; Mitigation Measure M-GE-3c (Design of Retaining Walls), on page 221; Mitigation Measure M-GE-3d (Construction on Steep Slopes), on page 221; Mitigation Measure M-GE-2a (Protection of Private Road From Existing Landslides), on page 214; Mitigation Measure M-GE-2b (Stitch Piers), on page 214; Mitigation Measure M-GE-2c (Debris Walls), on page 215; Mitigation Measure M-GE-2d (Drainage and Erosion Control), on page 216; Mitigation Measure M-GE-2f (Creep and Sloughing of Native Soils), on page 218; and Mitigation Measure M-GE-1b (Detailed Design Plans), on page 212.

Erosion, Including Erosion on the Dirt Access Road, and Effects on Intermittent Streams along Fifth Avenue

This topic is addressed in this EIR in Section IV.F. Geology and Soils, on pages 190–193. Implementation of Mitigation Measure M-GE-2d (Drainage and Erosion Control), on page 216, and Mitigation Measure

M-GE-1b (Detailed Design Plans), on page 212, would reduce the impact of the proposed project on drainage and erosion to less-than-significant levels.

Landslide and Mudslide

This topic is addressed in this EIR, in Section IV.F. Geology and Soils, beginning on page 184. Implementation of Mitigation Measure M-GE-1b (Detailed Design Plans), on page 212; Mitigation Measure M-GE-2a (Protection of Private Road From Landslides), on page 214; Mitigation Measure M-GE-2b (Stitch Piers), on page 214; Mitigation Measure M-GE-2c (Debris Walls), on page 215; Mitigation Measure M-GE-2d (Drainage and Erosion Control), on page 216; Mitigation Measure M-GE-2e (Existing Fill), on page 217; Mitigation Measure M-GE-2f (Creep and Sloughing of Native Soils), on page 218; and Mitigation Measure M-GE-2g (Maintenance), on page 218, would eliminate the risks posed by the portions of the site susceptible to landslides and reduce the impact associated with landslides to a less-than-significant level.

Seismic Hazards

This topic is addressed in this EIR, in Section IV.F. Geology and Soils, on pages 210–212. Implementation of Mitigation Measure M-GE-1 (Seismic Design Parameters), on page 210; and Mitigation Measure M-GE-1b (Detailed Design Plans), on page 212, by requiring compliance with the recommendations of the preliminary and site-specific geotechnical investigations, would ensure that the impact of seismic hazards, including seismic ground shaking, on the proposed project would be less than significant.

Inclusion of Boring Logs in Appendix of Geotechnical investigation

The project's geotechnical investigation (dated September 29, 2006), on which the geology and soils evaluation is based, includes boring logs in an appendix of the geotechnical investigation. The text of this report is included in Appendix C of the EIR; and the full report with appendices, including boring logs, is on file and available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, San Francisco, as part of Case No. 2004.0093E: San Francisco Overlook Development Residential Project.

Location of Referenced Slide Scarp

The location of the slide scarp[243] that is referred to in Section 5.02.1 of the geotechnical investigation is identified in Section 4.02.3.02, Existing Landslide Features, of the geotechnical investigation (dated September 29, 2006), and in this EIR, in Section IV.F. Geology and Soils, History of Site and Vicinity, on

243 A slide scarp is a steeply cut slope.

pages 179–183 and 184–186. The text of the geotechnical investigation is included in this EIR as Appendix C. The full geotechnical report, including appendices, is on file and available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, San Francisco, as part of Case No. 2004.0093E: San Francisco Overlook Development Residential Project.

New Site Reconnaissance after Wet Winter (of 2005/2006)

During an October 2, 2006 site visit, the geotechnical consultant noted that new slides had occurred on the steep slopes, downhill of the home at 391 Crestmont Drive. The materials deposited by the slides appear to be within the open space area controlled by the Mount Sutro Woods Homeowners Association, uphill of the San Francisco Overlook Development project site. This area of the slides is similar to the soil movement downhill of the home at 375 Crestmont Drive, which is included in the discussion in this EIR in Section IV.F. Geology and Soils, Miscellaneous Landslides, beginning on page 184. The proposed debris wall would be constructed along the uphill edge of the San Francisco Overlook Development private street. Mitigation Measure M-GE-2c, on pages 215–216, would reduce the likelihood of landslide material sliding onto the San Francisco Overlook Development property and causing a road obstruction.

During the October 2, 2006 site visit, the geotechnical consultant also noted a second area with significant additional ground movement. This area is within the raveling rockslide scar discussed in this EIR, in Section IV.F. Geology and Soils, on page 184. As discussed on pages 214–216, implementation of Mitigation Measure M-GE-2b: Stitch Piers, and Mitigation Measure M-GE-2c: Debris Walls would reduce the significant impacts of shallow soil/ground instabilities and ongoing sloughing/raveling to less-than-significant levels.

Effect of Ruptured Drain Line on Project and Existing Facilities

The geotechnical consultant observed during the October 2, 2006 site visit that the ruptured drain line downhill of the units at 465-467 and 475-477 Crestmont Drive had been repaired. It was apparent that some excavations had been performed in the area in order to repair the drain line, and flowing water was not heard.

Construction of Retaining Wall Not Discussed in Geotechnical Investigation

As noted in Section 3.01.10, Warren Drive Landslide, on page 16 of the project's geotechnical investigation (dated September 29, 2006), and in this EIR in Section IV.F. Geology and Soils, Warren Drive Landslide, on page 186, the retaining wall mentioned in the comment has been constructed.

Effects of Project Grading on Slope Stability of Uphill Properties of Mount Sutro Woods Homeowners Association

As discussed in the geotechnical investigation and in this EIR in Section IV.F. Geology and Soils, the slope stability analysis evaluated overall hillside stability, including the Mount Sutro Woods Homeowners Association property. The geotechnical consultant concluded that the overall hillside area would be stable, even with the construction of the proposed San Francisco Overlook Development project. However, the area of the slope immediately uphill of the San Francisco Overlook Development project site will remain unstable. Therefore, the geotechnical consultant recommended that a continuous debris wall be built along the uphill side of the project's private street in order to collect slide materials (see Mitigation Measure M-GE-2c: Debris Walls, on pages 215–216), and to use the factors of safety specified in Mitigation Measure M-GE-3a: Slope Stability, on pages 220–220. Implementation of these mitigation measures would reduce impacts on slope stability to less-than-significant levels.

Impact of the Landslide Downhill from 505-507 Crestmont Drive

The majority of the landslide impacting the building at 505-507 Crestmont Drive is located outside the San Francisco Overlook Development project site. Effects of the landslide on the building at 505-507 Crestmont Drive located outside the San Francisco Overlook Development project site are not impacts of the proposed project. Subsurface exploration outside the San Francisco Overlook Development project site, and recommendations for remedial work for that portion of the area, are outside the scope of this EIR.

Identification of Work Scope and Areas of Cut and Fill for Installation and Removal of Temporary Facilities in the Construction Staging Plan

The planning and staging of temporary construction roads, excavation, and stockpiles would be carefully conducted to minimize ground instabilities. Construction staging areas would be restored to a stable condition at the completion of work.

As discussed in Section IV.F. Geology and Soils, Geologic/Geotechnical Investigations, on page 204, for certain projects, such as the proposed San Francisco Overlook Project, the applicant would conduct a preliminary or "Master Plan" geotechnical investigation to determine the overall engineering feasibility of site development and to inform the preliminary designs. The objective of the preliminary geologic/geotechnical investigation is to compile existing information and develop enough new data to establish a Master Plan of the proposed development. At the Master Plan stage, geotechnical engineers would acquire a broad understanding of the site conditions while delineating areas on the site that are especially favorable for development and/or could be problematic from a soils engineering perspective.

The scope of the preliminary geotechnical studies is intended to develop a general understanding of the site; however, this level of investigation is not rigorous enough to generate the adequate “design-level” data needed to complete final grading or structural designs.[244] Furthermore, it is typically not prudent or effective to conduct a design-level design at the Master Plan stage of a project because the project layout or density may change considerably due to the outcome of the CEQA project review and other factors. Nevertheless, in most cases, a preliminary geotechnical study is adequate to complete necessary CEQA analyses because the level of detail and information obtained on the subsurface conditions effectively evaluates whether geologic or seismic impacts exist and whether mitigation would be required. Remedial measures developed by the geotechnical engineers in the preliminary geotechnical study may be identified as mitigation measures in the EIR. The EIR is not required to contain a design-level description of the project; a conceptual description of the project components is sufficient as long as the description contains sufficient detail to enable decision-makers and the public to understand the environmental impacts of the proposed project.[245] The geotechnical investigation, and the analysis in Section IV.F., Geology and Soils, beginning on page 179, address geotechnical issues, including excavation and slope stability at a conceptual level in compliance with CEQA. This analysis includes identification of significant geology and soils impacts of the proposed project, discussion of laws and regulations applicable to geology and soils impacts, discussion of plan review by DBI, and identification of mitigation measures required to reduce all impacts to a less-than-significant level. The level of detail in an identification of work scope and areas of cut and fill for installation and removal of temporary facilities in the construction staging plan is outside the scope of the CEQA-required environmental analysis.

Work Moratorium During Winter Months, Preceded by a “Winterization” Plan

Any earthwork or grading operations performed during the winter months would be conducted to minimize earth movement danger and damage. Winterization plans for the site would be developed and implemented to minimize water runoff and soil/ground erosion. Mitigation Measure M-GE-2d: Drainage and Erosion Control, on pages 216–217, includes provisions for erosion control during the rainy season. Although the Planning Commission, or the Board of Supervisors on appeal, may choose to impose a moratorium during winter months, such a moratorium is not required to reduce project impacts to less-than-significant levels, as discussed in this EIR in Section IV.F., Geology and Soils, beginning on page 179.

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244 "Design-level" investigations provide seismic and engineering parameters for specific building sites and proposed building footprints. The design-level data and analysis are used by the structural engineer to complete final foundation and structural design.

245 Dry Creek Citizens Coalition v. County of Tulare (1999) 70 CA4th 20, 82 CR2d 398.

Geotechnical Investigation of Upslope Property

While upslope property owners may allow access to their properties to the project geotechnical consultant to perform an on-site investigation on these properties, such an investigation is not required to provide sufficient detail on geologic issues and determine the geotechnical feasibility of the project, to enable decision-makers and the public to understand the environmental impacts of the proposed project.[246]

Effects on Storm Water Runoff and Storm Drains, Including Loss of Existing Trees

This topic is addressed in the Initial Study, in Topic 10. Water, on pages 42–43, in Appendix A of this EIR.

Methodology of Peer Review of Project Geotechnical Investigation

As discussed in the geotechnical investigation, the geotechnical investigation was subject to a peer review process under the direction of the San Francisco DBI. A meeting with the project peer review committee (PRC) selected by the DBI was held, to discuss and to obtain comments regarding the field investigation program and comments regarding the completion of the geotechnical investigation. The PRC requested additional subsurface exploration, review of foundation supporting conditions for existing upslope structures, cross-sections which extend off-site and depiction of the relationship of the project to existing project area structures, photographic documentation of existing conditions, and information on the existing sewer line on the project site, the landslide on the west side of the site, the Fifth Avenue bin wall, the tie-back wall at the end of Kirkham Street, and the Seventh Avenue retaining wall. Following a meeting with the PRC, and based on the requirements of the PRC, the geotechnical investigation was modified to address the PRC comments as outlined in the PRC memorandum from Frank L. Rollo of Treadwell & Rollo, Inc., dated December 21, 2004.[247] The evaluation and conclusions in Section IV.F. Geology and Soils of this EIR incorporate these modifications.

EMERGENCY ACCESS

Effect of Crestmont Drive Cul-de-sac on Emergency Vehicle Access

As discussed in this EIR, in Section IV.C. Transportation and Circulation, on page 99, vehicle traffic operations on Crestmont Drive, which is a long and winding cul-de-sac, currently have minimal delays for drivers, due to the low traffic volumes on the street. Similar vehicle maneuvering and circulation on narrow two-way streets are characteristic of such residential streets in hillside neighborhoods in San

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[246] Alan Kropp & Associates, op cit.

[247] Ibid, Appendix C.

Francisco. As discussed in this EIR in Section IV.C. Transportation and Circulation, on page 108, the addition of project-generated vehicle traffic would be small, and traffic volume on Crestmont Drive would remain low. As discussed in this EIR in Section IV.G. Emergency Access, on page 230, the proposed project would have a less-than-significant impact on emergency access. Therefore, impacts on emergency vehicle access on Crestmont Drive would be less than significant.

Effect of Narrow Streets on Emergency Vehicle Access

As discussed in this EIR in Section IV.C. Transportation and Circulation, on page 99, the width of Crestmont Drive varies from 26 to 28 feet. Due to the low traffic volume on the street, vehicle pass-by operations are not a frequent occurrence. Similar vehicle maneuvering and circulation on narrow two-way streets are characteristic of many residential streets throughout San Francisco. As discussed in this EIR in Section IV.C. Transportation and Circulation, on page 108, traffic volumes on Crestmont Drive would remain low.

Effect of Vehicles Parked on Project Area Streets on Emergency Vehicle Access

As noted in this EIR, in Section IV.C. Transportation and Circulation, on page 117, the proposed project would supply a total of 68 parking spaces, which would exceed the project's parking demand of 51 spaces. For this reason, the project likely would not generate a substantial demand for parking spaces on Crestmont Drive, which could affect the ability of emergency vehicles to access the area. As discussed in this EIR in Section IV.G. Emergency Access, on pages 230–231, on-street parking would not be permitted on the new private road, which would be enforced through the project's Declaration of Covenants, Conditions, and Restrictions (CC&Rs). The road would have a 20-foot road width, which the SFFD has determined to be in compliance with the SFFD's standards for emergency vehicle access and could accommodate their largest vehicles, and provide adequate access for emergency vehicles and personnel. (See Section IV.G. Emergency Access, on page 230, for discussion of the SFFD's letter).

Effect of Curves on Crestmont Drive on Emergency Vehicle Access

As discussed in this EIR, in Section IV.G. Emergency Access, on page 230, the SFFD, in a letter dated August 4, 2005, has determined that emergency vehicle access to the project site from Crestmont Drive would be adequate.

Effects of Fog on Visibility

The proposed project would not change the intensity or frequency of fog in the project vicinity. Visibility on Crestmont Drive would not be affected by fog more than on other roads in the area.

Ability of Emergency Vehicles to Maneuver

The proposed project would not affect the configuration or width of Crestmont Drive or other project area streets. As noted in this EIR, in Section IV.C. Transportation and Circulation, on page 108, the estimated project traffic volumes on Crestmont Drive would be low, and impacts on traffic flow, including emergency vehicle maneuvers, would be less than significant. As discussed in this EIR, in Section IV.G. Emergency Access, on page 230, the SFFD, in a letter dated August 4, 2005, has determined that the project design of the 20-foot-wide private cul-de-sac road is in compliance with the SFFD's standards with respect to emergency vehicle access, and that the new road could accommodate their largest vehicles and provide adequate emergency vehicle access.

Obstruction of Access or Reduced Maneuverability Caused By Fallen Trees or Simultaneous Responses by Two or More Emergency and/or Service Vehicles

The proposed project would not affect the likelihood that trees would fall and block project area streets. As discussed in this EIR, in Section IV.G. Emergency Access, on page 230, the SFFD, in a letter dated August 4, 2005, has determined that emergency vehicles' and personnel's access to the project site from Crestmont Drive would be adequate.

Increased Emergency Service Calls Due to Project

Although the project could increase the number of emergency service calls received from the area, the increase would not be substantial relative to the existing demand for emergency services on the west slope of Mount Sutro. As noted in this EIR, in Section IV.C. Transportation and Circulation, on page 108, traffic volumes on Crestmont Drive would remain low, even with the addition of project traffic. In addition, the SFFD, in a letter dated August 4, 2005, has determined that emergency vehicle access to the project site from Crestmont Drive would be adequate (see Section IV.G. Emergency Access, on page 230).

Effect of Construction Trucks on Emergency Vehicle Access During Construction Activity

As discussed in this EIR, in Section IV.C. Transportation and Circulation, on pages 112–114, the effects of project construction traffic would be similar to, or less than, those associated with the project when occupied by residents, which, as discussed in this EIR, in Section IV.C. Transportation and Circulation, on page 108, would be small. As discussed in this EIR, in Section IV.G. Emergency Access, on page 230, the SFFD, in a letter dated August 4, 2005, has determined that emergency vehicle access to the project site from Crestmont Drive would be adequate.

Fire Danger due to Eucalyptus Trees near Project Site

The fire danger posed by eucalyptus trees in the project vicinity is an existing condition that would remain with or without the project. To the extent that the project would remove trees from the site, this hazard would be reduced. As discussed in this EIR, in Section IV.G. Emergency Access, beginning on page 229, and in the Initial Study in Topic 12. Hazards, on pages 45–46, in Appendix A of this EIR, the project design is in compliance with the SFFD's standards with respect to emergency vehicle access.

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VI. ALTERNATIVES

This chapter identifies alternatives to the proposed project and discusses environmental impacts associated with each alternative. The *CEQA Guidelines* require that an EIR describe a reasonable range of feasible alternatives to the proposed project that could attain most of the basic project objectives. The alternatives considered should focus on avoidance or reduction of significant adverse impacts caused by the proposed project, even if an alternative reduces impacts only to a small degree. This EIR and the Initial Study (see Appendix A) found that the project would have significant impacts that could be mitigated to a less-than-significant level on air quality, geology and soils, subsurface archeological resources, buried human remains, paleontological resources, construction noise, nesting raptors and migratory birds, and hydrology and water quality. Decision-makers could approve any of the following alternatives instead of the proposed project if the alternative would reduce or avoid any of the project's significant impacts, and is feasible, while attaining most of the project sponsor's objectives. The determination of feasibility would be made by project decision-makers based on substantial evidence in the record, which would include, but not be limited to, information presented in this Draft EIR and comments received on it.

As discussed in more detail below, any development of the steep project site would involve significant impacts similar to those of the proposed project, including geologic impacts on slope stability that would require geotechnical mitigation measures. These significant impacts could be only avoided by changing the location of the project. As discussed in Section VI.D. Alternatives Considered but Rejected, on page 286, an off-site alternative is not feasible. Thus, no available alternatives, other than the No Project Alternative, would substantially reduce or avoid the impacts of the project. Alternatives were selected that would reduce, to the extent possible, identified impacts of the proposed project and include the following:

- **Alternative A: No Project Alternative.** Under this alternative, there would be no change on the project site, and none of the environmental impacts identified for the proposed project would occur.
- **Alternative B: Reduced Project Alternative.** This alternative would consist of 16 single-family dwellings and a total of 38 parking spaces, fewer than the proposed project's 34 duplex and townhome dwellings and 68 parking spaces. This alternative would involve less ground disturbance and slightly reduced geologic impacts, and generate fewer vehicle trips and air emissions.. All other impacts of this alternative would also be less than significant or less than significant with mitigation measures incorporated, although they could be somewhat less than those of the proposed project.
- **Alternative C: Reduced Foundations Alternative**. This alternative would consist of two buildings containing 34 multi-family dwelling units, the same number as the proposed project, in contrast to the proposed project's 12 duplex structures and one ten-unit townhome building. There would be a total of 51 parking spaces, fewer than the proposed project's 68 parking spaces. The buildings in this alternative would be constructed on piers, which, compared to the proposed project, would involve less ground disturbance and slightly reduced geologic impacts, and a higher roofline. All other impacts would be less than significant or less than significant with mitigations incorporated.

These alternatives reflect the intention of the Planning Department to select alternatives that would reduce or avoid the environmental impacts of the project, pursuant to CEQA. Decision-makers could also consider other alternatives, but additional environmental assessment may be required if the proposed uses differ substantially from the proposed project or the alternatives identified in this EIR.

A. ALTERNATIVE A: NO PROJECT ALTERNATIVE

CEQA and the State CEQA Guidelines require EIRs to include a No Project Alternative so decision-makers can compare the effects of approving the proposed project with the effects of not approving the project.

DESCRIPTION

Alternative A, the No Project Alternative, would entail no change to the undeveloped site and its dirt road. The proposed 13 four-story structures with 34 dwelling units and 68 parking spaces, and new paved 20-foot-wide, approximately 700-foot-long private street would not be constructed. This alternative would not preclude future proposals for development of the project site. Because the No Project Alternative would not involve demolition or construction, it would avoid the need for the proposed project's approvals: EIR certification, findings of *General Plan* and Priority Policies Consistency, Conditional Use Authorization for a PUD in an RM-1 District, including proposed modification of requirements for minimum rear yard depth, subdivision of Lot 25 into 13 parcels, building permits, Structural Advisory Committee review, and connection of the private road to Crestmont Drive.

IMPACTS

None of the impacts associated with the proposed project would occur. The undeveloped site with its trees and vegetation, and dirt road would remain unaltered.

The effects of the proposed project on views would not occur, although this impact would not be significant under the proposed project. The project-specific effects on intersection conditions, transit use, parking, loading, and pedestrian and bicycle traffic, also would not occur. Intersection operations at Warren Drive/Seventh Avenue and Clarendon Avenue/Laguna Honda Boulevard would degrade to unacceptable levels of service by the 2025 cumulative horizon year with or without the project.

The construction air quality impacts of the proposed project would not occur, although these impacts were found to be less than significant with implementation of mitigation measures. The other air quality impacts, and greenhouse gas emissions, of the project also would not occur. The geologic impacts of the proposed project, including geologic effects on landslides, slope stability, seismic hazards, erosion, existing fill on the site, and drainage would not occur, although these impacts were found to be less than significant with implementation of mitigation measures.

Other effects of the proposed project, including effects of the proposed 34-unit project on population, generation of noise during construction, wind, shadow on nearby streets and buildings, biological resources, hazardous materials, emergency access, and discovery of subsurface archeological resources, buried human remains, paleontological resources during excavation, impacts on migratory birds and nesting raptors, and hydrology and water quality, among other impacts, would not occur with this alternative. Therefore, no mitigation measures would be required.

The No Project Alternative would not meet any of the objectives of the project sponsor, San Francisco Overlook Development, LLC.

B. ALTERNATIVE B: REDUCED PROJECT ALTERNATIVE

DESCRIPTION

Alternative B, the Reduced Project Alternative, would involve construction of 16 single family residences with a new paved private road and 38 parking spaces on the project site (see figures 22 and 23, on pages 275–276). As compared to the proposed project, Alternative B has the following characteristics:

1. Instead of 12 detached duplex buildings and one ten-unit townhome building for a total of 34 dwelling units, there would be 16 single-family residential buildings, in a layout generally similar to the proposed project. The single-family dwellings would range in size from 3,600 to 4,600 square feet. The total of 16 dwelling units under the Alternative B would be fewer than the 34 dwelling units under the proposed project.

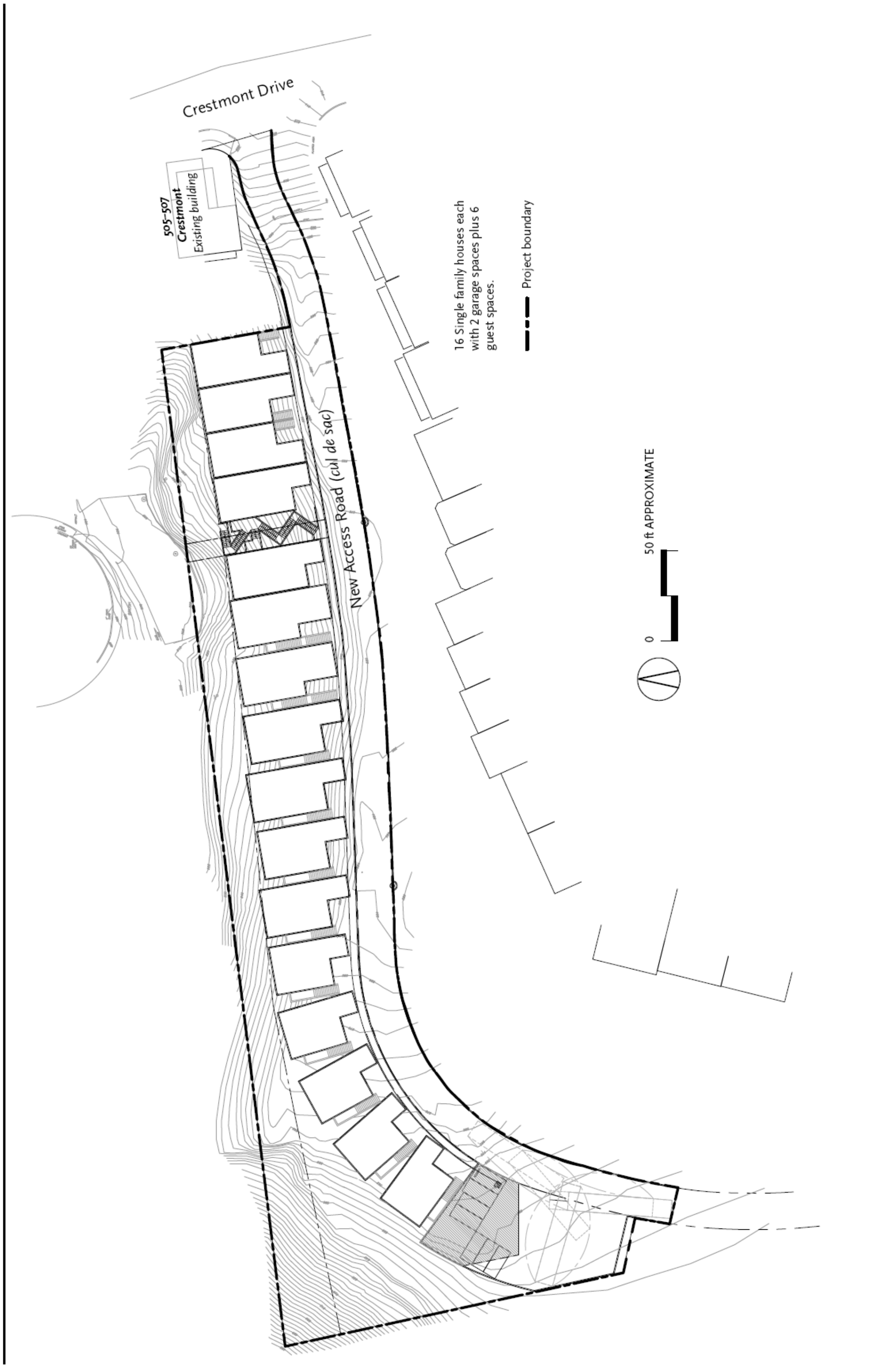
2. The foundations of this alternative would require fewer concrete piers than the proposed project, and would disturb less site soils.

3. Thirty-two designated garage spaces (two per dwelling unit would be provided), compared with 60 designated parking spaces of the proposed project.

4. The number of unenclosed guest parking spaces would be six spaces. Altogether, there would be 38 parking spaces in this alternative scenario, compared with 68 spaces in the proposed project. Sixteen spaces would be considered required parking, and the additional 22 parking spaces (which is less than three spaces per single-family home) would be considered accessory.

In total, this alternative would have approximately 57,600 to 73,600 square feet of residential space and 13,620 square feet for a private street on the approximately 63,890-square-foot project site. The proposed project would have the same area of private street and 65,750 square feet of residential space.

Like the proposed project, Alternative B would require EIR certification, findings of *General Plan* and Priority Policies Consistency, Conditional Use Authorization for a PUD in an RM-1 District to modify requirements for minimum rear yard depth, subdivision of Lot 25 into 16 parcels, review of permit application for project within the Northwest Mount Sutro Slope Protection Area, building permits, and DPW approval for connection of the private road to Crestmont Drive.



Source: Levy Design Partners
9-12-11

Alternative B: Reduced Project Alternative Site Plan **Figure 22**

Source: Levy Design Partners
9-12-11

Alternative B: Reduced Project Alternative Elevations Figure 23

IMPACTS

Alternative B would result in the construction of 16 residences on the project site in the Mount Sutro/Forest Knolls/Clarendon Heights area, but these 16 residential units would not be considered a significant addition to the housing stock in the City when considered within the context of year 2020 housing projections. Like the proposed project, cumulative land use effects would be less than significant.

The 16 single-family buildings under Alternative B would have more space between the buildings than under the proposed project, but this would not substantially change the appearance of the massing of the buildings because the space between the buildings would be narrow and the heights and overall massing of the 16 buildings of this alternative would be generally similar to the proposed project. From both uphill and downhill vantage points, the appearance of this alternative would be similar to the proposed project. This similar configuration would result in similar view obstruction and visual quality effects for the neighboring building at 505-507 Crestmont Drive. The overall effects on visual quality, urban design, and views would be similar to those of the proposed project, including from the building at 505-507 Crestmont Drive. Like the proposed project, Alternative B would not have significant impacts on views and visual quality.

The effects of Alternative B on transportation and circulation would be less than those of the proposed project. This alternative would generate about 160 new daily person trips and 17 weekday p.m. peak-hour vehicle trips, compared to 340 daily person trips and 37 p.m. peak-hour vehicle trips of the proposed project. The effects on operating conditions, and levels of congestion at the key intersections and road segments studied, including Crestmont Drive, would be less than those under the proposed project. These traffic impacts would be less than significant under this alternative, as well as the proposed project case.

At the intersections of Warren Drive/Seventh Avenue and Clarendon/Laguna Honda, which would operate at LOS F under cumulative year 2025 conditions, this alternative, like the proposed project, would add traffic to movements that would continue to operate satisfactorily. For movements that would operate poorly under cumulative conditions, Alternative B contributions to these movements would be minimal. Therefore, this alternative's traffic would not represent a considerable contribution to the adverse cumulative conditions at the intersections of Warren Drive/Seventh Avenue and Clarendon/Laguna Honda. Neither this alternative nor the project would have a significant cumulative impact at these intersections.

This alternative would have a total of 38 parking spaces, which would create a surplus of 14 parking spaces relative to demand. In comparison, the proposed project would provide 68 parking spaces, which would create a surplus of 17 parking spaces.

Alternative B would generate fewer operational air emissions and greenhouse gases than the proposed project. This alternative would generate construction vehicle and equipment emissions similar to the proposed project, and, like the proposed project, construction vehicle and equipment emissions would create a health risk that would be reduced to a less-than-significant level by implementation of Mitigation Measure M-AQ-3 described in in Section IV.D. Air Quality, on page 147.

The foundations of this alternative would require fewer concrete piers than the proposed project, and would disturb less of the site. However, any construction on the project site would result in impacts similar to those of the proposed project, due to the necessity of geotechnical engineering and slope stability features on the steep project site. For these reasons, the geologic impacts of this alternative would be slightly less than those of the proposed project. However, similar to the proposed project, implementation of the geotechnical mitigation measures described in Section IV.F. Geology and Soils would reduce the geologic impacts of this alternative to a less-than-significant level. Like the project, Alternative B would improve slope stability and drainage.

This alternative would be similar in height and massing to the proposed project and would have a correspondingly similar shadow effect. Neither this alternative nor the proposed project would shade any public open spaces under the jurisdiction of the Recreation and Park Department. Both project-specific and cumulative shadow effects for this alternative and the proposed project would be less than significant.

Impacts of both this alternative and the proposed project on biological resources would be similarly significant, but would be reduced to a less-than-significant level by implementation of Mitigation Measure 3, identified in the Initial Study and described in the Summary Chapter, in Section B. Summary of Impacts and Mitigation Measures.

Impacts of both this alternative and the proposed project on archeological resources, buried human remains, and paleontological resources would be similarly significant, but would be reduced to a less-than-significant level by implementation of Mitigation Measures M-CP-1 and M-CP-2, identified in Section IV.H CEQA Checklist Update, and Mitigation Measure 4, identified in the Initial Study.

Impacts of both this alternative and the proposed project on hydrology would be similarly significant, but would be reduced to less-than-significant levels through implementation of the geotechnical Mitigation

Measures M-GE-1b, M-GE-2a, M-GE-2b, M-GE-2c, M-GE-2d, M-GE-2e, M-GE-2f, and M-GE-2g, all described in Section IV.F. Geology and Soils.

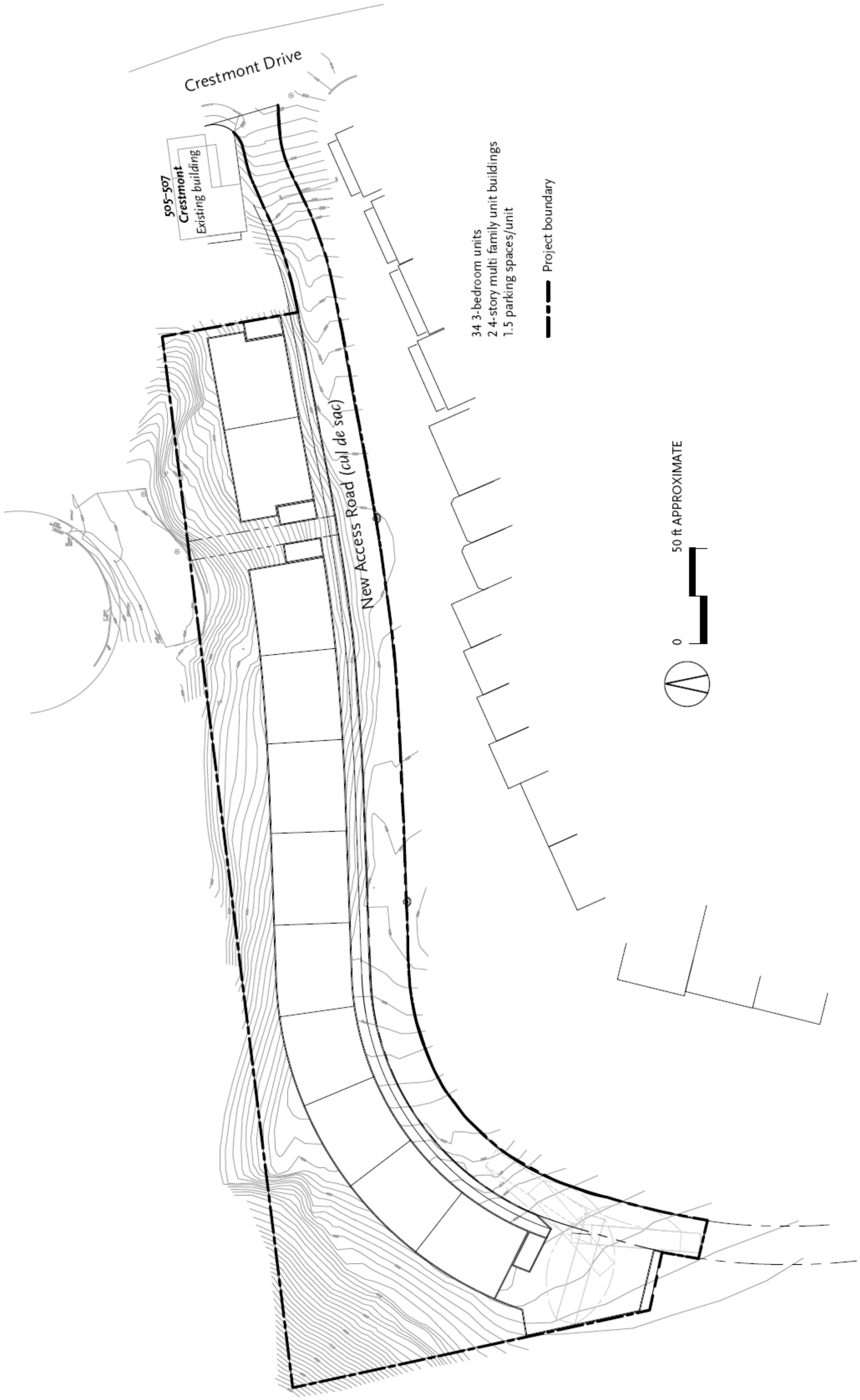
According to the project sponsor, high sales prices would need to be obtained for these large homes (3,600 to 4,600 square feet) and it has not been established that there is a market for expensive, large single-family homes in this location. Therefore, while Alternative B would meet San Francisco Overlook Development, LLC's objectives to (1) develop fewer units than the 61 units allowed under the *Planning Code* in order to conform the project to the San Francisco Residential Design Guidelines; (2) create an appropriately scaled residential development of larger multi-bedroom family-sized dwelling units; (3) develop a project that is considerate of the views of existing houses in the neighborhood; (4) given the site's lack of easy transit connections, provide more than the minimum number of on-site parking spaces (one space per unit); and (5) comply with the requirements of the Northwest Mount Sutro Slope Protection Area ordinance (Building Code Section 106.4.1.3) and the recommendations of the Geotechnical Investigation, Crestmont Drive Project, San Francisco, California, prepared by Alan Kropp & Associates (dated September 29, 2006, and updated December 7, 2010) in order to remedy the effects of ongoing hillside erosion, past landslides on and near the project site, and improve the stability of the existing site and surrounding areas, this alternative would not meet San Francisco Overlook Development, LLC's 6th objective to construct a residential project that would produce a sufficient return on investment for the project sponsor and its investors to implement necessary hillside stabilization measures and provide or upgrade site infrastructure (including a new access roadway, utilities, and fire hydrants).

C. ALTERNATIVE C: REDUCED FOUNDATIONS ALTERNATIVE

DESCRIPTION

Alternative C, the Reduced Foundations Alternative, would involve construction of two buildings containing a total of 34 multi-family residential units, a new paved private road, and 51 parking spaces on the undeveloped project site (see figures 24 through 26, on pages 280–282). As compared to the proposed project, Alternative C has the following characteristics:

1. Instead of the proposed project's 13 buildings, there would be two buildings, in a layout generally similar to the proposed project. The 34 multi-family dwellings of this alternative would,



Source: Levy Design Partners

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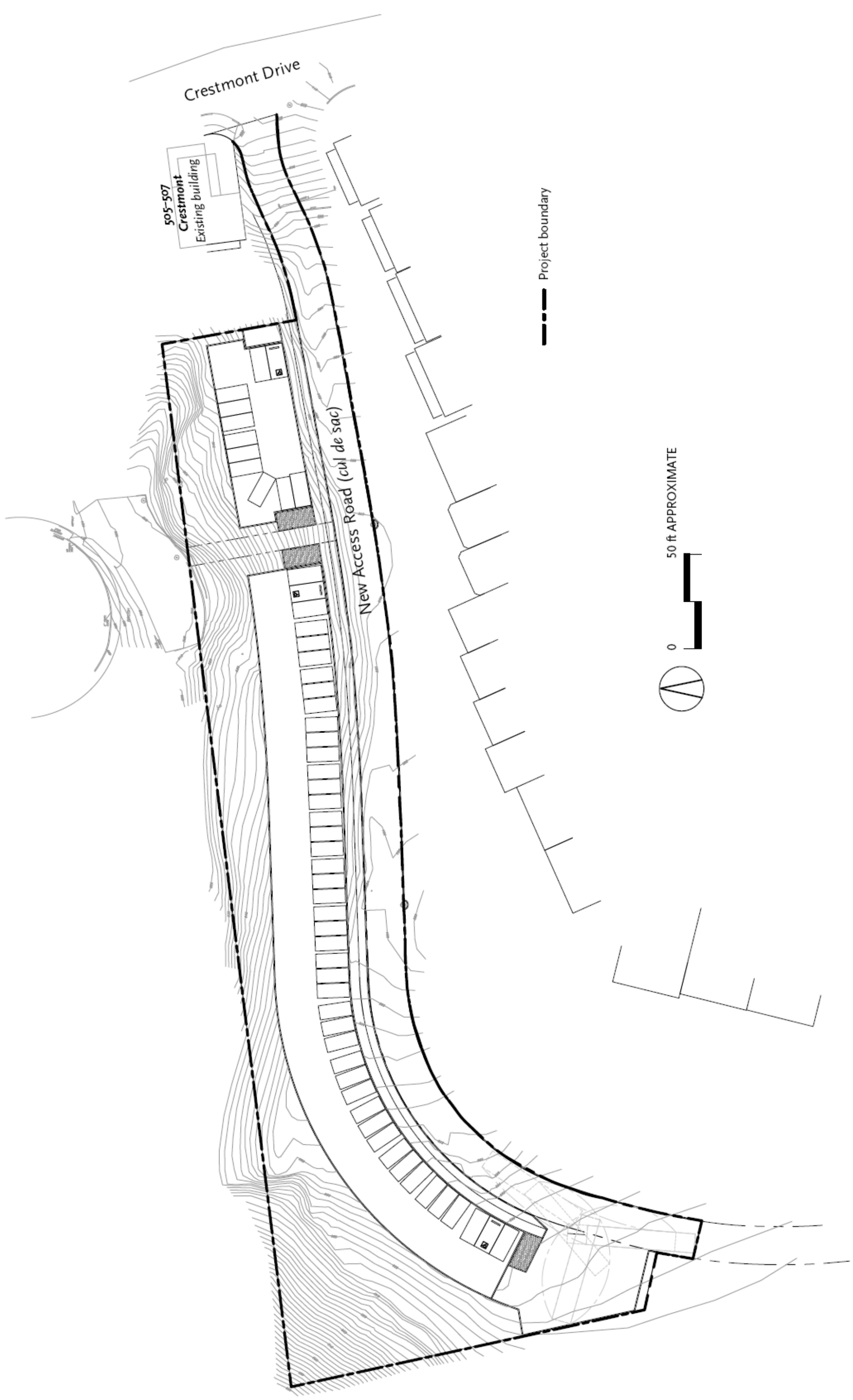
Alternative C: Reduced Foundations Alternative Site Plan **Figure 24**



Source: Levy Design Partners
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Alternative C: Reduced Foundations Alternative Parking Plan **Figure 25**

Source: Levy Design Partners

9-12-11

Alternative C: Reduced Foundations Alternative Elevations Figure 26 range in size from 1,650 to 1,850 square feet. There would be a total of 34 dwelling units under the Alternative C, the same as under the proposed project.

2. The buildings would be constructed on fewer piers, with less ground disturbance compared to the proposed project, but most of the roofline of this alternative, at approximately 40 feet tall would be higher than the project. (The remainder of this alternative's roofline would be similar to the project.)

3. The number of designated, enclosed parking spaces would be decreased. Alternative C would provide 51 designated garage spaces (1.5 per dwelling unit), compared with 60 designated parking spaces of the proposed project.

4. Guest parking spaces would not be provided. Altogether, there would be 51 parking spaces in this alternative scenario, compared with 68 spaces in the proposed project. Thirty-four spaces would be considered required parking, and the additional 17 parking spaces (which are 50 percent of required parking) would be considered accessory.

In total, this alternative would construct approximately 56,100 to 62,900 square feet of residential space and 13,620 square feet for a private street on the approximately 63,890-square-foot project site. The proposed project would have the same area of private street and 65,750 square feet of residential space.

Like the proposed project, Alternative C would require EIR certification, findings of *General Plan* and Priority Policies Consistency, Conditional Use Authorization for a PUD in an RM-1 District to modify requirements for minimum rear yard depth, review of permit application for project within the Northwest Mount Sutro Slope Protection Area, building permits, and DPW approval of the connection of the private road to Crestmont Drive. Unlike the proposed project, this alternative would not require subdivision of Lot 25 into 13 parcels.

IMPACTS

Alternative C would result in the construction of 34 multi-family dwelling units on the project site, adding residential density to the Mount Sutro/Forest Knolls/ Clarendon Heights area. These 34 dwelling units would not be considered a significant addition to the housing stock in the City when considered within the context of year 2020 housing projections. Like the proposed project, cumulative land use effects would be less than significant.

The two buildings containing a total of 34 multi-family dwelling units under Alternative C would have space between the buildings, similar to the space between the two buildings of the proposed project. Viewed from the new private road, the highest roofline of this alternative would be approximately 40 feet above the new street grade, about the same height as highest portion of the proposed project, but most of the roofline of this alternative would be higher than the proposed project. Therefore, the massing and heights of the buildings in this alternative would be greater than the proposed project. From both uphill and downhill vantage points, this alternative would be more visually prominent than the proposed project. This more massive configuration would result in greater view obstruction and visual quality effects for the neighboring building at 505-507 Crestmont Drive, as well as other nearby buildings on Crestmont Drive. The overall effects on visual quality, urban design, and views would be greater than those of the proposed project, including from the building at 505-507 Crestmont Drive. However, like the proposed project, Alternative C would not have significant impacts on views and visual quality.

The effects of Alternative C on transportation and circulation would be similar to the proposed project. Like the proposed project, this alternative would generate about 340 new daily person trips and 37 weekday p.m. peak-hour vehicle trips. The effects on operating conditions, and levels of congestion at the key intersections and road segments studied, including Crestmont Drive, would be similar to those under the proposed project. These traffic impacts would be less than significant under this alternative, as is the case with the proposed project.

At the intersections of Warren Drive/Seventh Avenue and Clarendon/Laguna Honda, which would operate at LOS F under cumulative year 2015 conditions, this alternative, like the proposed project, would add traffic to movements that would continue to operate satisfactorily. For movements that would operate poorly under cumulative conditions, Alternative C contributions to these movements would be minimal. Therefore, this alternative's traffic would not represent a considerable contribution to the adverse cumulative conditions at the intersections of Warren Drive/Seventh Avenue and Clarendon/Laguna Honda. Neither this alternative nor the project would have a significant cumulative impact at these intersections.

This alternative would have a total of 51 parking spaces, which would be equal to parking demand. In comparison, the proposed project would provide 68 parking spaces, which would create a surplus of 17 parking spaces.

Alternative C would result in similar levels of operational air emissions and greenhouse gases as the proposed project. This alternative would generate construction vehicle and equipment emissions similar to the proposed project, and, like the proposed project, construction vehicle and equipment emissions would be reduced to a less-than-significant level by implementation of Mitigation Measure M-AQ-3 described in Section IV.D. Air Quality, on page 147.

The foundations of this alternative would require fewer concrete piers than the proposed project. The buildings in this alternative would be constructed above grade, which would disturb less of the site soils and shield the slope from rainfall. However, any construction on the project site would result in geologic impacts similar to those of the proposed project, due to the necessity of geotechnical engineering and slope stability features on the steep project site. For these reasons, the geologic impacts of this alternative would be slightly less than those of the proposed project. However, similar to the proposed project, implementation of the mitigation measures described in Section IV.F. Geology and Soils, on pages 210–227, would be required to reduce the geologic impacts of this alternative to less-than-significant levels.

This alternative would be larger in height and massing to the proposed project and would have a correspondingly greater shadow effect. Neither this alternative nor the proposed project would shade any public open spaces or park under the jurisdiction of the Recreation and Park Department. Both project-specific and cumulative shadow effects for this alternative and the proposed project would be less than significant.

Impacts of both this alternative and the proposed project on biological resources would be similar, and would be significant. However, these impacts would be reduced to less-than-significant levels by implementation of Mitigation Measure 3, identified in the Initial Study (see Appendix A).

Impacts of both this alternative and the proposed project on archeological resources and paleontological resources would be similar, and would be significant but would be reduced to less-than-significant levels by implementation of Mitigation Measures M-CP-1 and M-CP-2 (see Summary of Significant Environmental Effects and Mitigation Measures Identified in Initial Study, pages S-47–S-50), identified in V.H CEQA Checklist Update, and Mitigation Measure 4, identified in the Initial Study.

Impacts of both this alternative and the proposed project on hydrology would be similarly significant, but would be reduced to less-than-significant levels through implementation of the geotechnical Mitigation Measures M-GE-1b, M-GE-2a, M-GE-2b, M-GE-2c, M-GE-2d, M-GE-2e, M-GE-2f, and M-GE-2g, all described in Section IV.F. Geology and Soils.

Alternative C would have greater impacts on views than the proposed project, and would not meet San Francisco Overlook Development, LLC's objective number (3) to develop a project that is considerate of the views of existing houses in the neighborhood. Alternative C would meet San Francisco Overlook

Development, LLC's other objectives, namely, to (1) develop fewer units than the 61 units allowed under the *Planning Code* in order to conform the project to the San Francisco Residential Design Guidelines; (2) create an appropriately scaled residential development of larger multi-bedroom family-sized dwelling units; (4) given the site's lack of easy transit connections, provide more than the minimum number of on-site parking spaces (one space per unit); (5) comply with the requirements of the Northwest Mount Sutro Slope Protection Area ordinance (*Building Code* Section 106.4.1.3) and the recommendations of the *Geotechnical Investigation, Crestmont Drive Project, San Francisco, California,* prepared by Alan Kropp & Associates (dated September 29, 2006, and updated December 7, 2010) in order to remedy the effects of ongoing hillside erosion, past landslides on and near the project site, and improve the stability of the existing site and surrounding areas; and (6) construct a residential project that would produce a sufficient return on investment for the project sponsor and its investors to implement necessary hillside stabilization measures and provide or upgrade site infrastructure (including a new access roadway, utilities, and fire hydrants).

D. ALTERNATIVES CONSIDERED BUT REJECTED

No alternatives other than those assessed in this chapter were identified that could substantially reduce the environmental impacts of the proposed project. As discussed in Project Alternative with Access from Fifth Avenue on page 20, an alternative providing access from Fifth Avenue was determined not to be feasible because the project sponsor's property has no frontage on Fifth Avenue or any easement rights to gain access to Fifth Avenue. Consideration of the feasibility of developing a project alternative at a different site depends on whether other property is owned by the project sponsor or can be acquired reasonably by the project sponsor. The project sponsor does not own any other sites in San Francisco, and no viable alternative sites have been identified within San Francisco where the proposed project could be constructed that would meet most of the project sponsor's objectives. Therefore, no off-site alternative is analyzed.

E. ENVIRONMENTALLY SUPERIOR ALTERNATIVE

The proposed project would have significant impacts on air quality, geology and soils, noise, archeological resources, paleontological resources, human remains, biological resources, and hydrology and water quality that would be reduced to less than significant with 21 mitigation measures (M-AQ-3, on page 147; M-GE-1a, on page 210; M-GE-1b, on page 212; M-GE-2a, on page 214; M-GE-2b, on page 214; M-GE-2c, on page 215; M-GE-2d, on page 216; M-GE-2e, on page 217; M-GE-2f, on page 218; M-GE-2g, on page 218; M-GE-3a, on page 220; M-GE-3b, on page 220; M-GE-3c, on page 221; M-GE-3d, on page 221; M-GE-6a, on page 223; M-GE-10a, on page 225; M-CP-1, on page 234; M-CP-2, on page 235; Mitigation Measure 1 identified in the Initial Study, on page S-43; Mitigation Measure 3 identified in the Initial Study, on page S-45; and Mitigation Measure 4 identified in the Initial Study, on page S-47). With implementation of the geology and soils mitigation measures, the proposed project would result in slope stability and drainage improvements.

The proposed project would have less-than-significant operational traffic and associated operational air quality impacts. It would have a range of other less-than-significant impacts or no impact in other environmental areas (see Table S-3 in the Summary section of this document, on page S-54, for a tabular comparison between proposed project and the Reduced Project and Reduced Foundations Alternatives impacts).

Alternative B would have 16 dwelling units, fewer than the proposed project. The geotechnical impacts of this alternative would be slightly less than those of the proposed project. Alternative B would have similar visual impacts due to its similar scale. It would generate approximately 160 new weekday daily person trips, of which 17 would be p.m. peak hour vehicle trips, fewer than the proposed project. The operating conditions, and levels of congestion at the key intersections and road segments studied, including Crestmont Drive, would be better than those under the proposed project, although these traffic impacts would be less than significant for both this alternative and the proposed project. This alternative would generate a smaller surplus of parking spaces than the proposed project. Operational air emissions associated with project traffic would be less than those of the proposed project. Construction air emissions would be similar to those of the proposed project, which would be less than significant with implementation of Mitigation Measure M-AQ-3. Otherwise, Alternative B would have similar less-than-significant impacts.

The No Project Alternative would avoid all of the proposed project's impacts, but would not provide the slope stability and drainage improvements of the project. CEQA Guidelines require identification of an environmentally superior alternative other than the No Project Alternative which would reduce, avoid or eliminate significant impacts of the proposed project. Alternative B would be the environmentally superior alternative due to its reduced transportation and operational air quality impacts, and its slightly reduced geotechnical impacts.

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VII. EIR PREPARERS AND PERSONS AND ORGANIZATIONS CONTACTED

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PROJECT SPONSOR

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VIII. APPENDICES

APPENDIX A: NOTICE OF PREPARATION AND INITIAL STUDY

APPENDIX B: TRANSPORTATION DEFINITIONS

APPENDIX C: GEOTECHNICAL INVESTIGATION REPORT

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APPENDIX A

NOTICE OF PREPARATION

AND INITIAL STUDY

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PLANNING DEPARTMENT

City and County of San Francisco ● 1660 Mission Street, Suite 500 ● San Francisco, California ●

MAIN NUMBER	DIRECTOR'S OFFICE	ZONING ADMINISTRATOR	PLANNING INFORMATION	COMMISSION CALENDAR
(415) 558-6378	PHONE: 558-6411	PHONE: 558-6350	PHONE: 558-6377	INFO: 558-6422
	4TH FLOOR FAX: 558-6426	5TH FLOOR FAX: 558-6409	MAJOR ENVIRONMENTAL FAX: 558-5991	INTERNET WEB SITE WWW.SFGOV.ORG/PLANNING

May 27, 2006

To Responsible Agencies, Trustee Agencies, and Interested Parties:

RE: CASE NO. 2004.0093E—CRESTMONT HILLS RESIDENTIAL PROJECT
NOTICE OF PREPARATION OF AN ENVIRONMENTAL IMPACT REPORT

A Notice of Preparation (NOP) of a Draft Environmental Impact Report (DEIR) for the above-referenced project (State Clearinghouse No. 2003122131), described below, has been issued by the Planning Department. An Initial Study has also been prepared to provide more detailed information regarding the proposed project and the environmental issues to be considered in the DEIR. The NOP/Initial Study is either attached or is available upon request from **Irene Nishimura**, who you may reach at **(415) 558-5967** or in writing at the above address. This notice is being sent to you because you have been identified as potentially having an interest in the project or the project area.

The project site is on Crestmont Drive on the northwest side of Mt. Sutro (Assessor's Block 2636, Lots 25 and 28). It would involve the construction of 34 dwelling units in 17 two-unit townhouse buildings arranged in four clusters on a proposed new private road. The 17 duplex buildings would contain four levels and would be about 23 to 33 feet high from the new street level, with two to three stories above the new street grade level and one to two stories below. There would be 31 three-bedroom dwelling units and 3 four-bedroom units, each with one full-size off-street parking space. Six of the units would have an additional tandem space, and 15 off-street parking spaces for guests also would be provided, for a total of 55 off-street parking spaces for the project. The new street would be a 20-foot-wide cul-de-sac extending approximately 670 feet west from the existing roadway of Crestmont Drive. The total project site is 63,320 square feet, and consists of undeveloped, vegetated, down-sloping land and an unpaved dead-end road on Lots 25 and 28 in Assessor's Block 2636. The proposed dwellings would be built on Lot 25 and the proposed road on Lot 28. Approximately 40,500 square feet of the 63,320-square-foot project site would be developed with the new residential buildings and the new paved private street. The remaining 22,820 square feet of the project site would be left undeveloped. The project site is within an RM-1 (Residential, Mixed, Low-Density) District and a 40-X Height and Bulk District. The proposed project would require a Conditional Use Authorization from the Planning Commission for a Planned Unit Development.

A notification that the project is receiving environmental review was published on June 23, 2004. The Planning Department has decided to prepare an Environmental Impact Report (EIR) prior to any final decision regarding whether to approve or disapprove the project. The purpose of the EIR is to provide information about potential significant physical environmental effects of the proposed project, to identify possible ways to minimize the significant effects, and to describe and analyze possible alternatives to the proposed project. Preparation of an NOP or EIR does not indicate a decision by the City to approve or to disapprove the project. However, prior to making any such decision, the decision makers must review and consider the information contained in the EIR.

Comments concerning the scope of the EIR are welcomed. In order for your concerns to be fully considered throughout the environmental review process, we would appreciate receiving them by **June 26, 2006.** Written comments should be sent to Paul Maltzer, Environmental Review Officer, San Francisco Planning Department, 1660 Mission Street, Suite 500, San Francisco, CA 94103.

If you work for an agency that is a Responsible or a Trustee Agency, we need to know the views of your agency as to the scope and content of the environmental information that is relevant to your agency's statutory responsibilities in connection with the proposed project. Your agency may need to use the EIR when considering a permit or other approval for this project. We will also need the name of the contact person for your agency. If you have questions concerning environmental review of the proposed project, please contact **Irene Nishimura** at **(415) 558-5967**.

PLANNING DEPARTMENT

City and County of San Francisco • 1660 Mission Street, Suite 500 • San Francisco, California •

MAIN NUMBER	DIRECTOR'S OFFICE	ZONING ADMINISTRATOR	PLANNING INFORMATION	COMMISSION CALENDAR
(415) 558-6378	PHONE: 558-6411	PHONE: 558-6350	PHONE: 558-6377	INFO: 558-6422
	4TH FLOOR FAX: 558-6426	5TH FLOOR FAX: 558-6409	MAJOR ENVIRONMENTAL FAX: 558-5991	INTERNET WEB SITE WWW.SFGOV.ORG/PLANNING

NOTICE OF PREPARATION OF AN ENVIRONMENTAL IMPACT REPORT

Date of this Notice May 27, 2006

Lead Agency: San Francisco Planning Department
1660 Mission Street, Suite 500
San Francisco, California 94103-2414

Agency Contact Person: Irene Nishimura **Telephone**: (415) 558-5967

Project Title: **2004.0093E:** Crestmont Hills Residential Project
Project Sponsor: Alex Novell, Crestmont Hills LLC, 611 Summit Ave., Mill Valley, CA 94941
Project Contact Person: Alex Novell, Crestmont Hills LLC, 611 Summit Ave., Mill Valley, CA 94941
Telephone: (415) 564-5950 **e-mail:** info@crestmonthills.com

Assessor's Block and Lot: Block 2636, Lots 25 and 28
City and County: San Francisco

Project Description: The proposed project would involve construction of 34 dwelling units in 17 two-unit townhouse buildings arranged in four clusters on a proposed new private road off of Crestmont Drive on the northwest side of Mt. Sutro. The 17 buildings would contain four levels and would be about 23 to 33 feet high from the new street level, with two to three stories above the new street grade level and one to two stories below. There would be 31 three-bedroom dwelling units and 3 four-bedroom units, each with one full-size off-street parking space. Six of the units would have an additional tandem space, and 15 off-street parking spaces for guests also would be provided, for a total of 55 off-street parking spaces for the project. The new street would be a 20-foot-wide cul-de-sac extending approximately 670 feet west from the existing roadway of Crestmont Drive. The total project site is 63,320 square feet, and consists of undeveloped, vegetated, down-sloping land with an unpaved dead-end road on Lots 25 and 28 in Assessor's Block 2636. The proposed dwellings would be built on Lot 25 and the proposed road on Lot 28, and would occupy approximately 40,500 square feet of the approximately 63,320-square-foot project site. The remaining 22,820 square feet of the project site would remain undeveloped. The project site is within an RM-1 (Residential, Mixed, Low-Density) District and a 40-X Height and Bulk District. The proposed project would require a Conditional Use Authorization by the Planning Commission for a Planned Unit Development.

THIS PROJECT MAY HAVE A SIGNIFICANT EFFECT ON THE ENVIRONMENT AND AN ENVIRONMENTAL IMPACT REPORT IS REQUIRED. This determination is based upon the criteria of the State CEQA Guidelines, Section 15063 (Initial Study), 15064 (Determining Significant Effect), and 15065 (Mandatory Findings of Significance), and the following reasons, as documented in the Environmental Evaluation (Initial Study) for the project, which is attached.

Written comments on the scope of the EIR will be accepted until the close of business on June 26, 2006. Written comments should be sent to Paul Maltzer, Environmental Review Officer, San Francisco Planning Department, 1660 Mission Street, Suite 500, San Francisco, CA 94103.

State Agencies. We need to know the views of your agency as to the scope and content of the environmental information that is germane to your agency's statutory responsibilities in connection with the proposed project. Your agency may need to use the EIR when considering a permit or other approval for this project. Please include the name of a contact person in your agency. Thank you.

May 27, 2006
Date

Paul E. Maltzer, Environmental Review Officer

INITIAL STUDY

Crestmont Hills

Planning Department Case No. 2004.0093E

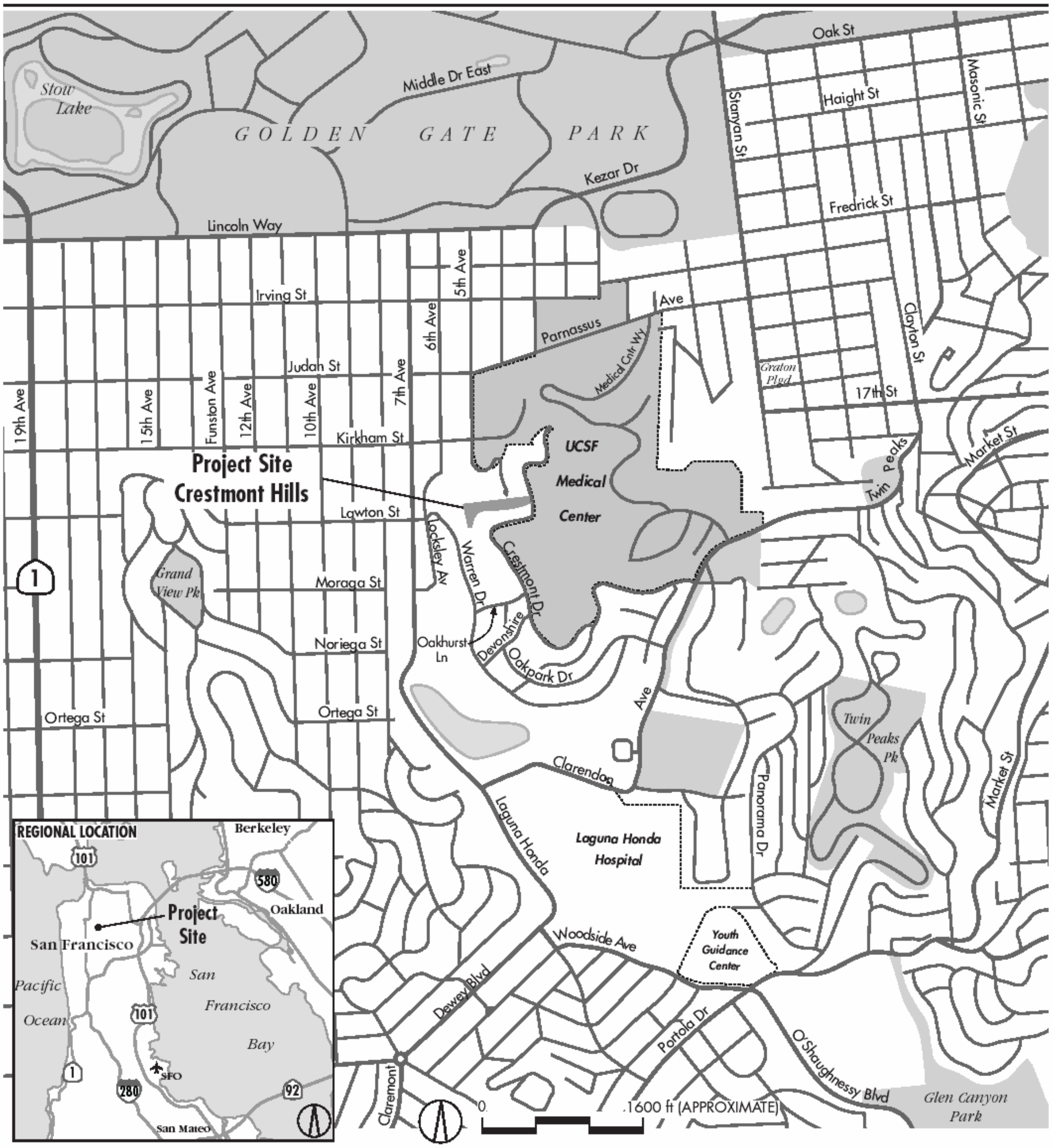
I. PROJECT DESCRIPTION AND SETTING

A. PROJECT DESCRIPTION

The project site (Assessor's Block 2636, Lots 25 and 26) is on the northwest slope of Mt. Sutro, about a quarter mile southwest of the University of California Medical Center (Figure 1, page 2) and approximately 600 feet northwest of the summit of Mt. Sutro.

The proposed project would consist of construction of 34 dwelling units on an undeveloped, partially wooded, vegetated, down-sloping, 49,558-square-foot lot (Lot 25) and a new 20-foot-wide private street on an adjoining 13,762-square-foot lot (Lot 28) for which the project sponsor holds an easement. Access to the site would be from near the north end of Crestmont Drive. The 34 units would be constructed as duplexes (with a two-level unit above and a two-level unit below) in 17 structures that would be arranged in four clusters (Figures 2 to 6 on pages 3 to 7). The clusters share front and rear facades, but share no other walls, and have independent foundations and firewalls separating them. The project would consist of 31 three-bedroom units and three four-bedroom units. The dwelling units would range in size from 1,490 square feet to 3,130 square feet. Each unit would have one parking space off of a new private street. Six units would have an additional tandem space, and there would be 15 parking spaces for visitor parking for a total of 55 off-street parking spaces. In total, the project would construct approximately 68,440 square feet of residential space and 13,620 square feet of private street area on the 63,320 square-foot project site. Approximately 40,500 square feet of the project site would be developed with the new residential buildings and new paved private street, while the remaining 22,820 square feet of the project site would be left undeveloped.

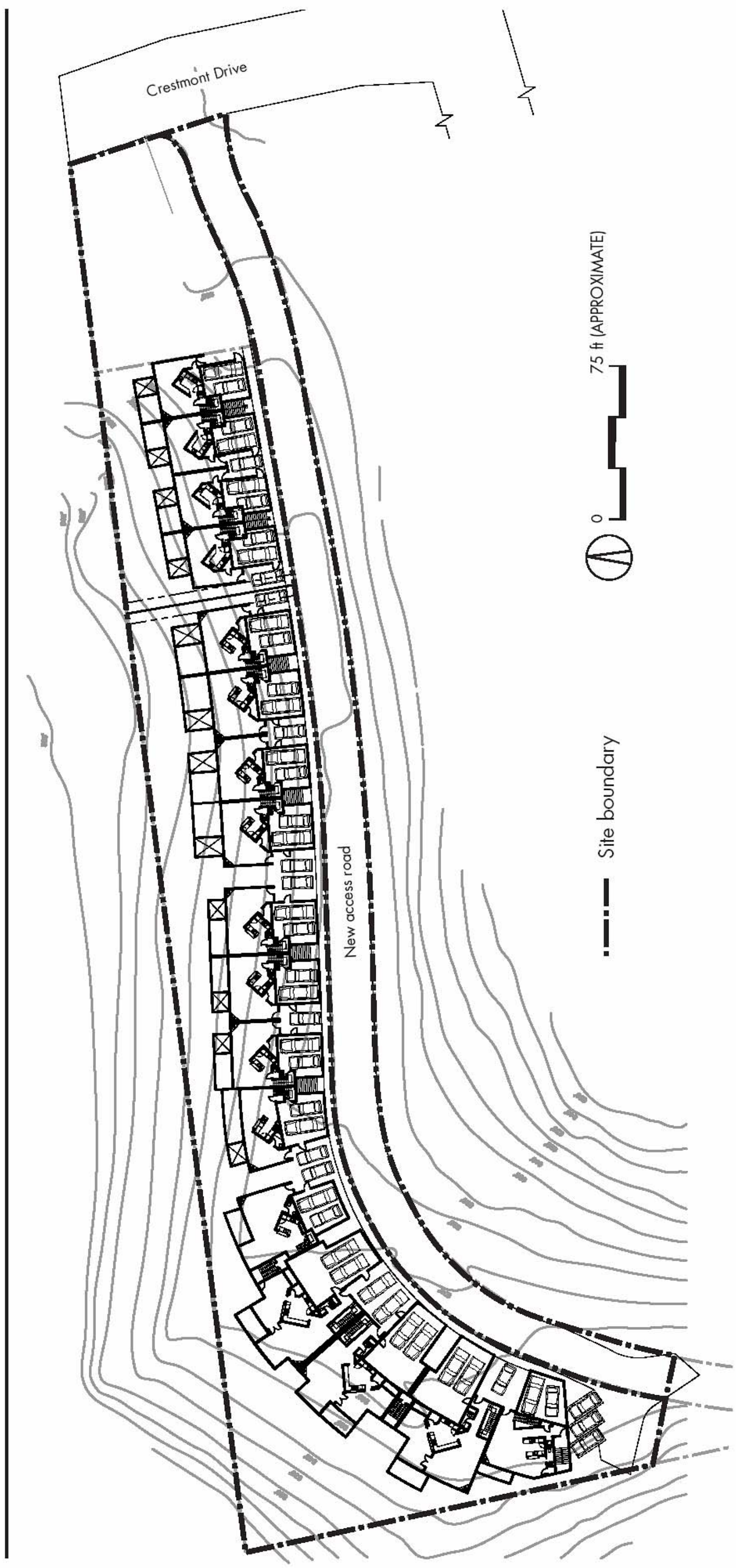
The proposed buildings would range between approximately 23 to 33 feet in height above the new street grade. The buildings would be four stories, with two to three stories above street level, and at the rear, down-sloping portion of the project site, one to two stories below street level.



Source: During Associates

2-24-06

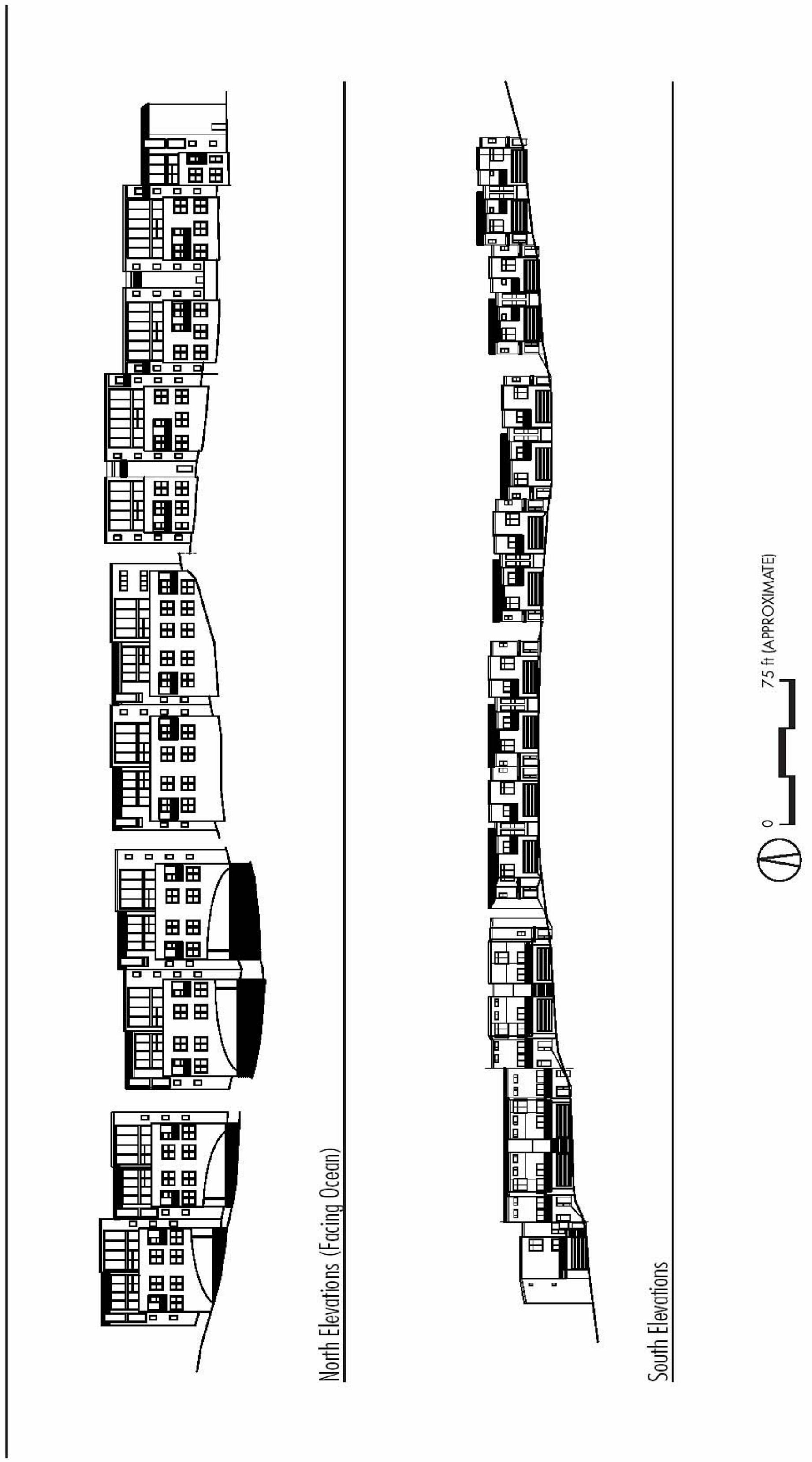
Project Site Location Figure 1



Source: Levy Design Partners

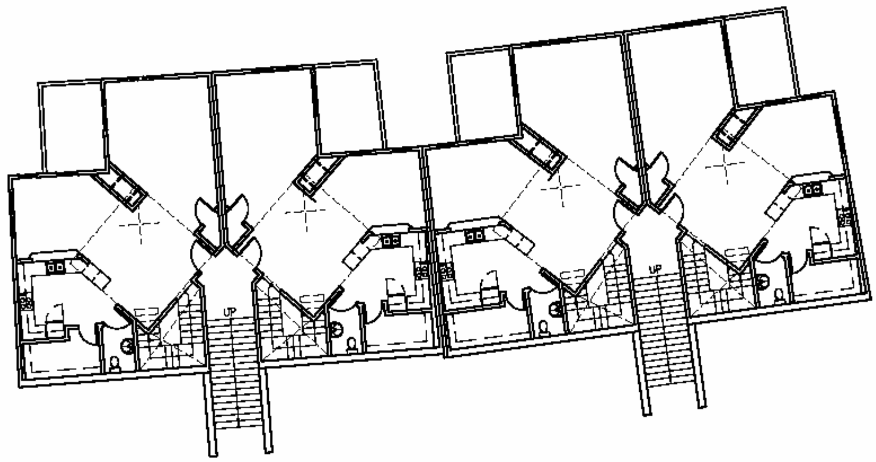
12-2-05

Proposed Site Plan Figure 2

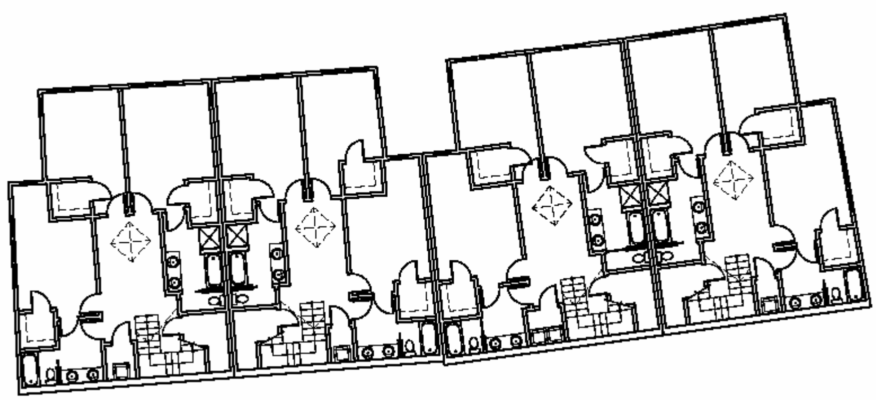


Source: Levy Design Partners
8-6-04

Proposed Project Elevations Figure 3



Level Two—Upper Level of Bottom Unit



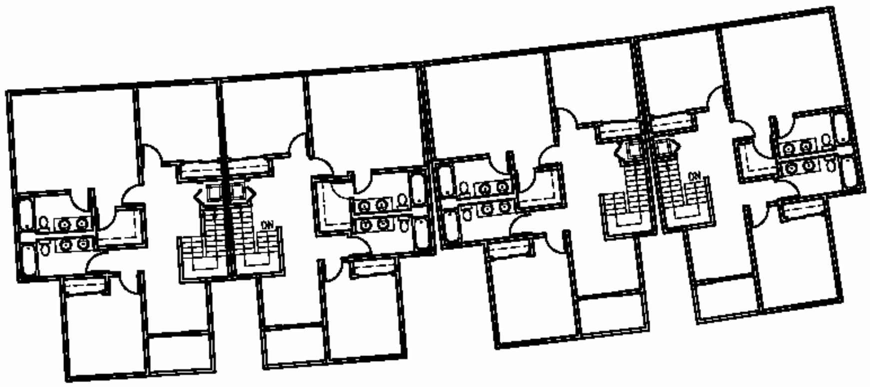
Level One—Lower Level of Bottom Unit

Note: Sample is one of several different duplex models.

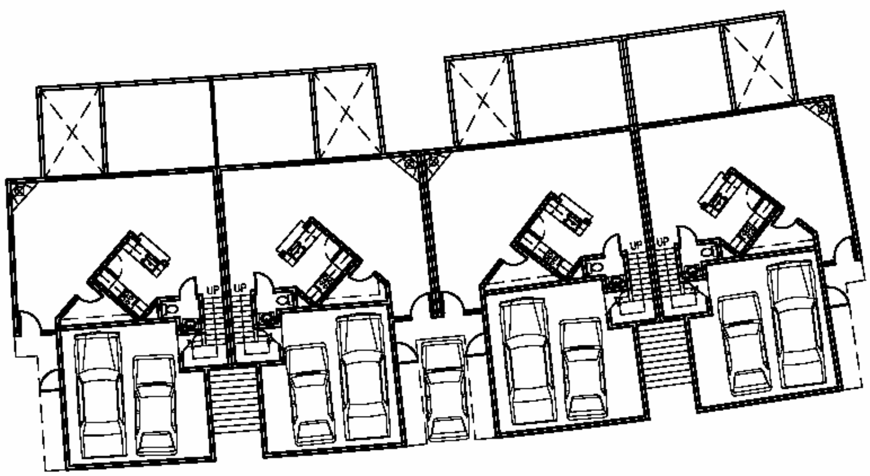
Source: Levy Design Partners

5-4-06

Proposed Floor Plans—Levels 1 and 2 Figure 4



Level Four—Upper Level of Top Unit



Level Three— Garages and Lower Level of Top Unit

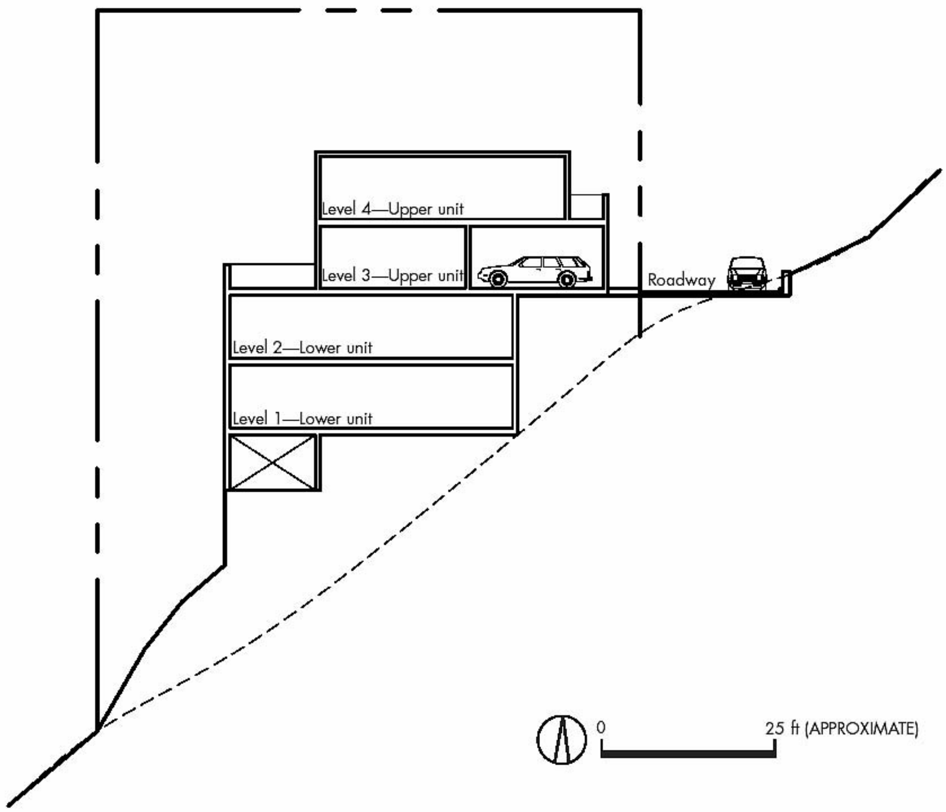
Note: Sample is one of several different duplex models.

0 25 ft (APPROXIMATE)

Source: Levy Design Partners

5-4-06

Proposed Floor Plans—Levels 3 and 4 Figure 5



Note: Sample is one of several different duplex models.

Source: Levy Design Partners

2-24-06

Proposed Section Sample Figure 6

The new 20-foot-wide cul-de-sac would extend about 670 feet west from near the north end of Crestmont Drive. The new units would be built on the north side of and downhill from the new private road. There would be a turn-around area at the end of the new road.

The project site is within an RM-1 (Residential, Mixed, Low-Density) District and a 40-X Height and Bulk District. The proposed project would require Conditional Use Authorization from the Planning Commission for a Planned Unit Development pursuant to Sections 303 and 304 of the *Planning Code*.

Project construction would take approximately 14 months. The project architect is Levy Design Partners.

B. PROJECT SETTING

The project site is on the northwest slope of Mt. Sutro. The undeveloped partially-wooded, primarily rectangular-shaped site runs east and west, with a hook-shaped area protruding south from the west edge (see Figures 1 and 2, pages 2 and 3). The site contains an unpaved dead-end road that follows the contour of the hill going west, and is blocked from vehicular access by a chain at the east end of the project site at Crestmont Drive. Its north portion slopes sharply down to an abandoned quarry that is on an adjacent parcel at the foot of which are the two-towered, 11-story Avalon Sunset Towers Apartment complex (8 Locksley Avenue) and the 86-unit Kirkham Heights Apartments (1530-1555 Fifth Avenue). To the south, uphill from the project site, are two- to four-level single-family and two-family residential homes built into the hill on Crestmont Drive, and steeply-sloped and undeveloped parcels that extend to Oakhurst Lane, a public stairway that runs between Crestmont and Warren Drives. Two- and three-story apartment buildings and single-family residences are downhill to the west, along Warren Drive. The University of California, San Francisco (UCSF) Parnassus Campus is northeast of the project site and UCSF's open space preserve is to the east, uphill, across Crestmont Drive.

The project site is within an RM-1 (Residential, Mixed, Low-Density) District. Uphill to the south are single-family and two-family residences within the same RM-1 District. The Kirkham Heights Apartments, downhill from the project site to the north, and the residential units to the west are within an RM-2 (Residential, Mixed, Moderate-Density) District. To the northwest, the zoning district is RM-4 (Residential, Mixed, High-Density) within which the Avalon Sunset Towers Apartments are located. To the south across Oakhurst Lane is a low density RH-1(D) (Residential, House, One-Family [Detached Dwelling]) District. UCSF and its open space preserve on Mt. Sutro are zoned P for public uses and OS for open space, respectively. The nearest neighborhood commercial area is the Inner Sunset Neighborhood Commercial District, an NC-2 (Neighborhood Commercial, Small-Scale) District along 9th Avenue (from Golden Gate Park south to Judah Street) and on Irving Street (from 5th Avenue west to 27th Avenue), and is approximately one mile by vehicle northeast of the project site.

The project site is within a 40-X Height and Bulk District (40-foot height limit with no bulk limit), as are most of the surrounding residential areas. The exceptions are: a large P (Public) District south and immediately east of the north end of Crestmont Drive, which is primarily designated OS (open space) and under UCSF jurisdiction, and a smaller P District south and west of the project site also designated OS; and a small area to the southeast of the project site on the other side of Mt. Sutro's southwest slope and a small area northeast of the project site on the other side of the mountain, which are within a 25-X Height and Bulk District (25-foot height limit).

II. SUMMARY OF POTENTIAL ENVIRONMENTAL EFFECTS

A. EFFECTS FOUND TO BE POTENTIALLY SIGNIFICANT

The proposed residential development project is examined in this Initial Study to identify potential physical effects on the environment. On the basis of this study, project-specific effects that relate to geologic hazards and erosion or siltation, visual quality, and transportation and circulation, have been determined to be potentially significant, and will be analyzed in an Environmental Impact Report (EIR). These topics are noted "To Be Determined" which means that analysis in the EIR will enable a determination of whether or not the proposed project would generate or result in a significant impact directly related to these topics. In addition, the EIR will provide further discussion of land use and emergency access for informational purposes, although the impacts are determined in this Initial Study to be less than significant.

B. EFFECTS FOUND NOT TO BE SIGNIFICANT

The following potential environmental effects were determined either to be less than significant or to be reduced to a less-than-significant level through mitigation measures described in this Initial Study. These environmental issues are discussed in Section III below, and do not require further environmental evaluation in the EIR: land use, population and housing, noise, air quality, utilities and public services, biology, water, energy/natural resources, and cultural resources.

III. ENVIRONMENTAL EVALUATION CHECKLIST AND DISCUSSION

A. COMPATIBILITY WITH ZONING, PLANS, AND POLICIES

		N/A	Discussed
1.	Discuss any variances, special authorizations, changes proposed to the City Planning Code or Zoning Map, if applicable.	☐	■
2.	Discuss any conflicts with any other adopted environmental plans and goals of the City or Region, if applicable.	☐	■

The *San Francisco Planning Code (Code)*, which incorporates by reference the City's Zoning Maps, governs permitted land uses, development densities, and the configuration of buildings within San Francisco. Permits to construct new buildings (or to alter or demolish existing ones) may not be issued unless either the proposed project conforms and complies with the *Code*, or an exception is granted pursuant to provisions of the *Code*. Approval of the proposed project would result in new development on an undeveloped site, of which the environmental effects are discussed below under the relevant topic heading.

The project site is within an RM-1 (Residential, Mixed, Low-Density) District, which allows up to 61 dwelling units as a principal use and up to 81 units with Planned Unit Development approval, and a 40-X Height and Bulk District, which allows buildings up to 40 feet in height with no bulk limitations. Development of 105 units (five single-family dwellings, 34 two-unit buildings, and one 32-unit building), a community center and a parking garage were approved as a Planned Unit Development on the current project site and adjoining parcels (totaling about six acres) in 1963

(Planning Commission Motion No. 5632). In 1976, the Planning Commission modified the 1963 Planned Unit Development approval to substitute five two-unit buildings for the previously approved 32-unit building and to eliminate the community center and parking garage, for a total of 83 approved units (Planning Commission Motion No. 7504). Forty-eight of the 83 approved single-family and duplex units were built. The proposed project, consisting of 17 two-unit buildings (34 units) and a private street on approximately 63,320 square feet (almost 1.5 acres) of the original six-acre Planned Unit Development, would be different than the projects approved in 1963 and 1976 and would require Conditional Use Authorization by the Planning Commission pursuant to Sections 303 and 304 of the *Planning Code*. The proposed project complies with the provisions of the *Code* for the RM-1 District and 40-X Height and Bulk District, which permits construction of residences up to a height of 40 feet and no building bulk limit. There are rear yard and useable open space requirements which may be allowed to vary or to be modified from requirements under Planned Unit Development and Conditional Use for project sites ½ acre or larger.

Environmental plans and policies are those, like the *Bay Area Air Quality Plan*, which directly address physical environmental issues and/or contain targets or standards which must be met in order to preserve or improve characteristics of the City's physical environment. The proposed project would not obviously or substantially conflict with any such adopted environmental plan or policy.

The *San Francisco General Plan*, which provides general policies and objectives to guide land use decisions, contains some policies that relate to physical environmental issues. The compatibility of the project with *General Plan* policies that do not relate to physical environmental issues will be considered by decision makers as part of their determination whether to approve or disapprove the proposed project and any potential conflicts identified as part of that process would not alter the physical environmental effects of the proposed project.

In November 1986, the voters of San Francisco passed *Proposition M, the Accountable Planning Initiative*, which added Section 101.1 to the *Planning Code,* which established eight Priority Policies. These policies are: preservation and enhancement of neighborhood-serving retail uses; protection of neighborhood character; preservation and enhancement of affordable housing; discouragement of commuter automobiles; protection of industrial and service land uses from commercial office development and enhancement of resident employment and business ownership; maximization of earthquake preparedness; landmark and historic building preservation; and protection of open space. Prior to issuing a permit for any project which requires an Initial Study under the California Environmental Quality Act (CEQA); or prior to issuing a permit for any demolition, conversion, or change of use; and prior to taking any action which requires a finding of consistency with the *General Plan*, the City is required to find that the proposed project or legislation is consistent with the Priority Policies. The case report and motion on the Conditional Use Authorization for the Planning Commission will contain the analysis determining whether the proposed project is consistent with the Priority Policies.

The Planning Commission must certify the EIR as a complete and accurate environmental document for the project prior to making any decisions on the proposed project. Conformance and compliance of the project with the *Code* requirements will be described in the EIR for informational purposes.

B. ENVIRONMENTAL EFFECTS

The items on the Initial Study Environmental Evaluation Checklist that have been checked "No," indicate that, upon evaluation, Planning Department staff has determined that the proposed project could not have a significant adverse environmental effect. For items where the conclusion is "To Be Determined," the Planning Department has determined that the proposed project may have a significant adverse environmental effect, requiring further analysis in the EIR. Several of the Checklist items have been checked "Discussed," indicating that the Initial Study text includes discussion about that particular issue. For all of the items checked "No" without a discussion, the conclusions regarding potential significant adverse environmental effects are based on field observation, staff and consultant experience and expertise on similar projects, and/or standard reference material available within the Planning Department, such as the Department's Transportation Guidelines for Environmental Review, or the California Natural Diversity Data Base and maps, published by the California Department of Fish and Game. For each Checklist item, the evaluation has considered both the individual and cumulative impacts of the proposed project.

1. **Land Use** – Could the project:	Yes	No	Discussed
a. Disrupt or divide the physical arrangement of an established community?	☐	■	■
b. Have any substantial impact upon the existing character of the vicinity?	☐	■	■

Land use impacts of a proposed project are considered significant if the project would disrupt or divide the physical arrangement of an established community or have a substantial adverse impact upon the existing character of the vicinity. The proposed residential units would be a new development on a steep undeveloped site and would increase the density of development in the project area.

The area surrounding the project site consists of single-family and multi-family residential uses and open space. Many of the existing buildings upslope of the project site (to the south) are two- to four-story residential units built into the uphill slope, south of the project site. The existing buildings downslope of the project site (to the north) are two-story residential units. The project would change the nature of the project site from a wooded hillside lot to a lot developed with 34 dwelling units in 17 buildings arranged in four clusters and a private street between the existing dwelling units on Crestmont Drive, Warren Drive, and Fifth Avenue. The proposed project's 17 residential buildings, arranged in four clusters, would be four stories, built into the side of the hill along an east/west contour from Crestmont Drive that curves to a north/south contour, with two to three stories above the new street grade level and one to two stories below the new street level (see Figure 6, page 7). The new private street would be relatively level; whereas the other nearby streets are generally sloped. Although the project would be built on undeveloped land with trees and other vegetation, the proposed project would not disrupt or divide the physical arrangement of the surrounding established development. The existing surrounding land uses and activities would continue to coexist with each other, without substantial or adverse disruption from the proposed project.

The existing character of the project area is primarily residential surrounded by the wooded slopes of Mt. Sutro. There is a sense of verticality from the existing two- to four-level houses built into the steeply sloped hillside. The character of the project area would be affected by the proposed residential development in terms of increased density and construction on the existing large undeveloped, partially wooded space. However, the changes would not be significant. The project would be compatible with the existing land uses and scale of development and density in the project vicinity. There are single-family and two-family units within the RM-1 (Residential, Mixed, Low-Density) District uphill, to the south of the project site. Downhill, to the north, are multi-family units in the RM-2 (Residential, Mixed, Moderate-Density) District, and the 11-story Avalon Sunset Towers in the RM-4 (Residential, Mixed, High-Density) District. The project site is currently undeveloped and in an RM-1 (Residential, Mixed, Low-Density) District, which permits a residential density up to 61 units, and hence, the proposed 34-unit development would be under the density limit of the district.

The project buildings would range from 23 feet to 33 feet high above street level, and would be similar in height to that of other buildings uphill and downhill from the project site. The project is in a 40-X Height and Bulk District, and meets the height limit of the district. The density and massing of the proposed project would be similar to the multi-family residential buildings downhill (to the north).

The project would change the use of the site as it is currently undeveloped; however, the proposed type of development, size, scale, and density would fit within the existing development controls for the area and would not substantially or adversely alter the character of the area.

While the proposed project would include construction of 17 two-unit buildings arranged in four clusters on the site, for the reasons discussed above, the project would not result in a significant adverse land use impact. No discussion of this topic is therefore required in the EIR; however, the EIR will include a land use description for informational purposes.

2.	**Visual Quality** – Could the project:	Yes	No	Discussed
a.	Have a substantial, demonstrable negative aesthetic effect?	To Be Determined		
b.	Substantially degrade or obstruct any scenic view or vista now observed from public areas?	To Be Determined		
c.	Generate obtrusive light or glare substantially impacting other properties?	☐	■	■

Aesthetics/Urban Design

The visual character of the project site is an undeveloped, vegetated, wooded open space dominated by a grove of eucalyptus trees in the center and eastern portions of the site, and an open area downslope to the west and northwest. The proposed project would remove a majority of the trees and vegetation on the site, and construct 17 four-level buildings arranged in four clusters. The building size, scale, and massing in the project area are varied. Generally, the immediate vicinity of the project site is characterized by one- to four-story residential buildings. Uphill to the south, most of the buildings are two- to four-story residential buildings built into the side of Mt. Sutro so that their downhill elevations appear as multi-level buildings facing the project site. To the northwest of the project site, at the base of the hill, are two 11-story buildings (the Avalon Sunset Towers Apartments) and to the north are two-story multi-family residential units (Kirkham Heights). The wooded undeveloped slopes of Mt. Sutro are to the east of the project site. The visual changes to the project site will be illustrated, depicted, and discussed in the EIR.

Scenic Views

Views of the project site from portions of Golden Gate Park and Grand View Park, which are both approximately two-thirds mile to the north and west, respectively, of the project site, would be altered. Views from publicly accessible locations in the vicinity of the project site, such as the surrounding public streets and sidewalks, including Crestmont and Warren Drives; Fifth, Sixth, Seventh, and Locksley Avenues; and Kirkham, Lawton, and Moraga Streets, may also be altered. The EIR will analyze the change in scenic views from public vistas and the change in views from adjacent public roadways, using visual simulations of the proposed buildings in the context of the surrounding area and the visual changes resulting from the proposed development of the undeveloped parcel.

Light and Glare

The project site is currently undeveloped. The proposed project would result in the construction of approximately 17 residential townhouse duplexes attached in four clusters, with exterior lighting typical of residential buildings in the project vicinity. This lighting would be similar in magnitude to and consistent with the exterior lighting of the nearby residential buildings. The project would comply with Planning Commission Resolution 9212, which prohibits the use of mirrored or reflective glass. For these reasons, the proposed project would not generate obtrusive light or glare that would substantially impact other properties, and light and glare would not be considered a significant impact of the project, and will not be analyzed in the EIR.

3. **Population** – Could the project:	Yes	No	Discussed
a. Induce substantial growth or concentration of population?	☐	■	■
b. Displace a large number of people (involving either housing or employment)?	☐	■	☐
c. Create a substantial demand for additional housing in San Francisco, or substantially reduce the housing supply?	☐	■	■

San Francisco is the most densely populated and developed city in an attractive region. The San Francisco Bay Area is known for its mild climate, open space, recreational opportunities, cultural amenities, and prominent educational institutions. As a regional employment center, San Francisco attracts people who want to live close to where they work. These factors continue to support a strong demand for housing in San Francisco. Providing new housing to meet this strong demand is particularly difficult in San Francisco because the amount of land available for housing development is limited and land and development costs are relatively high. For these reasons, San Francisco consistently ranks as one of the most expensive housing markets in the United States.

San Francisco housing production has varied substantially over the past 20 years, with recent production showing a dramatic increase.[1] During the period of 1990-2000, the number of new housing units completed citywide ranged from a low of about 380 units (1993) to a high of about 2,065 units (1990) per year. From 1982 to 1998, housing production was relatively low, averaging about 1,100 units per year. From 1999 to 2003, housing production increased dramatically to an average of almost 1,600 units per year, and may be accelerating. Average annual production in the final two years of that period (2002 and 2003) amounted to 2,450 units per year, the highest housing production over the last 20 years. The 20-year average has been almost 1,400 units per year.

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[1] San Francisco Planning Department, Citywide Policy and Analysis Group, *2001-2004 Housing Inventory Summary Report*, July 2005. This report is available online for public review at www.sfgov.org/site/uploadedfiles/planning/Citywide/pdf/Housing%20inventory%2001-04.pdf.

In March 2001, the Association of Bay Area Governments (ABAG) projected regional and local housing needs in its Regional Housing Needs Determination (RHND) 1999-2006 Allocation. San Francisco's need for the 1999–2006 period was projected to total 20,370 new dwelling units or an average yearly need of 2,546 net new dwelling units. The 34 proposed dwelling units would contribute around one percent of this annual housing need.[2]

The proposed project would result in the construction of 34 dwelling units on an undeveloped site. Of the 34 dwelling units, 31 would be three-bedroom units and three would be four-bedroom units.

Extrapolating from Census 2000 data yields an average household size of roughly 3.7 persons among the larger household sizes in Census Tract 301.02, within which the project site is located. Based on this average household size of 3.7, the proposed 34-dwelling-unit project could have around 126 residents.[3] While the 126 new residents of the proposed project may be noticeable to other residents in the area, the project-generated population would not be considered a substantial increase or concentration of people in a generally urbanized area, and would not induce a significant population or growth impact. Hence population will not be analyzed in the EIR.

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[2] City and County of San Francisco Planning Department, *Housing Element* of the *General Plan*, May 13, 2004, page 1. This report is available online for public review at www.sfgov.org/site/uploadedfiles/planning/projects_reports/Adopt%20Preface.pdf.

[3] Larger household size is assumed to be three or more persons per household. The proposed project would be assumed to have a larger household size than the average for the census tract, as the number of rooms in each unit (six or seven) is larger than approximately 68 percent of the other residences in the census tract. A household size of three or more persons is larger than approximately 81 percent of the other households in the census tract, and a positive correlation between the two is conservatively assumed. Data is extrapolated from Table QT-H3 Tenure, Household Size, and Age of Householder: 2000, and Table DP-4 Profile of Selected Housing Characteristics: 2000, Census 2000 Summary File. Census Tract 301.02, San Francisco County, California. These tables are available for public review by appointment in Project File No. 2004.0093E at the Planning Department, 1660 Mission Street, Suite 500, San Francisco.

4. **Transportation/Circulation** – Could the project:

		Yes	No	Discussed
a.	Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system?	To Be Determined		
b.	Interfere with existing transportation systems, causing substantial alterations to circulation patterns or major traffic hazards?	To Be Determined		
c.	Cause a substantial increase in transit demand which cannot be accommodated by existing or proposed transit capacity?	To Be Determined		
d.	Cause a substantial increase in parking demand which cannot be accommodated by existing parking facilities?	To Be Determined		

The proposed project would include 34 dwelling units with 55 parking spaces. The addition of residents on the project site would result in increased demands on the local transportation system, including increased traffic, transit demand, and parking demand. The EIR will discuss project effects related to transportation and circulation, including intersection operations, transit demand, and impacts on pedestrian circulation and parking, as well as construction impacts. The analysis will include the potential cumulative development occurring in the project vicinity.

5. **Noise** – Could the project:

		Yes	No	Discussed
a.	Increase substantially the ambient noise levels for adjoining areas?	☐	■	■
b.	Violate Title 24 Noise Insulation Standards, if applicable?	☐	■	■
c.	Be substantially impacted by existing noise levels?	☐	■	■

The project area, which consists of residences and low-traffic-volume streets, is fairly quiet. A noise level of 49 dBA[4] L_{eq}[5] was measured at the project site by an acoustical engineer during a site visit on February 6, 2005.[6] The noise sources were generally from distant traffic and construction noise occurring in the inner Sunset neighborhoods, and are typical of the noises that residents on Crestmont

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[4] dBA is the symbol for decibels using the A-weighted scale. A decibel is a unit of measurement for sound loudness (amplitude). The A-weighted scale is a logarithmic scale that approximates the sensitivity of the human ear.

[5] L_{eq} is the average A-weighted noise level during the measurement period.

[6] Richard Rodkin, Illingworth and Rodkin, Inc., letter to Stu During, During Associates, *Crestmont Hills San Francisco – Noise Assessment,* February 9, 2005. This report is available for public review by appointment in Project file No. 2004.0093E at the Planning Department, 1660 Mission Street, Suite 500, San Francisco, CA.

Drive are exposed to during the daytime. Noise levels at the south end of Fifth Avenue, below the project site, also would be similar or slightly higher due to proximity to traffic sources.

Project-Generated Noise

Substantial increases in the ambient noise level due to the proposed 34 dwelling units' occupancy, equipment and operation noise are not anticipated. Traffic is the main noise source that makes the greatest contribution to ambient noise levels throughout most of San Francisco, including the project site area. Preliminary estimates of traffic volumes generated by the project indicate about 50 weekday PM peak-hour vehicle-trips due to the project. The project traffic would increase average noise levels by two to three dBA during the peak hour.[7] The increase in noise from traffic on Crestmont Drive generated by the proposed residences would cause the overall daytime and nighttime average noise level to change by less than one dBA, which would not be a significant change.

The proposed project would not violate Title 24 Noise Insulation Standards, as the buildings would be built to include noise attenuation standards pursuant to Title 24. Additionally operational noise would be minimal. As noted previously, the existing noise levels are quite low in the area, so the proposed project would not be substantially impacted by ambient noise.

Construction Noise

Construction noise in San Francisco is regulated through the City's Noise Ordinance (Ordinance No. 274-72, Article 29). The noise ordinance states, *"It shall be unlawful for any person, including the City and County of San Francisco, to operate any powered construction equipment, regardless of age or date of acquisition if the operation of such equipment emits noise at a level in excess of 85 dBA when measured at a distance of 100 feet from such equipment, or an equivalent sound level at some other convenient distance."* The noise level limit does not apply to impact tools, but such tools must be fitted with intake and exhaust mufflers recommended by the manufacturers and approved by the Director of Public Works as the best at accomplishing maximum noise attenuation, and acoustically-attenuating shields or shrouds shall be used. The noise ordinance also regulates construction work at night. The ordinance prohibits construction work between the hours of 8:00 PM

[7] Richard Rodkin, Illingworth and Rodkin, Inc., op.cit.

of any day and 7:00 AM of the following day if the noise resulting from the activity is in excess of the ambient noise level by 5 dBA at the nearest property line.

Construction activities are expected to last approximately 14 months, and would consist of four phases: ground clearing, excavation and shoring, construction of the buildings, and exterior and interior finishing. The first three phases would generate the most noise, and would take approximately twelve months (the last stage, exterior and interior finishing, would take approximately two months). Noise-generating construction activities would include clearing of vegetation, including the cutting of 880 eucalyptus trees; excavation; and shoring that would include drilled pier installation; and construction of the new residential structures. These activities would generate maximum noise levels of up to 85 dBA at 50 feet from construction equipment for at least one year.

Residents on the 400- and 500-block of Crestmont Drive would hear direct noise from construction activities. Residents of the Kirkham Heights Apartments adjacent to the project site would also hear direct noise from construction activity. At the homes closest to the construction activities, in the 400- and 500-block of Crestmont Drive, approximately 50 to 100 feet from the project site, noise levels would be up to 85 dBA at times, which would be within the City's noise ordinance limits, as noted above. Due to the relatively low ambient noise levels in the project area, construction noises would be clearly noticeable to residents along the 400- and 500-blocks of Crestmont Drive and the most southerly Kirkham Heights Apartments. Construction trucks passing through the neighborhood also would be audibly noticeable. The trucks would access the site from Warren Drive, a steep residential street. Noise from the trucks climbing Warren Drive would generate noise levels above levels typically resulting from existing traffic. There would be about two to ten trucks per day accessing the site, mostly during the initial construction phases, lasting approximately two to three months.

Implementation of Mitigation Measure 1, which includes standard noise control measures, and adherence to the City's noise ordinance would reduce construction noise to a less-than-significant level. (See page 50, Mitigation Measure 1)

Construction Vibration

The following discussion of vibrations from construction activities is based on information published by the National Cooperative Research Highway Program[8] and the California Department of Transportation (CALTRANS).[9]

Foundations of nearby homes would be located within about 50 to 100 feet of the closest project construction activities, and about 100 feet or further from drilled pier installation. The nearby structures are about 30 to 35 years old, and are considered to be normal or modern construction. Construction of the proposed project would involve large equipment and drilled pier installation that would produce vibration intermittently over a period of approximately two to three months, during the excavation and shoring period of construction work (other periods during construction would not use drilled pier installation). Vibrations decrease with distance from the source. While vibrations can be felt in buildings close to construction activities, rarely do these vibrations reach levels that cause damage to nearby structures. Old or fragile buildings are sometimes an exception. In addition, humans are sensitive to vibration levels.

Construction vibrations are generally assessed by the maximum rate of ground movement, or peak particle velocity (ppv), which is typically expressed in terms of inches per second (in/sec). The greatest vibration-generating construction activities would include use of bulldozers and caisson drilling. Based on published data, these activities produce ppv vibration levels of 0.089 in/sec. Heavy loaded trucks produce ppv levels of 0.076 in/sec. The human threshold of perception is a ppv of 0.008 to 0.012 in/sec. As a result, vibrations may be perceptible to people at 50 to 100 feet from these activities, including the passage of large loaded trucks on Crestmont Drive. Vibration levels at residences closest to the construction activities are likely to fall in the category of barely to distinctly perceptible. While vibrations may be perceptible, Caltrans reports that there is virtually no risk of "architectural" damage to normal buildings at levels of 0.10 in/sec. Caltrans also uses a ppv level of 0.2 in/sec as a criterion for "minor architectural damage" risk from continuous vibrations, although they report that this appears conservative for intermittent sources such as construction. In addition, high amplitude, low frequency sound from construction equipment may generate noise capable of

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[8] National Cooperative Highway Research Program, NCHRP Synthesis 218, National Academy Press, Washington, D.C. 1999

[9] California Department of Transportation. Transportation Related Earthborne Vibrations (Caltrans Experiences). Technical Advisory, Vibration (TAV_02-01-R9601. February 2002.

rattling windows or structures. Although this may result in perceptible vibration, no damage to buildings or the stability of the slope would occur as a result of this sound vibration.[10] Recent landslides in the vicinity have likely been caused by water loading during and after heavy rains. As discussed under Geology/Topography, pages 41 to 42, slope stability on the project site will be discussed and analyzed in the EIR.

Project-generated noise and vibration, including traffic, construction, operational, and occupant-generated noise, would not result in significant environmental impacts. Because the proposed project would generate a less-than-significant level of noise for adjoining areas and would be built according to Title 24 Noise Insulation Standards, the project's noise impacts would be less than significant. Thus, noise will not be analyzed in the EIR.

6. **Air Quality/Climate** – Could the project:	Yes	No	Discussed
a. Violate any ambient air quality standard or contribute substantially to an existing or projected air quality violation?	☐	■	■
b. Expose sensitive receptors to substantial pollutant concentrations?	☐	■	■
c. Permeate its vicinity with objectionable odors?	☐	■	■
d. Alter wind, moisture, or temperature (including sun shading effects) so as to substantially affect public areas, or change the climate either in the community or region?	☐	■	■

Construction Emissions

Excavation, grading, foundation construction, and other ground-disturbing construction activities would temporarily affect localized air quality for up to about nine months during ground clearing, excavation and shoring, and building construction phases, causing temporary and intermittent increases in particulate dust and other pollutants. Excavation and movement of heavy equipment could create fugitive dust and emit nitrogen oxides (NO_x), carbon monoxide (CO), sulphur dioxide (SO_2), reactive organic gases or hydrocarbons (ROG or HC), and particulate matter with a diameter

[10] James A Reyff, Illingworth and Rodkin, Inc., telephone conversation with Stu During, During Associates, April 1, 2005.

of less than 10 microns (PM_{10}) as a result of diesel fuel combustion.[11] Fugitive dust is made up of particulate matter including PM_{10} and $PM_{2.5}$. Soil disturbance from foundation excavation and site grading would create the potential for wind-blown dust to add to the particulate matter in the local atmosphere while open soil is exposed.

While construction emissions would occur in short-term, temporary phases, they could cause adverse effects on local air quality. The Bay Area Air Quality Management District (BAAQMD), in its CEQA Guidelines, has developed an analytical approach that obviates the need to quantitatively estimate these emissions. The BAAQMD has also identified a set of feasible PM_{10} and $PM_{2.5}$ control measures for construction activities. Soil movement for foundation excavation and site grading would create the potential for wind-blown dust to add to the particulate matter in the local atmosphere while open soil is exposed. In order to reduce the quantity of dust generated during site preparation and construction, the project sponsor has agreed to implement Mitigation Measure 2 listing the BAAQMD PM_{10} control measures. (See Mitigation Measure 2, page 51) The project would include this mitigation measure to reduce the effects of construction activities to a less-than-significant level. Therefore, this topic will not be discussed further in the EIR.

Operations Emissions

Project occupancy would affect local air quality by increasing the number of vehicles on nearby roads and at the project site, and by introducing stationary equipment operation emissions to the project site. Transportation sources are the primary source of operational project-related emissions.[12] Stationary source emissions, generated by combustion of natural gas for space and water heating, would be less-than-significant. The BAAQMD has established screening methods to determine whether development projects could exceed significance thresholds for air quality impacts of project operations, and therefore require a detailed air quality analysis.[13] The BAAQMD generally does not recommend a detailed air quality analysis for residential projects with fewer than 320 single-family units or 510 multi-family units, or for projects generating less than 2,000 vehicle trips per day. Preliminary estimates indicate that the proposed project's 34 multi-family units would generate up to

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[11] Bay Area Air Quality Management District, *BAAQMD CEQA Guidelines,* Assessing the Air Quality Impacts of Projects and Plans, April 1996, Revised December 1999.
[12] *Ibid.*
[13] *Ibid.*

300 daily vehicle trips, which would be fewer daily vehicle trips than the 2,000-vehicle-trips-per-day threshold of significance indicated by the *BAAQMD CEQA Guidelines*. Hence, according to the BAAQMD Guidelines, detailed air quality analysis would not be required, and no significant air quality impacts due to vehicular emissions would be generated by the proposed project.

Toxic Air Contamination/Objectionable Odors

The proposed project would include a change of use from undeveloped parcels to 34 dwelling units and a private paved street. The proposed residential use could require operation of natural-gas-fired boilers, which are standard in residential developments, that could emit trace quantities of toxic air contaminants, but they would not be expected to have the potential to generate toxic air contaminants in substantial amounts or create objectionable odors.

In view of the above, air quality effects, including construction emissions (with implementation of Mitigation Measure 2, on page 51), traffic emissions, toxic air contaminant emissions, and objectionable odors, would not result in significant environmental impacts. Hence, air quality will not be analyzed further in the EIR.

Wind

Prevailing winds in San Francisco are from the west, off the Pacific Ocean. Wind speeds, in general, are greatest in the spring and summer, and least in fall. Daily variation in wind speed is evident, with the strongest wind in the late afternoon and lightest wind in the morning.

Ground-level wind accelerations near buildings vary by exposure, massing, and orientation. Exposure is a measure of the extent that the building extends above surrounding structures into the wind stream. A building that is surrounded by taller structures is not likely to cause adverse wind accelerations at ground level, while even a small building can cause wind problems if it is freestanding and exposed.

Massing is important in determining wind impact because it controls how much wind is intercepted by the structure and whether building-generated wind accelerations occur above-ground or at ground level. In general, slab-shaped buildings have the greatest potential for wind problems. Buildings that have an unusual shape or utilize setbacks have a lesser effect. A general rule is that the more complex the building is geometrically, the lesser the probable wind impact at ground level.

Orientation determines how much wind is intercepted by the structure, a factor that directly determines wind acceleration. In general, buildings that are oriented with their wide axis across the prevailing wind direction will have a greater ground-level wind impact than a building oriented with its long axis along the prevailing wind direction.

The proposed Crestmont Hills project site, on the northwest side of Mt. Sutro, is exposed to prevailing winds, and has no shelter from existing buildings or terrain. The elevated terrain and exposure to winds off the Pacific Ocean result in persistent and often strong winds. While some very tall structures exist near the project site, they offer no shelter to the site due to the lower elevation of these structures.

The proposed buildings would extend two to three stories above the new private access road, and one to two stories would be constructed in the downsloping portion of the project site, below the level of the private access road. For the most part, the buildings would face to the north and not directly west into the prevailing winds, although the structures would intercept some of the prevailing wind and redirect it to ground level on the north and west sides of the project, although the alignment of the buildings limits the amount of wind that would be intercepted.[14] The buildings would not be directly exposed to southerly or southwesterly winds, which are often associated with winter storms.

The buildings would be four stories tall at the rear portion of the site (away from the access road), and the design of the structures would include a set-back between the second and third levels, to create decks. These deck areas, as well as the gaps between the buildings would likely have moderately accelerated winds. These areas of accelerated winds would be within the project site itself, and the proposed project would have little potential to accelerate wind speeds beyond the project site boundaries. The project access road and existing homes above the project site, along

[14] Donald Ballanti, Certified Consulting Meteorologist, Letter to Stu During of During Associates*: Wind Impact Evaluation for the Proposed Crestmont Hills Project, San Francisco,* April 5, 2005. A copy of this letter is available for review, by appointment, at the Planning Department, 1660 Mission, Suite 500, as part of Case File 2004.0093E.

Crestmont Drive, would likely have winds slightly diminished by the sheltering effect of the proposed project for the northwesterly to westerly wind directions.[15]

In summary, based on considerations of exposure, massing, and orientation, potential pedestrian-level wind impacts of the project would not cause significant changes to the wind environment in pedestrian areas adjacent to or near the site. Hence, wind effects will not be analyzed in the EIR.

Shadow

Section 295 of the Planning Code was adopted as a result of Proposition K (passed by San Francisco voters in November 1984) which called for protection of public open spaces and parks from shading and shadowing. Planning Code Section 295 restricts net new shadow on public open spaces and parks under the jurisdiction of, or to be acquired by, the Recreation and Park Commission by any new or renovated structure exceeding 40 feet in height, unless the Planning Commission, in consultation with the Recreation and Park Commission, finds the shadow/shading effect to be less-than-significant. The proposed project would not include any buildings exceeding 40 feet, and so is not under Section 295 restriction.

The nearest public open space, the UCSF open space preserve on Mt. Sutro, to the east across Crestmont Drive from the new private access road, would be approximately 150 feet away from the new structures. The preserve is also at a higher elevation, and hence, would not be affected by the shadows created by the proposed project.

The new shadows created by the project would not exceed levels commonly expected in urban areas, and would not affect any Proposition K-protected public parks or open spaces. Therefore, shadow effects will not be analyzed in the EIR.

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[15] Ibid.

7. **Utilities/Public Services** – Could the project:	Yes	No	Discussed
a. Breach published national, state, or local standards relating to solid waste or litter control?	☐	■	■
b. Extend a sewer trunk line with capacity to serve new development?	■	☐	■
c. Substantially increase demand for schools, recreation, or other public facilities?	☐	■	■
d. Require major expansion of power, water, or communications facilities?	☐	■	■

The project site is in a residential area of the City that is currently served by fire, police, schools, solid waste collection, recreational facilities, water, gas, and electricity services. The proposed project would increase the demand for and use of public services and utilities on the project site, but not in excess of amounts expected and provided for in the project area. The proposed project would not require any substantial expansion of public service or utilities, as explained below.

Solid Waste

San Francisco's solid waste is disposed of at the Altamont Landfill. A substantial expansion of the landfill was approved in 1997 and this expansion of capacity will be able to accommodate San Francisco's solid waste stream well into the future. Statistics indicate that San Francisco is now recycling more material than it sends to the landfill, and that the City has a strong start on its goal of diverting 75 percent of all waste from landfill disposal by 2010.[16] The solid waste associated with the proposed project construction and operation would not substantially affect the projected capacity of the Altamont Landfill. As a result, the proposed project would not create a significant solid waste impact, and will not be analyzed in the EIR.

Sewage and Stormwater

The project site is served by San Francisco's combined sewer system, which handles both sewage and stormwater run-off. Wastewater treatment for the west side of the City is provided primarily by the Oceanside Water Pollution Control Plant, located by the San Francisco City Zoo.

[16] This information is available online at http://www.sfgov.org/wcm_controller/community_indicators. Follow the link for Physical Environment:

A 12-inch-diameter sewer pipe runs along Fifth Avenue, just south of Kirkham Street to the south end of the Fifth Avenue cul-de-sac, and then runs farther south and east to Crestmont Drive. A second sewer pipe runs from Crestmont Drive along the eastern boundary of Lot 28 (the proposed private street) to connect to another pipe beneath Oakhurst Lane, just to the west of the project site. Sewer pipes run beneath Crestmont Drive and Warren Drive providing sanitary sewer service to the residents in this area. In the past three to four years, there have been four recorded incidents of stormwater overflow in the catch basins on Crestmont Drive and Seventh Avenue/Warren Drive, and the outside vents on Warren Drive and Fifth Avenue.[17] The Department of Public Works (DPW), Bureau of Sewers, and Sewer Repair personnel solved these overflows by cleaning out the debris stuck in the catch basins and outside vents. The size of the existing sewer lines and catch basins is adequate to meet the current stormwater demand. The overflows are created by accumulating debris that clogs the catch basins and outside vents, not related to the capacity of the sewer system.

The proposed project, which would cover much of the undeveloped land on the project site with impervious surfaces, would increase the amount of stormwater run-off into the existing sewer system. The project sponsor would install three new sewer lines, including one in the new roadway (in addition to the existing line connecting lines under Crestmont Drive and Oakhurst Lane, described above) discharging into the existing 12-inch sewer at the top of the slope, and two at the bottom of the slope running along the north property line discharging into the existing 12-inch sewer.[18] All the stormwater and waste water runoff from the project site would be conveyed into the existing 12-inch sewer line which runs from Crestmont Drive down to and along the existing unpaved road on the site, and down to an existing manhole at the top (at the south end) of Fifth Avenue. These new lines would have the capacity to handle excess stormwater run-off generated by the proposed project, and no stormwater would be allowed to migrate off-site.[19] Based on a

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[17] Barry Pearl, San Francisco Public Utilities Commission (SFPUC), memo to Irene Nishimura, Planning Department, Review of Sewers Condition Information. A copy of this memo is available for review, by appointment, at the Planning Department, 1660 Mission, Suite 500, in Project File No. 2004.0093E.

[18] Nader Gorji, Olivia Chen Consultants, *Crestmont Hill Sanitary and Storm Water Flows,* email to Stu During, February 15, 2006. A copy of this email is available for review, by appointment, at the Planning Department, 1660 Mission, Suite 500, in Project File No. 2004.0093E.

[19] Nader Gorji, Olivia Chen Consultants, *Crestmont Development, Summary of Hydraulic Analysis for Future Sanitary & Storm Flows to the Existing 12-inch Sewer Located on Site.* Memorandum to Adam Philips, Levy Design, December 7, 2005. A copy of this memo is available for review, by appointment, at the Planning Department, 1660 Mission, Suite 500, in Project File No. 2004.0093E.

hydraulic analysis with available data and assumptions of existing conditions, the existing 12-inch sewer that traverses the site would be capable of handling existing-plus-project flows[20], as well as of conveying future sanitary flows.[21]

The proposed project would increase the total wastewater volume discharged through the combined sewer system by an estimated 2,108 gallons of wastewater per day.[22] Since the increase would be incremental compared to the 84 million gallons of sewage treated per day (there is considerably more total wastewater during the rainy season),[23] it is unlikely that major new capital improvements to the wastewater collection and treatment system would be required. The project would not substantially increase demand for wastewater treatment, and thus it would not be considered to create a significant impact. This topic will not be evaluated in the EIR.

Police and Fire Protection

The project area currently has police and fire protection services. The addition of approximately 126 residents could increase the demand for fire and police services in the area.

The nearest police station is the Park Station located at 1899 Waller Street, about 2.0 miles from the project site, serving the vicinity of the project area and of the east end of Golden Gate Park. Although the project could potentially increase the number of calls received from the area or the level of regulatory oversight that must be provided as a result of activity on the project site, the increase in responsibilities would not likely be substantial in light of the existing demand for police protection services on the west slope of Mt. Sutro.

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[20] Cliff Wong, City and County of San Francisco, Department of Public Works, Bureau of Engineering - Hydraulics Section, e-mail to Adam Phillips, Levy Design, March 22, 2006. A copy of this e-mail is available for review, by appointment, at the Planning Department, 1660 Mission, Suite 500, in Project File No. 2004.0093E.

[21] Nader Gorji, Olivia Chen Consultants, *Crestmont Hill Sanitary and Storm Water Flows,* email to Stu During, February 15, 2006, op cit.

[22] This estimate is based on current typical residential use, 62 gallons per household per day, as estimated in SFPUC, 2005 Urban Water Management Plan for the City and County of San Francisco, December 2005, page 40. 62 gallons per day x 34 units = 2,108 gallons per day. This report is available online for public review at http://sfwater.org/detail.cfm/MC_ID/7/MSC_ID/106/ MTO_ID/NULL/C_ID/2776.

[23] This information is obtained from the San Francisco Public Utility Commission's website, http://sfwater.org/main.cfm/MSC_ID/14.

The closest Fire Station is Station No. 12, located at 1145 Stanyan Street, about 1.6 miles from the project site. Although the project could potentially increase the number of calls received from the area or the level of regulatory oversight that must be provided as a result of the increased activity on the site, the increase in responsibilities would not be substantial in light of the existing demand for fire protection services on the west slope of Mt. Sutro.

In addition, the potential increase in police and fire protection demand would not require the construction of any new police or fire stations and would not result in any substantial service degradation. Emergency vehicles and personnel would have adequate access to the project site with the new 20-foot-wide private cul-de-sac (see discussion on page 45). Therefore, the project would not have a significant demand on police and fire services; hence these public services will not be further analyzed in the EIR.

Schools and Recreation Facilities

The proposed project would include family-size units. The residents of the project site could have children of school age. The proposed 34-unit housing project could increase the school-age population in the neighborhood. Census 2000 data indicates that 14.6 percent of the population in Census Tract 301.02, in which the project site is located, was 19 years of age and under.[24] If the same percentage were used to extrapolate the estimated number of school-age children, potentially 18 of the project's 126 new residents would be of school age. Six San Francisco Unified School District (SFUSD) elementary schools are within two miles of the project site and include Alice Fong Yu at 1541 12th Ave., Clarendon at 500 Clarendon Ave., Grattan at 165 Grattan Street, Rooftop-Mayeda at 443 Burnett Ave (includes K-8 grades), West Portal/Sunset Elementary School at 5 Lenox Way, and Jefferson at 1725 Irving St. Herbert Hoover Middle School at 2290 14th Avenue is less than two miles away. Three SFUSD high schools are within three miles of the project site and include School of the Arts Alternative at 555 Portola Avenue, Gateway Charter School at 1430 Scott Street, and Thomas Jefferson High School at 2162 24th Avenue.

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[24] Census 2000 data can be obtained online at http://factfinder.census.gov. The tables generated to determine the cited data are on file and available for public review by appointment at the San Francisco Planning Department, 1660 Mission Street, 5th Floor, San Francisco, as part of Project File No. 2004.0093E.

The SFUSD facilities throughout the City and County are generally underutilized. The SFUSD currently has more classrooms district-wide than it needs, and the surplus is predicted to increase over the next ten years as enrollment shrinks.[25] No construction of schools is planned near the project site. The potential increase of 18 students associated with the proposed project would not substantially change the demand for schools, and the existing schools would be able to accommodate these students. As is standard for all new development projects, the proposed project would be assessed $2.24 per gross square foot of residential space for school funding. Due to the limited student population associated with the 34 new households, the proposed project would not substantially increase demand for San Francisco's school services or facilities, and therefore the proposed project would have no significant impact. This topic will not be analyzed in the EIR.

Power and Communications Facilities

The proposed buildings would require typical utility connections and would tap into existing power and communications grids. Any extension or expansion would be completed without interruption of service to adjacent properties.

San Francisco consumers have experienced rising energy costs and uncertainties regarding the supply of electricity. The root causes of these conditions are under investigation and are the subject of much debate. Part of the problem is thought to be that the State does not generate sufficient energy to meet its demand and must import energy from outside sources. Another part of the problem may be insufficient development of free market conditions related to energy market deregulation that would normally prevent and/or correct market manipulation by stimulating a competitive supply response to changing demand for energy. The California Energy Commission is currently considering applications for the development of new power-generating facilities in San Francisco, the Bay Area, and elsewhere in the state. These facilities could supply additional energy to the power supply "grid" within the next few years. These efforts, together with conservation, will be part of the statewide effort to achieve sufficiency of energy supply relative to demand.

Project-generated demand for electricity would be small in the context of the overall demand within San Francisco and the state, and thus would not require a major expansion of power facilities. No

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[25] San Francisco Unified School District, Facilities Master Plan, 2003.

new expanded power or communications facilities would be necessary as a result of project occupancy. Hence, the proposed project would not result in a significant physical environmental effect and this topic will not be analyzed in the EIR.

Water Supply Facilities

The proposed project would generate an estimated demand for about 2,108 gallons of water per day.[26] Currently, no consumption of San Francisco Public Utilities Commission (SFPUC) water supply occurs on the site. The proposed project would incrementally increase the demand for water in San Francisco, and would be accommodated by the amount of water use planned for in *San Francisco's 2005 Urban Water Management Plan (UWMP).*

During project construction, the project sponsor and project building contractor must comply with Ordinance 175-91, passed by the Board of Supervisors on May 6, 1991, which requires that non-potable water be used for dust control activities. Therefore, the project sponsor shall require the construction contractor(s) to obtain reclaimed water from the Clean Water Program for this purpose.

The new construction would be designed to incorporate water-conserving measures, such as low-flush toilets and urinals, as required by the California State Building Code Section 402.0(c). The growth of new residential developments in the City anticipated between 2000 and 2025 (including projects of this size) assumed projected water consumption in the SFPUC's *2005 UWMP* and an adequate water supply would be available for the project.[27]

Since project water demand could be accommodated by the existing and planned supply, as anticipated under the San Francisco Public Utility Commission's *Year 2000 Urban Water Management Plan*, and the project would use best-practices water conservation devices, it would not

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[26] This estimate is based on current, typical residential use, 62 gallons per household per day, as estimated in SFPUC, *2005 Urban Water Management Plan for the City and County of San Francisco (UWMP),* December 2005, page 40. 62 gallons per day x 34 units = 2,108 gallons per day. This report is available online for public review at http://sfwater.org/detail.cfm/MC_ID/7/MSC_ID/106/ MTO_ID/NULL/C_ID/2776.

[27] The SFPUC's *2005 UWMP* is based on the San Francisco Planning Department's current long range growth projections – *Land Use Allocation 2002* – an estimate of total growth expected in the City and County of San Francisco from 2000 – 2025. These projections have similar employment growth and an approximately 15,000-household larger growth than ABAG Projections 2002.

result in a substantial increase in water use. Therefore, the project would not result in a significant environmental impact and this topic will not be discussed in the EIR.

8.	**Biology** – Could the project:	Yes	No	Discussed
a.	Substantially affect a rare or endangered species of animal or plant, or the habitat of the species?	☐	■	■
b.	Substantially diminish habitat for fish, wildlife, or plants, or interfere substantially with the movement of any resident or migratory fish or wildlife species?	☐	■	■
c.	Require removal of substantial numbers of mature, scenic trees?	☐	■	■

The project site is undeveloped, although portions of the project site have been disturbed. A biological special species habitat assessment was prepared by an independent consultant to evaluate whether or not any special-status, state-listed or federal-listed, rare, threatened, or endangered plants or animals, or their habitat exist on the project site.[28] The results of that study are summarized below on pages 33 to 37.

Special-Status Species

Special-status species include those animals and plants formally listed or proposed for listing as endangered or threatened, or are candidates for such listing, under the Federal Endangered Species Act or the California Endangered Species Act. The acts protect listed and proposed-list species. California Department of Fish and Game (CDFG) Species of Special Concern are also special-status species. In addition, in the case of plants, all plants included in Lists 1 through 4 of the California Native Plant Society Inventory and all plants that qualify under the definition of "rare" as specified in Section 15380 of the California Environmental Quality Act (CEQA) are considered special-status species. Special-status habitat refers to specialized vegetation, wildlife, or aquatic habitat that could contain special-status species. In addition, sensitive habitats are critically important as high value natural areas and are rapidly diminishing in size and extent in the City and County of San Francisco.

[28] Booker Holton, Ph.D., TOVA Applied Science and Technology*, 2004 Biological Assessment--Crestmont Housing Project,* San Francisco, CA, November, 12, 2004, and memo to Stu During, During Associates, April 5, 2005. This report and memo are available for public review by appointment in Project File No. 2004.0093E at the Planning Department, 1660 Mission Street, Suite 500, San Francisco, CA.

These sensitive habitat areas include wetlands and riparian corridors, native grasslands, and significant native tree forests or stands.

Primary sources for the identification of special-status plants and animals that could occur on the project site included the Department of Fish and Game's California Natural Diversity Database (CNDDB) and the California Native Plant Society's *Inventory of Rare and Endangered Plants of California*. Based on records for the San Francisco South and San Francisco North USGS, 7.5-min topographic quadrangles, there are a number of special-status plants and animals occurring or historically occurring in San Francisco. Site visits were conducted on February 15 and September 23, 2004, and January 19, 2006 to determine the occurrence, or potential occurrence, of special-status species and special-status or sensitive habitats on the project site; to verify that no special-status bird species were nesting in eucalyptus trees proposed for removal; and to assure that trees larger than 12-inches diameter-breast-height (DBH, at 4.5 feet above the ground surface) would not be removed. The February 2004 field survey focused on the area of the proposed building structures, access roads, and ancillary areas. The September 2004 survey focused on trees on the site. All the surveys were conducted at times of the year when special-status species may be present, including migratory birds. Like the other two previous surveys, the January 2006 survey included observations for the presence or absence of special-status plant and wildlife species at the project site. It also included a general survey of the habitat of the San Francisco garter snake (which is an endangered species) at known locations in the San Francisco Bay Area.

None of the special-status plant species identified in the CNDDB for San Francisco or the California Native Plant Society's listing of rare plants in California were observed on the project site. Some of the plant species identified in the CNDDB no longer exist in San Francisco. Urban development of the City on former sand dunes, coastal bluffs, and coastal scrublands has eliminated large areas of native habitat formerly containing these species. Other special-status plants occur in habitats different from the eucalyptus vegetation cover of the project site, and rarely, if ever, found in urban areas. These specialized habitats include coastal bluffs, sand dunes, chaparral, marshes, broadleaved upland forest, and closed-cone coniferous forest. Finally, other plants only occur in areas of limited distribution such as the Presidio or San Bruno Mountain.

Special-Status Animals. None of the special-status animal species identified in the CNDDB for the San Francisco Peninsula was observed on the project site. Some of these species, such as the Bay Checkerspot and Mission Blue butterflies, occur within native grasslands, and on specific larval host plants that are not on the project site. The California red-legged frog and pond turtle occur in riparian areas, such as along streams, ponds, and lakes, all of which are absent from the project site. Two other species, the bumblebee scarab beetle and bank swallow, may be found along the coastal bluffs or sand dunes, two habitat types that are not on the project site.

Eucalyptus can provide the physical structure to support nesting for a variety of bird species, not necessarily special-status bird species. For example, along Lake Merced, the double-crested cormorant will occasionally use surrounding eucalyptus groves as nest sites. In many areas of the San Francisco Bay region, great blue heron and red-tailed hawk also occasionally use large eucalyptus trees as nesting sites. The eucalyptus trees surveyed on the project site in February and September 2004, and January 2006 do not contain recognizable nests of these or any other bird species. Eucalyptus leaf litter also could provide habitat for some small vertebrate species such as lizards, gopher snakes, and wood rats, which are all common species. However, eucalyptus is considered to be of limited wildlife habitat value as it is a non-native, introduced, and monocultural species.[29]

San Francisco Garter Snake (SF Garter Snake).[30] The SF garter snake *(Thamnophis sirtalis tetrataenia)* is considered an endangered species. Concerns were raised by the public about the possible existence on the project site of the SF garter snake. No sightings of the SF garter snake were made by the biological consultant during the three project field surveys on February 15 and September 23, 2004, and January 19, 2006. However, public sightings of unidentified snakes have occurred on the project site and in the nearby area which may be similar in appearance to the SF garter snake.[31] Based on a review of photographic evidence from one sighting of an unidentified snake, the biological consultant concluded that the snake was a California red-sided garter

[29] Booker Holton, Ph.D., phone conversation with Morgan Gillespie, During Associates, May 22, 2006.

[30] Information on the San Francisco garter snake provided by Booker Holton, Ph.D., TOVA Applied Science and Technology, memoranda dated December 6, 2005 and February 3, 2006. These memos are on file and available for public review by appointment at the San Francisco Planning Department, 1660 Mission Street, Fifth Floor, San Francisco, as part of Case File No. 2004.0093E.

[31] Alfonso Faustino, email communication to Irene Nishimura April 17, 2006. This email is on file and available for public review by appointment at the San Francisco Planning Department, 1660 Mission Street, Fifth Floor, San Francisco, as part of Case File No. 2004.0093E.

(Thamnophis sirtalis infernalis). The SF garter snake differs from the California red-sided garter snake in its appearance by a prominent red stripe within a broad blackish stripe down the length of its body, rather than the California red-sided garter snake's red spots along the border of its broad blackish stripe; and the SF garter snake's pale stripes washed with turquoise, rather than the white stripes of the California red-sided garter snake; and the pale blue-green belly of the SF garter snake rather than white belly of the California red-sided garter snake. Otherwise, there is significant morphological consistency between the two species.

Despite its name, the San Francisco garter snake is endemic to San Mateo County and does not occur in San Francisco. The San Francisco garter snake was once common in stock ponds and small marshes in San Mateo County; however, it has been reduced to a few specialized areas due to urbanization, draining and pollution, and illegal poaching. The San Francisco garter snake has been completely extirpated from many areas where it was once common, and remnant populations are now limited to a few wetlands around the San Francisco Airport, coastal portions of San Mateo County, and Wadell Creek, one mile into northern Santa Cruz County.

The aquatic environment and vegetation cover types represented by each of the known habitat areas of the San Francisco garter snake all indicate that the snakes' preferred habitat is a densely vegetated pond near an open hillside. The snake tends to stay near water, and lives mainly in ponds, marshes, roadside ditches, streams, meadows, and upland areas near such features. Emergent and bankside vegetation such as cattails, bulrushes, and spike rushes apparently are preferred and used for cover. San Francisco garter snakes also forage extensively in aquatic habitats. Adult snakes feed primarily on California red-legged frogs, although recent studies have documented the snake's movement over several hundred yards away from wetlands.

The most recent data compiled in the Department of Fish and Game's CNDDB suppresses the precise location of the known populations of the San Francisco garter snake because of the potential for unlawful poaching of this endangered species by reptile fanciers and collectors. The CNDDB records do indicate, however, general habitat descriptions of the sites where the garter snake has been observed. The habitat characteristics where some of these recorded sightings occurred are:

- September 2003 Recorded Observation**:** Permanent freshwater, canals/marshes, site is ungrazed and unmowed, with lush reed/grass/brush covering borders of waterways.

- May 1987 Recorded Observation**:** Ranch ponds; one of the two is an old sagg pond[32]. Both ponds have good stands of aquatic and shoreline vegetation and support Pacific tree frogs, California red-legged frogs, and California newts.
- October 1985 Recorded Observation**:** Small pond-type reservoir, measuring 150 x 75 feet, with good shoreline vegetation cover. Prey species present include Pacific tree frog and California red-legged frog.
- October 1985 Recorded Observation**:** Fresh water pond with water present all year; large shallow inshore zone; narrow vegetation band around pond's edge; small fish and Pacific tree frog and California red-legged frog present for food.

Additional field visits of known habitats and the project site were undertaken on January 19, 2006 to compare the vegetation cover and habitat type of the project site to that of the three known San Francisco garter snake sites. The project site's existing habitat of upland eucalyptus forest with no aquatic habitat, located some distance inland from the coastal portions of San Mateo County and the San Francisco Airport supports the conclusion that the project site has never and would not currently support populations of the San Francisco garter snake.[33]

In summary, no evidence was found during three separate field surveys or in the standard set of biological resource inventories and research resources to support the occurrence of special-status plants or animals on the project site.

Existing Biological Conditions

Vegetation. The project site is located on a northwest-facing slope dominated by a thick, closed stand of blue gum eucalyptus (*Eucalyptus globulus*), red gum (*Eucalyptus camaldulensis*), acacia (*Acacia melanoxylon* and *A. baileyana*), and isolated plum (*Prunus domestica*). There are a few stumps of what appear to be Monterey pine (a widely naturalized species in California), indicating that the site had been cleared of large trees in the past, except for the eucalyptus trees. All of the trees slated for removal are less than 12 inches DBH.

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[32] A sagg, or sag, pond occurs where the ground subsides below the water table. Sometimes it refers to a coastal pond or a topographic coastal plan that is influenced by the rise and fall of the water table. In addition, the term refers to a depression that marks a transcurrent, or strike-slip, fault zone.

[33] Booker Holton, Ph.D., TOVA Applied Science and Technology, memorandum dated February 3, 2006, op cit.

The eucalyptus tree cover on the project site is typical of the area around and on Mt. Sutro. Native to Australia, Eucalyptus globulus plantations have displaced native vegetation in coastal grasslands and scrublands. Planting of eucalyptus trees began throughout the state in the late 1800's, and the introduced trees occur in many parts of the Bay Area, including the Mt. Sutro area and other areas of San Francisco. Most likely, eucalyptus tree planting occurred after quarry operations ended on the project site in the early part of the last century. Historical accounts indicate, for example, that Adolph Sutro arranged for the planting of thousands of trees on what was formerly called Mt. Parnassus to celebrate the state's first Arbor Day in November 1886. The remains of the extensive plantings, the "Sutro Forest", now surround the peak and slopes of present day Mt. Sutro.

The biological field surveys found that, under the eucalyptus tree canopy on the Crestmont project site, the non-native English ivy (*Hedera helix*), Himalayan blackberry (*Rubus discolor),* and periwinkle *(Vinca major*) occur where there are gaps in the eucalyptus cover. Along the edges of the tree cover, non-native plant species that are typical of disturbed places, such as wild mustard *(Brassica nigra*), fennel (*Foeniculum vulgara*), and clumps of pampas grass (*Cortaderia selloana),* occur.

The tops of the eucalyptus groves (the canopy) are typically limited to one species of the genus or, in the case of the project site, mixed stands of other species of the same genus Eucalyptus. Few native overstory species are present within eucalyptus-planted areas. The Eucalyptus is an invasive species. Eucalyptus trees change the composition of native communities and are associated with reduced plant and insect diversity, probably due to the species' allelopathic (toxic) effects on other plants and its disturbance of soil nutrients. They are resilient to fire and other disturbances due to the species characteristics of being able to sprout saplings from tree stumps, tree roots and buried stems, even if the tree is dead.

The biological field surveys found that no significant, rare, endangered, or threatened tree species exists on the project site. All of the trees on the site are introduced, non-native species.

Wildlife. No wildlife was observed on the site during the site visits in February and September 2004, and January 2006. However, based on the dominant eucalyptus cover and the surrounding residential land uses, wildlife expected to occur on the site would be typical of eucalyptus plantations in urban areas throughout the Bay Area. The soil composition and soil nutrient disturbance by eucalyptus trees frequently results in fewer birds and aerial insects than in areas lacking eucalyptus.

Characteristic species of eucalyptus habitat include crow, raven, barn owl, red-tailed hawk, and red-shouldered hawk. Eucalyptus is important as roosts, perches, and nest sites for a number of bird species, particularly raptors. In addition, blue gum eucalyptus, with its stringy bark and tendency for rapid deposition of litter, create micro-habitats for a number of small vertebrate species, including wood rat, lizards, and gopher snake.

No nests were observed in the trees on the project site during the field visits on February 15 and September 23, 2004, and January 19, 2006, however, raptors or migratory birds could establish new nests in the site's trees before construction proceeds on the project site. When in active use, these newly established nests would be subject to protection under the federal Migratory Bird Treaty Act (MBTA).

The list of migratory birds includes almost every native bird in the United States. The MBTA also extends to parts of birds' nests and eggs. It is therefore a violation of the MBTA to directly kill these birds or destroy an active nest of any bird species. The MBTA is typically applied on domestic projects to prevent injury or death of nesting birds and their chicks.

Wetlands and Riparian Habitats. The steep soils on the project site are rocky and well drained. The project site lacks the characteristic-defining components of wetlands – hydric soils, preponderance of hydrophytic vegetation, and hydrology (e.g., frequently inundated, saturated, or flooded). The project site does not contain streams or creeks, or riparian vegetation.

Impacts

Approximately 40,500 square feet of the site would be affected by construction, resulting in the removal of approximately 880 small (less than 12 inches in diameter and less than 30 feet tall) eucalyptus trees. (The remaining 22,820 square feet of the site would be left undeveloped.)

The removal of trees containing raptor or migratory bird nests would be a potentially significant impact. Implementation of Mitigation Measure 3, which calls for a pre-construction survey, nest monitoring, and installation of protective fencing near a nest tree, would avoid or minimize the potential disruption of raptor or migratory bird breeding activity, reducing the potential impact to special-status birds to a less-than-significant level.

The proposed project would not directly, or indirectly, affect (i.e., through habitat loss) a candidate, or listed threatened or endangered species. The project would not adversely affect wetland or riparian habitat, significant native trees, or other sensitive habitat since none exist on the project site. Project implementation, with Mitigation Measure 3, would not interfere substantially with the movement of any resident or migratory or wildlife species. The proposed project would not substantially reduce the habitat of a wildlife or plant species or cause a species to drop below self-sustaining levels. The project would remove a number of mature non-native eucalyptus trees which are not considered scenic, landmark, or significant trees.

The San Francisco Board of Supervisors recently adopted new legislation (effective March 1, 2006) in the form of amendments to existing city ordinances which would require a special permit from the DPW to remove any tree designated as a "landmark" tree, not only on public property, but anywhere within the territorial limits of the City and County of San Francisco, including private properties. Under the new legislation, the criteria for designating a landmark tree include such considerations as age, size, shape, species, location, historical association, or visual quality. No tree on the project site is currently designated a "landmark" tree.

If one or more trees on the property were to be officially designated as a "landmark" tree at some point in the future, and would be removed as part of the project, a tree removal permit from the DPW would be required.

A "significant" tree is defined by the new legislation as being greater than 12 inches in diameter, or being greater than 20 feet tall, or having a canopy greater than 15 feet, and being within 10 feet of a public right-of-way. A tree removal permit from the DPW is required to remove any significant trees. No tree on the project site meets the criteria for designation as a significant tree.

Hence, for the reasons discussed above under the Biology topic, the project would not have a significant, adverse impact on biological resources.

9.	**<u>Geology/Topography</u>** – Could the project:	Yes	No	Discussed
a.	Expose people or structures to major geologic hazards (slides, subsidence, erosion, and liquefaction)?	To Be Determined		
b.	Change substantially the topography or any unique geologic or physical features of the site?	To Be Determined		

The Community Safety Element of the *San Francisco General Plan* contains maps that indicate areas in which one or more geologic hazards exist. The project site is located in an area subject to "a non-structural damage level" (Modified Mercalli Intensity VII) from seismic groundshaking originated by a characteristic earthquake (Moment Magnitude 7.1) along the San Andreas fault approximately six miles southwest of San Francisco, and the Northern Hayward fault approximately 12 miles northeast of San Francisco (Maps 2 and 3 in the Community Safety Element).[34] There have been landslides in the area of the project site, which is identified as an area subject to landslides (Map 5 in the Community Safety Element). The project site is not in an area subject to seiche (standing or prolonged oscillating wave caused by atmospheric/barometric changes or strong winds or seismic shifts in lakes, bays, gulfs, or in areas of the ocean) or tsunami run-up or reservoir hazards (Maps 6 and 7 in the Community Safety Element).[35]

The elevations at the project site's unpaved road vary from about 560 feet above sea level at the southwest end of the site to about 610 feet at Crestmont Drive. The slope drops down to about 520 feet near the end of Fifth Avenue, north of the site, and the slope at the western portion of the site drops down to about 200 feet toward Warren Drive.[36]

The project site is in a Seismic Hazards Study Zone (SHSZ) designated by the California Division of Mines and Geology. Because the project site is steeply sloped in an identified landslide area, and because of previous landslide occurrences in the project area, the proposed project is being analyzed by the project's specialist and structural engineering geotechnical consultants and the Department of Building Inspection (DBI)-appointed peer review panel. The EIR will include a discussion of the

[34] City and County of San Francisco, Community Safety Element, San Francisco *General Plan*, April 1997.
[35] Ibid.
[36] Alan Kropp & Associates, *Geotechnical Investigation, Crestmont Drive Project, San Francisco, California, March 10, 2005*. This report is available for public review at the San Francisco Planning Department, 1660 Mission Street, 5th Floor, San Francisco, as part of Case File No. 2004.0093E.

geological hazards of the project site, an analysis of the potential significant geological hazards, an analysis of any changes to the existing topography, and identification of appropriate mitigation measures.

10. **Water** – Could the project:	Yes	No	Discussed
a. Substantially degrade water quality, or contaminate a public water supply?	☐	■	■
b. Substantially degrade or deplete groundwater resources, or interfere substantially with groundwater recharge?	☐	■	■
c. Cause substantial flooding, erosion or siltation?	☐	■	■

The proposed project, consisting of 34 dwelling units and a new private cul-de-sac street would add impervious surfaces on the project site. Building permit applications for the proposed project would include a hydrology plan to address drainage and water run-off. During construction, requirements to reduce erosion would be implemented pursuant to *California Building Code* Chapter 33, Excavation and Grading, which require an Engineered Grading Permit.[37]

An Engineered Grading Permit application requires:

- Plans and Specifications
- Supporting data consisting of soils engineering report and engineering geology report
- Dimensions and elevations of contours of proposed grading and drainage
- Detailed plans of all surface and subsurface drainage devices, walls and other protective devices to be constructed and estimated run-off of areas served by any drains
- Location of any buildings on the proposed project site and adjacent buildings
- Design of retaining walls or other structures to support cut and fill areas on the project site
- The sequence of cut and fill operations in a manner that assures interim stability of the site during project construction.

Project-related wastewater and stormwater would flow through the site and local combined sewer system to the City's sewer system and would be treated to standards contained in the City's National

[37] A more stringent grading permit as set forth in Section 3309.4 of the *California Building Code*, Chapter 33.

Pollutant Discharge Elimination System (NPDES) Permit for the Oceanside Water Pollution Control Plant (which serves the west part of San Francisco) prior to discharge.

As noted above on page 28, there have been recorded incidences of stormwater overflow in the project area due to debris in the catch basins and vents, which DPW staff cleared. The size of the existing sewer lines and catch basins is adequate to meet the current stormwater demand. The overflows are created by accumulating debris that clog the catch basins and outside vents, which are not related to the capacity of the sewer system. During occupancy, the project would comply with all local wastewater discharge requirements. Analysis of existing storm drains and the site's proposed sewer system concludes that they would be adequate for accommodating the additional runoff and wastewater generated by the proposed project (see pages 27 to 29 for the analysis).

The proposed project would not involve the use of groundwater and, as mentioned above, would add impervious surfaces. An appropriate drainage system would be constructed on the site. Drains in the public area would be maintained by the DPW in order to avoid potential overflow during storms.

Groundwater resources would not be substantially degraded or depleted, and the project would not interfere substantially with groundwater recharge. Hence, there would be no potential groundwater impacts.

The proposed project would not result in significant adverse impacts on surface water or groundwater quality. This topic will not be discussed in the EIR.

11. **Energy/Natural Resources** – Could the project:	Yes	No	Discussed
a. Encourage activities which result in the use of large amounts of fuel, water, or energy, or use these in a wasteful manner?	☐	■	■
b. Have a substantial effect on the potential use, extraction, or depletion of a natural resource?	☐	■	■

Energy Use

The project would have 34 new households when fully occupied. Hence, the project-generated demand for electricity would be negligible in the context of the overall demand of San Francisco and

California. Occupancy of the project would not result in use of large amounts of fuel, water, or energy in the context of energy use throughout the City and region. The project would meet current state and local codes concerning energy consumption, including Title 20 of the *California Code of Regulations* enforced by the Department of Building Inspection. Hence, the proposed project would not encourage activities that result in wasteful use of fuel, water, or energy. Thus, the proposed project would not result in an associated significant physical environmental effect due to increased energy demand.

Natural Resource Use

The 34-dwelling-unit project would not use substantial quantities of natural resources. Therefore, the project would not have a significant impact on the use, extraction, or depletion of a natural resource.

For the reasons discussed above, the project would not cause a wasteful use of energy, and would have a less-than-significant impact on energy and natural resources. These topics will not be discussed in the EIR.

12. **Hazards** – Could the project:	Yes	No	Discussed
a. Create a potential public health hazard or involve the use, production, or disposal of materials which pose a hazard to people or animal or plant populations in the area affected?	☐	■	■
b. Interfere with emergency response plans or emergency evacuation plans?	☐	■	■
c. Create a potentially substantial fire hazard?	☐	■	■

This section addresses the potential hazards on the project site including contaminants in the soil, emergency response plans, and fire hazards. Since the project site has never been developed, other typical hazards or materials found or potentially existing on sites with previous development, such as manufactured asbestos materials and lead-based paint, are not present.

Public Health Hazards and Hazardous Materials

The proposed project would require some site preparation. Serpentine rock containing asbestos is not on the project site.[38] Potentially hazardous building materials, such as electrical equipment containing PCBs or mercury would not be used nor installed.

Residents typically would use relatively small quantities of hazardous materials for routine household activities, such as paints, cleaners, toners, solvents, and disinfectants. These commercial products are labeled to inform users of potential risks and to instruct them in appropriate handling and disposal procedures. For these reasons, hazardous materials from the project would not pose any substantial public health or safety hazards related to hazardous materials, and will not be discussed in the EIR.

Emergency Response Plans

Occupants of the proposed buildings would contribute to the flow of people and traffic if an emergency evacuation of the Parnassus/Mt. Sutro area were required. The project sponsor would develop an evacuation and emergency response plan in consultation with the Mayor's Office of Emergency Services to ensure coordination between San Francisco's emergency planning activities and the project sponsor's plan for building occupants in the event of an emergency. The San Francisco Fire Department (SFFD) has preliminarily reviewed the schematic roadway design for the proposed project and the junction of the existing Crestmont Drive and the proposed private road, and found that the project design is in compliance with the SFFD's standards with respect to emergency vehicle access.[39] The SFFD also indicated that on-street parking would not be permitted on the new private road in order to keep clear the 20-foot roadway width. The project sponsor's plan would be reviewed by the Office of Emergency Services and approved before the Department of Public Works issues a final permit for a new curb cut between the project's private driveway and the Crestmont Drive right-of-way. Therefore, no interference with emergency response plans or emergency evacuation plans would be expected by the proposed project.

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[38] James Joyce, Certified Engineering Geologist, telephone conversation with Stu During, During Associates, April 1, 2005.

[39] Michie Wong, San Francisco Fire Department, letter to Alex Novell, August 3, 2005. A copy of this letter is available for public review by appointment in Project File No. 2004.0093E at the Planning Department, 1660 Mission Street, Suite 500, San Francisco.

Fire Hazards

San Francisco ensures fire safety primarily through provisions of the Building Code and the Fire Code. Existing buildings are required to meet standards contained in these codes. The proposed project would conform to these standards.[40] Potential fire hazards (including those associated with hillside development, hydrant water pressure, and emergency access) would be mitigated during the DBI's building permit process and the DPW's street permit review process. Additionally, the San Francisco Fire Department has reviewed the schematic plans of the proposed development, and has determined that the new 20-foot-wide private road, including the turnaround at the end, could accommodate their largest vehicles.[41]

For the reasons discussed above, potential public health, safety, and fire hazards would be reduced to less-than-significant impacts. Hazards will not be discussed in the EIR.

13. **Cultural** – Could the project:	Yes	No	Discussed
a. Disrupt or adversely affect a prehistoric or historic archeological site or a property of historic or cultural significance to a community, ethnic or social group; or a paleontological site except as a part of a scientific study?	☐	■	■
b. Conflict with established recreational, educational, religious, or scientific uses of the area?	☐	■	■
c. Conflict with the preservation of buildings subject to the provisions of Article 10 or Article 11 of the City Planning Code?	☐	■	■

Archeological Resources

The project site has never been developed; thus, no historical archeological resource is expected to be present within the project site. In addition, no prehistoric archeological resources have been recorded or reported in the project vicinity. Known prehistoric sites in San Francisco have generally been located on the Bay side or northern shore comparatively near fresh water and/or tidal wetlands. Temporary shellfish processing encampments also have been discovered along the coast. Prehistoric

[40] Ibid.
[41] Ibid.

sites at higher elevation in San Francisco have not been documented, although one was reported on Nob Hill. There are, however, recorded prehistoric higher elevation sites elsewhere in the Bay Area like San Bruno Mountain and the East Bay Hills, so the possibility of such resources on the project site could exist.

Portions of the site have been disturbed. The proposed project would require excavation to various depths up to approximately 15 feet. No evidence is apparent to suggest that archeological resources are present within the project site. Yet it is possible that potential prehistoric resources could be discovered by excavation activities of the project site. While accidental discovery is not anticipated, a mitigation measure is required to ensure that any adverse impacts on any potential prehistoric resources would be mitigated to a less-than-significant level through implementation of Mitigation Measure 4, on page 52. Archeological resources will not be analyzed in the EIR.

Historic Architectural Resources

The project site is undeveloped. Therefore, there is no structure on the site determined eligible for inclusion in, any federal, state, or adopted local register of historic resources (including *Planning Code* Articles 10 and 11), pursuant to CEQA Guidelines, Section 15064.5(a)(1) and (2). In the vicinity of the project site, no structure is listed as a historic resource in *Planning Code* Articles 10 or 11, or in any City-adopted survey.

Other Cultural Resources

The project would consist of 34 residential units, its associated parking, and a private cul-de-sac. The project would not conflict with established recreational, educational, religious, or scientific uses of the area. The EIR will not analyze this topic.

C. OTHER

	Yes	No	Discussed
1. Does the project require approval and/or permits from City Departments other than the Planning Department or Department of Building Inspection, or from Regional, State, or Federal Agencies?	■	□	■

Approvals would be needed from the SFFD, the Office of Emergency Services, and the DPW.

A discussion of approvals and permits necessary for the project is presented in "Compatibility with Zoning and Plans," pages 10 to 12. The project proposal would be considered as a Planned Unit Development, which would require Conditional Use Authorization by the Planning Commission pursuant to Sections 303 and 304 of the *Planning Code*. The project would require approval by the DPW for a subdivision of the two lots into 17 parcels. In addition, the project would require approval by the DBI before issuing a site permit, which would include review of the new private cul-de-sac and its connection to the public right-of-way, Crestmont Drive. The project's new proposed private cul-de-sac connection to the public right-of-way would additionally require approval by the DPW and the SFFD.

Public Notice and Comment

On June 23, 2004, the Planning Department mailed a Notice of Project Receiving Environmental Review to property owners within 300 feet of the Crestmont Hills project site, tenants adjacent to the site, and other potentially interested parties.

A number of groups and individuals commented and expressed concerns regarding potential effects of the proposed project on its surroundings. Concerns were expressed regarding the following environmental issues:

- Changes in land use and character and project density, and proximity to adjacent residences (addressed in 1. Land Use, pages 13 to 14);
- Potential visual impacts including scenic views (to be addressed in the EIR, see 2. Visual Quality, pages 14 to 16);
- Increased population (addressed in 3. Population, pages 16 to 17);
- Increased traffic, and near the site, adequacy of parking, and pedestrian safety (to be addressed in the EIR, see 4. Transportation/Circulation, page 18);
- Noise (addressed in 5. Noise, pages 18 to 22 and Mitigation Measure 1, pages 50 to 51);
- The effect on air quality from project construction (addressed in 6. Air Quality/Climate, Construction Emissions, pages 22 to 23, and Mitigation Measure 2, page 51);
- Change in wind effects on nearby residences (addressed in 6. Air Quality/Climate, Wind, pages 24 to 26);
- Impacts on water and sewer service (addressed in 7. Utilities/Public Services, Sewage and Stormwater pages 27 to 29);

- The potential impact on biological resources, including effects on San Francisco garter snake habitat, and tree removal (addressed in 8. Biology, pages 33 to 40 and Mitigation Measure 3, pages 51 to 52);
- Geologic issues, including seismic safety and the potential for landslides and slope stability near adjacent residences during construction (to be addressed in the EIR; see 9. Geology/ Topography, pages 41 to 42); and
- Impacts on fire safety and emergency access (addressed in 12. Hazards, pages 45 to 46).

Potential impacts to the physical environment identified in public comments are addressed in this Initial Study or will be addressed in the EIR as noted above.

Several comments were also received concerning the history of the project site's zoning. Past zoning of the project site is not relevant to the project's environmental analysis since it does not pertain to CEQA physical environmental issues. Hence, it has not been analyzed in the Initial Study checklist discussion. This issue will be discussed in the case report for the project application for Conditional Use Authorization and a Planned Unit Development.

Overall, concerns and issues raised by the public in response to the notice were taken into consideration and incorporated into the Initial Study, or will be addressed in the EIR, as appropriate for CEQA analysis. Comments regarding merits of the project and those that expressed support for or opposition to the project are not relevant to CEQA analysis of environmental impacts, but may be taken into account by the Planning Commission and other decision-makers as part of their consideration whether to approve or disapprove the proposed project.

D. MITIGATION AND IMPROVEMENT MEASURES

	Yes	No	N/A	Discussed
1. Could the project have significant effect if mitigation measures are not included in the project?	■	□	□	■
2. Are all mitigation measures necessary to eliminate significant effects included in the project?	■	□	□	■

MITIGATION MEASURES

The following mitigation measures are related to topics which, with implementation of the mitigation measures below, would bring identified significant environmental impacts to less-than-significant levels or avoid significant impacts; hence, those topics would not require further analysis in the EIR. The EIR will include a Mitigation Measure chapter which will include the Initial Study-identified mitigation measures as well as the EIR-identified mitigation measures and any other mitigation measures which would or could be adopted. Below are mitigation measures identified here in this Initial Study to reduce significant impacts to a less-than-significant level. The project sponsor has agreed to include and implement these mitigation measures, which are necessary to avoid significant impacts, as part of the project in an agreement letter signed and dated May 22, 2006.[42]

Mitigation Measure 1

Construction Noise. The project sponsor shall implement the following construction control measures and adhere to the City's noise ordinance to reduce construction noise to a less-than-significant level.

- Equip all internal combustion engine driven equipment with intake and exhaust mufflers which are in good condition and appropriate for the equipment.
- Locate stationary noise generating equipment as far as possible from sensitive receptors when sensitive receptors adjoin or are near a construction project area.
- Utilize "quiet" air compressors and other stationary noise sources where technology exists.
- The contractor shall prepare a detailed construction plan identifying the schedule for major noise-generating construction activities. The construction plan shall identify a procedure for coordination with the adjacent noise sensitive facilities so that construction activities can be scheduled to minimize noise disturbance.
- Designate a "noise disturbance coordinator" who would be responsible for responding to any local complaints about construction noise. The disturbance coordinator would determine the cause of the noise complaint (e.g., starting too early, bad muffler, etc.) and would require that reasonable measures warranted to correct the problem be implemented. The project sponsor would conspicuously post a telephone number for the disturbance coordinator at the construction site and include it in the notice sent to neighbors regarding the construction schedule.

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[42] This agreement is on file and available for public review by appointment in Project File No. 2004.0093E at the Planning Department, 1660 Mission Street, Suite 500, San Francisco.

- The contractor shall stage large trucks in a non-residential area off-site (yet to be determined) and prohibit large trucks from accessing the construction site prior to 7:00 AM.

Mitigation Measure 2

Construction Air Quality: The project sponsor shall require the construction contractor(s) to spray the project site with water during demolition, excavation, grading, and site preparation activities; spray unpaved construction areas with water at least twice per day; cover stockpiles of soil, sand, and other such material; cover trucks hauling debris, soils, sand or other such material; and sweep surrounding streets during these periods at least once per day to reduce particulate emissions. Ordinance 175-91, passed by the Board of Supervisors on May 6, 1991, requires that non-potable water be used for dust control activities. Therefore, the project sponsor shall require the construction contractor(s) to obtain reclaimed water from the Clean Water Program for this purpose.

The project sponsor shall require the project contractor(s) to maintain and operate construction equipment so as to minimize exhaust emissions of particulates and other pollutants, by such means as prohibiting idling motors when equipment is not in use or when trucks are waiting in queues, and implementing specific maintenance programs to reduce emissions for equipment that would be in frequent use for much of the construction period.

Mitigation Measure 3

Nesting Raptor and Migratory Bird Avoidance. If construction is scheduled during the nesting season (February 15 to July 31), a pre-construction field survey of the eucalyptus trees shall be conducted no earlier than 45 days and no later than 20 days prior to the proposed construction within the 40,500-square-foot project zone[43] and near the zone within the larger 1.45-acre parcel. Should the surveys find nesting birds, disruptive construction activity would be postponed through the end of the nesting season in consultation with a qualified biologist and the California Department of Fish and Game (CDFG). Each identified nest tree will be monitored for bird egg-incubation, including:

- Incubation behavior (e.g., regular periods of "disappearance" into the nest structure followed by short, secretive flights to forage).

[43] Approximately 40,500 square feet of the site would be affected by construction, and the remaining 22,820 square feet of the site would be left undeveloped.

- Extreme distress and alarm calls when in close vicinity of the nest tree.
- Observation of food carried in the beak or claws to the nest.

If incubation behavior is detected, incorporating the following measures should protect the nest location:

- Establishment of a buffer using orange construction fencing around the tree in accordance with CDFG recommendations until the young have fledged. The nest tree should be monitored a minimum of once per week to confirm that the young have fledged and that no new nesting pairs are present before the buffer is removed. Construction shall not occur within 150 feet of an active nest until the nest is vacated or juveniles have fledged.
- If it is not feasible to delay or modify construction activities around the tree, the CDFG should be contacted to discuss alternative buffer options.

If there is no sign of active bird use based on the pre-construction field survey, or if construction is planned between August 1 and February 1, such construction and associated tree removal could proceed as scheduled.

Mitigation Measure 4

Archeological Resources: The following mitigation measure is required to avoid any potential adverse effect from the proposed project on accidentally discovered buried or submerged historical resources as defined in CEQA Guidelines Section 15064.5(a)(c). The project sponsor shall distribute the Planning Department archeological resource "ALERT" sheet to the project prime contractor; to any project subcontractor (including demolition, excavation, grading, foundation, pier drilling, etc. firms); or utilities firm involved in soils disturbing activities within the project site. Prior to any soils disturbing activities being undertaken, each contractor is responsible for ensuring that the "ALERT" sheet is circulated to all field personnel including, machine operators, field crew, pier drilling crew, supervisory personnel, etc. The project sponsor shall provide the Environmental Review Officer (ERO) with a signed affidavit from the responsible parties (prime contractor, subcontractor(s), and utilities firm) to the ERO confirming that all field personnel have received copies of the Alert Sheet.

Should any indication of an archeological resource be encountered during any soils disturbing activity of the project, the project Head Foreman and/or project sponsor shall immediately notify the

ERO and shall immediately suspend any soils disturbing activities in the vicinity of the discovery until the ERO has determined what additional measures should be undertaken.

If the ERO determines that an archeological resource may be present within the project site, the project sponsor shall retain the services of a qualified archeological consultant. The archeological consultant shall advise the ERO as to whether the discovery is an archeological resource, retains sufficient integrity, and is of potential scientific/historical/cultural significance. If an archeological resource is present, the archeological consultant shall identify and evaluate the archeological resource. The archeological consultant shall make a recommendation as to what action, if any, is warranted. Based on this information, the ERO may require, if warranted, specific additional measures to be implemented by the project sponsor.

Measures might include: preservation in situ of the archeological resource; an archeological monitoring program; or an archeological testing program. If an archeological monitoring program or archeological testing program is required, it shall be consistent with the Major Environmental Analysis (MEA) division guidelines for such programs. The ERO may also require that the project sponsor immediately implement a site security program if the archeological resource is at risk from vandalism, looting, or other damaging actions.

The project archeological consultant shall submit a Final Archeological Resources Report (FARR) to the ERO that evaluates the historical significance of any discovered archeological resource and describes the archeological and historical research methods employed in the archeological monitoring/data recovery program(s) undertaken. Information that may put at risk any archeological resource shall be provided in a separate removable insert within the final report.

Copies of the Draft FARR shall be sent to the ERO for review and approval. Once approved by the ERO, copies of the FARR shall be distributed as follows: California Archeological Site Survey Northwest Information Center (NWIC) shall receive one (1) copy and the ERO shall receive a copy of the transmittal of the FARR to the NWIC. The Major Environmental Analysis division of the Planning Department shall receive three copies of the FARR along with copies of any formal site recordation forms (CA DPR 523 series) and/or documentation for nomination to the National Register of Historic Places/California Register of Historical Resources. In instances of high public interest or interpretive value, the ERO may require a different final report content, format, and distribution than that presented above.

IMPROVEMENT MEASURES

Improvement measures diminish the effects of the project that were found through the environmental analysis process to be less-than-significant impacts. An improvement measure designed to reduce already less-than-significant impacts is listed below, and could be implemented.

Improvement Measure 1

Construction Traffic: The following measures would minimize disruption of the general traffic flow on adjacent streets.

- To the extent possible, truck movements should not occur during the PM peak hours (5:00 to 6:00 PM, or other times, if approved by the Department of Parking and Traffic [DPT]).
- The project sponsor and construction contractor(s) would meet with staff of the Traffic Engineering Division of the DPT, the Fire Department, Muni, the Planning Department, and other City agencies to determine feasible traffic improvement measures to reduce traffic congestion during construction of the project.

E. ALTERNATIVES

Alternatives to the proposed project will be defined further and described in the EIR. At a minimum, the alternatives analyzed in the EIR will include the following:

1. A *No Project Alternative* in which the project site would remain in its existing condition, as an undeveloped site; and

2. A *Reduced Size Alternative* in which the proposed residential project would be at a lower size so as to reduce potential geological and visual quality impacts (or any other potentially significant impact).

F. MANDATORY FINDINGS OF SIGNIFICANCE

		Yes	No	Discussed
1.	Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or pre-history?	☐	■	☐
2.	Does the project have the potential to achieve short-term, to the disadvantage of long-term, environmental goals?	☐	■	☐
3.	Does the project have possible environmental effects which are individually limited, but cumulatively considerable? (Analyze in the light of past projects, other current projects, and probable future projects.)	■	☐	☐
4.	Would the project cause substantial adverse effects on human beings, either directly or indirectly?	☐	■	☐

The EIR will identify any adverse cumulative visual quality, transportation, or geologic impacts in light of past projects, other current projects and probable future projects in the vicinity of the project site.

G. ON THE BASIS OF THIS INITIAL STUDY:

☐ I find the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared by the City Planning Department.

☐ I find that although the proposed project could have a significant effect on the environment, there WILL NOT be a significant effect in this case because the mitigation measures in the discussion have been included as part of the proposed project. A MITIGATED NEGATIVE DECLARATION will be prepared.

■ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

Date: May 27, 2006

PAUL E. MALTZER
Environmental Review Officer

for

Dean L. Macris
Director of Planning

APPENDIX B

TRANSPORTATION DEFINITIONS

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Roadway Classifications

The San Francisco Planning Department has developed a street hierarchy system for the City and County of San Francisco, in which the function and design of each street are consistent with the character and use of adjacent land. The major classifications in the Vehicle Circulation Plan of the San Francisco *General Plan* are:

- **Freeways:** Limited access, very high capacity facilities; primary function is to carry intercity traffic; they may, as a result of route location, also serve the secondary function of providing for travel between distant sections in the city.

- **Major Arterials:** Cross-town thoroughfares whose primary function is to link districts within the city and to distribute traffic from and to the freeways; these are routes generally of citywide significance; of varying capacity depending on the travel demand for the specific direction and adjacent land uses.

- **Transit Conflict Streets:** Street with a primary transit function, which are not classified as major arterials but experience significant conflicts with automobile traffic.

- **Secondary Arterials:** Primarily intra-district routes of varying capacity serving as collectors for the major thoroughfares; in some cases supplemental to the major arterial system.

- **Recreational Streets:** A special category of street whose major function is to provide for slow pleasure drives and cyclist and pedestrian use; more highly valued for recreational use than for traffic movement. The order of priority for these streets should be to accommodate: 1) pedestrians, hiking trails or wilderness routes, as appropriate; 2) cyclists; 3) equestrians; 4) automobile scenic driving. This should be slow and consistent with the topography and nature of the area.

- **Collector Streets:** Relatively low-capacity streets serving local distribution functions primarily in large, low-density areas, connecting to major and secondary arterials.

- **Local Streets:** All other streets intended for access to abutting residential and other land uses, rather than for through traffic: generally of lowest capacity.

In addition to the San Francisco Planning Department's roadway classifications, the freeways, major arterials, and transit conflict streets are included in the Congestion Management Program ("CMP") network and Metropolitan Transportation System ("MTS") network (see below).

Transit Preferential Streets

The Transit Preferential Street network classification system takes into consideration all transportation functions, and identifies the major transit routes where general traffic should be routed away from. There are two classifications of transit preferential streets: Primary Transit Streets, which are either transit-oriented or transit-important; and Secondary Transit Streets.

- **Primary Transit Street – Transit-Oriented:** Not major arterials, with either high transit ridership, high frequency of service, or surface rail. Along these streets, the emphasis should be on moving transit vehicles, and impacts on automobile traffic should be of secondary concern.

- **Primary Transit Street – Transit-Important:** Major arterials, with either high transit ridership, high frequency of service, or surface rail. Along these streets, the goal is to improve the balance between modes of transportation, and the emphasis should be on moving people and goods, rather than on moving vehicles.

- **Secondary Transit Street:** Medium transit ridership and low-to-medium frequency of service, or medium frequency of service and low-to-medium transit ridership, or connects two or more major destinations.

In general, it is City policy that transit preferential treatments should be concentrated on the most important transit streets, and the treatments applied should respond to all transportation needs of the street. For example, on streets that are major arterials for transit and not for automobile traffic, treatments should emphasize transit priority; on streets that are major arterials for both transit and automobiles, treatments should emphasize a balance between the modes. It is also City policy that automobile facility features (such as driveways and loading docks) should be reduced, relocated or prohibited on transit preferential streets in order to avoid traffic conflicts and automobile congestion.

Citywide Pedestrian Network

The Citywide Pedestrian Network is a classification of streets throughout the City used to identify streets devoted to or primarily oriented to pedestrian use. The main classifications are:

- **Citywide Pedestrian Network Street:** An inter-neighborhood connection with “citywide significance” includes both exclusive pedestrian and pedestrian-oriented vehicular streets. These streets include the Bay, Ridge and Coast trails, are used by commuters, tourists and the general public, and connect major institutions with transit facilities.

- **Neighborhood Network Street:** A neighborhood commercial, residential or transit street that serves pedestrians from the general vicinity. Some streets may be part of the Citywide network, but are generally oriented towards neighborhood-serving uses. Types include exclusive pedestrian and pedestrian-oriented vehicular streets. As part of the Neighborhood Network Street network, streets are classified as **Neighborhood Commercial Streets**, which are streets that are predominantly commercial use with parking and loading conflicts, or **Neighborhood Network Commercial Streets**, which are intra-neighborhood connection streets that connect neighborhood destinations.

In general, it is City policy that sufficient pedestrian movement space should be provided to minimize pedestrian congestion, sidewalks should be widened where intensive commercial, recreational or institutional activity is present, and efforts should be made to ensure convenient and safe pedestrian crossings at intersections.

Congestion Management Program Network

The CMP network is a network of freeways, state highways, major arterials and transit conflict streets (see Roadway Classifications, above) established in accordance with state Congestion Management legislation. As part of the CMP, the San Francisco County Transportation Authority is required to determine the level of service ("LOS") for the CMP network streets every two years. The LOS is based on the average travel speed for each roadway segment during both the AM and PM peak periods. The level of service standard is LOS E, except for roadway segments that operated at LOS F in 1991 (when the first study was performed). The CMP requires development of "Deficiency Plans" for any CMP-designated roadway that operates at LOS F. These plans include an analysis of the causes of the deficiency, a list of improvements that would have to be made to prevent the deficiency from occurring (including cost estimates), a list of improvements proposed as part of the plan, and an action plan for implementation of the improvements (including an implementation schedule).

The following are the most-recently determined travel speeds and levels of service for the CMP network streets in the vicinity of the project area for the weekday PM peak period (generally 4:00 to 6:00 PM). For the other CMP network roadway segments in the vicinity of the project site, no travel speed or level of service information is provided.

Roadway Performance - Weekday PM Peak Period				
Roadway Segment	**Direction**	**Travel Speed**	**LOS**	**Year Reported**
I-80 - US 101 to Fremont	E	10.0	F	2004
I-80 - Fremont to Treasure Island	E	14.6	F	2004
I-80 - Treasure Island to Fremont	W	21.7	F	2004
I-80 - Fremont to US 101	W	13.8	F	2004

Metropolitan Transportation System Network

The MTS network is defined by the Metropolitan Transportation Commission ("MTC") as part of its Regional Transportation Plan. The MTS is a regional network of roadways, transit corridors and transfer points, identified by the MTC in the basis of specific criteria. The criteria identified facilities that provide relief to congested corridors, improve connectivity, accommodate travel demand and serve a regional transportation function. The State highways and major thoroughfares designated in San Francisco's CMP roadway network are all included in the regional MTS network. There are few instances in which the local CMP network is not identical to the MTS network due to differences in the criteria used to define each network.

Signal Warrants

A signal warrant is a condition that an intersection must meet to justify a signal installation. There are different warrants, which examine factors such as the volume of vehicles, bicyclists, and pedestrians, the signal system, collision statistics, as well as the geometric/physical configuration of the intersection. Even if a signal warrant is not met under the strictest interpretation, the determination to signalize an intersection could be made based upon the city traffic engineer's professional judgment of intersection operations.

APPENDIX C

GEOTECHNICAL INVESTIGATION REPORT
(excluding appendices)

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GEOTECHNICAL INVESTIGATION
CRESTMONT DRIVE PROJECT
SAN FRANCISCO, CALIFORNIA

ALAN KROPP & ASSOCIATES

9/29/2006

(TEXT ONLY, NO REFERENCED MAPS, DRAWINGS OR DIAGRAMS)

TABLE OF CONTENTS

1.00 INTRODUCTION

1.01 Project Description

The project site is described as Parcel 1, Lot 25, and is located south of the terminus of Fifth Avenue as shown on Figure 1, Vicinity Map. The project site is accessible via an existing unpaved road off Crestmont Drive (between 495 and 505/507 Crestmont Drive). The unpaved road is located at the south margin of the site. The slopes above and below the unpaved road are steeply inclined. There are existing residential structures south of the site, and there is one residential structure east of the site. We understand that the undeveloped slope area between the unpaved road and the upslope residential lots, as well as a small undeveloped lot immediately east of the project site, belongs to the Mount Sutro Woods Home Owners Association (MSWHOA). A schematic diagram representing the locations of the project site, MSWHOA and surrounding private lots is presented on Figure 2, Mount Sutro Woods Area. The area at the toe of the slope has been developed for apartment buildings. There is an existing bin wall downslope of the northeast corner of the project site behind the apartment at the end of Fifth Avenue. An existing rock bolt facing is present behind the apartment building at the end of Warren Drive at the toe of the slope below the western portion of the project site. The approximate locations of the Fifth Avenue bin wall and Warren Drive rock bolt facing are shown on Figure 6.

As currently envisioned, the proposed development would consist of 17 two-unit buildings in four groupings of 4 to 5 buildings each. The proposed 4-story structures would be constructed on the inclined slope below the existing unpaved road and would be stepped down the slope. A new access roadway would be built along the south portion of the site on the parcel designated as Parcel 1, Lot 28. The location of Lot 28 is shown on Figure 3, and a schematic depiction of the location of Lot 28 with respect to surrounding features is shown on Figure 2. We understand that the proposed access roadway would be a private road, but would be designed in accordance with City and County of San Francisco requirements. The new access roadway does not conform to the limits of the current graded unpaved road. As such, grading of the new access roadway would include cuts and fills. A series of retaining walls would be needed to support the roadway fill, the upslope excavation for the roadway, and proposed cuts and fills for the new buildings. Based upon undated preliminary cross-sections received from Levy Design Partners on dated April 21, 2005, retained cuts would be up to about 12 feet and retained fills would be up to about 23 feet. These cross-sections reflect the project as originally proposed and in this report are referred to as the "project". It should be noted an earlier draft version of our report (dated march 18, 2005) utilized an earlier version of cross-sections (supplied on November 8, 2004) in the analyses and as a base for Figures 8 to 11 in our report. The changes in the cross-sections were relatively modest so the figures have not been redrafted.

As part of the environmental review by the San Francisco Planning Department, a second project alternative has been developed which has the same general building layout, but with some of the structures lowered by one story into the hillside to reduce the height of the buildings above street level. With this scheme, cuts restrained by retaining walls up to about 20 feet high would be made below the middle of the buildings. Retaining walls in this scheme are generally lower in height (up to 21 feet high) and would be built about 5 feet down hill of the buildings to hold fill materials placed for a rear pathway. The fill material should consist of light weight material to reduce surcharge loading. This second scheme is referred to as the "alternative project" in this report.

As described in Item 9 under Section 1.03 Scope, this project has undergone a peer review process under the direction of the San Francisco Department of Building Inspection. As a result of this process, a number of modifications have been made to our recommendations.

We understand that collected surface water would be directed into the existing sanitary sewer/storm drain that is located within the existing unpaved road and extends down the slope to the end of Fifth Avenue. The locations of the manhole covers along the access roadway, as well as the easement through the project site, were included in the project survey which is shown on Figure 3. Greater detail can be seen on the survey documents. Some water from the lower areas of the site may be pumped to the storm sewer.

1.02 Purpose

The purpose of our geotechnical and geologic investigation was to obtain and review available existing information relevant to the proposed development, to obtain additional site-specific subsurface information, and to characterize the existing geologic and geotechnical engineering conditions at the project site. This was performed in order to provide preliminary geotechnical recommendations for design and construction criteria for the following aspects of construction of the proposed development of the Crestmont Hills project:

- Site preparation and earthwork;
- Foundations;
- Retaining systems;
- Slabs and pavements;
- Drainage and erosion control; and
- Building code seismic design parameters.

1.03 Scope

Our firm has performed this geotechnical investigation for the proposed Crestmont Drive project in San Francisco, California in conjunction with Joyce Associates (JA). Our firm performed the geotechnical aspects of the geotechnical investigation and JA performed the geological aspects of the investigation. Our services were provided in accordance with our proposal dated February 5, 2004. Specifically, our scope of work to accomplish the stated purpose included the following:

1. A review of available historic geotechnical investigations prepared for the project site and in the immediate vicinity of the site;

2. A review of files provided by the City and County of San Francisco regarding previous construction activities on the site and in the immediate vicinity including permits and plans;

3. A review of published geotechnical and geological materials with data relevant to the site;

4. An examination of aerial photographs of the area to observe historic development and broad features;

5. A reconnaissance of the site and portions of the immediate surrounding properties to evaluate general geotechnical and site conditions;

6. Field mapping of geologic features on the existing slope within the site, and in the immediate vicinity of the project site;

7. A subsurface investigation program consisting of the rotary wash borings, rock coring, and borings with portable access equipment;
8. Laboratory index, classification and strength tests on surface and subsurface samples from the site to evaluate the properties of the materials recovered;

9. A meeting with the project peer review consultant (PRC) selected by the City and County of San Francisco Department of Building Inspection (SFDBI), to discuss and to obtain comments regarding the field investigation program and comments regarding the completion of the geotechnical investigation report. Following an initial meeting with the PRC and based upon the requirements of the PRC, our scope of work was modified to address the PRC comments as outlined in a PRC memorandum;

10. Geotechnical engineering analyses of the collected data; and

11. Preparation of this preliminary geotechnical investigation report.

Prior to proceeding with our geologic mapping and field investigation (Scope Items 6 and 7), four swaths approximately 50 feet wide were partially cleared by others from the unpaved road to near the lower property line. The portions of the slope which had been partially cleared, as well as the unpaved road, were then surveyed by others. The clearing and survey work were performed in August and September 2004. The approximate limits of the partially cleared slope sections are indicated on Figure 3 by the areas of the slope which contain topographic lines as well as the terminology "Clearing Zone" on the base map. The clearing zones were designated "A" through "D" by the project architect. The first 4 cross-sections presented in this report correspond to the nomenclature adopted on the base map. In March 2004, additional survey work was performed to provide spot elevations for selected features.

The additional scope of work required to address the comments of the PRC (discussed in Item 9 above) included the following items. The findings of these additional scope items will be incorporated into the relevant scope categories listed above.

1. Additional subsurface exploration including large diameter borings;

2. Collection and review of the available information regarding the existing sanitary sewer/storm drain line within the unpaved road, the landslide at the west end of the site, the existing bin wall at the end of Fifth Avenue, the existing tie-back wall at the end of Kirkham Street, and the Seventh Avenue retaining wall;

3. Review and summary of foundation supporting conditions for the existing structures upslope of the project site;

4. Development of cross-sections which extend off-site and depict the relationship of the project development to existing structures; and

5. A photographic documentation of existing conditions on the project site and properties in the immediate vicinity.

A final addition to our scope of services resulted from the receipt of a letter by Trans Pacific Geotechnical Consultants (TPGC), who performed a review of our draft report and observed the site conditions. TPGC summarized their information in a letter to the San Francisco Planning Commission dated June 26, 2006. In response, we visited the site on October 2, 2006 and prepared a letter dated October 4, 2006. Our letter is presented in Appendix H.

Our scope of work did not include an evaluation of the potential presence of sulfates in the soil, or other possibly corrosive, naturally-occurring elements.

There are numerous off-site issues which may have implications for the subject development. Although our scope of work considers these offsite issues and provides recommendations for mitigation of these issues that would be implemented either on the project site or the access easement, our scope of work did not include providing recommendations for repairs beyond the project limits. Likewise, although our investigation considered the global stability of slopes on the project site and in the immediate vicinity of the project site, we have not evaluated the integrity and/or stability of existing foundations.

This report has been prepared for the exclusive use of you and your consultants for specific application to the proposed development in accordance with generally accepted geotechnical engineering practices. No other warranty, either expressed or implied, is made. In the event the nature, design, or location of the proposed construction differs significantly from what has been noted in this report, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and the conclusions of this report modified or verified in writing.

The findings of this report are valid as of the present date. However, the passing of time will likely change the conditions of the existing property due to natural processes or the works of man. In addition, due to legislation or the broadening of knowledge, changes in applicable or appropriate standards may occur. Accordingly, the findings of this report may be invalidated, wholly or partly, by changes beyond our control. Therefore, this report should not be relied upon after three years without being reviewed by this office.

2.00 SITE INVESTIGATION

2.01 Review of Available Historic Geotechnical Investigations

Several engineering studies have been performed for the project site and the immediate surrounding area and included soil/foundation investigations and geologic investigations (geotechnical investigations). Some of these reports were available within our company library, while others were obtained from the SFDBI. We also obtained some information from other engineering firms who had been involved in past work in the vicinity of the project site. We reviewed this information in order to obtain data relevant to our current study including subsurface conditions and foundation information for existing structures in the immediate vicinity of the project site. Information relevant to the current investigation, which we obtained from geotechnical investigations, is incorporated into "Section 3.01, History of Site and Vicinity." Within the test of this report, we often refer to particular addresses, especially with respect to the historic geotechnical investigations. Figure 4 presents the street name and house numbers for properties located in the immediate vicinity of the project site.

Detailed information regarding the reports reviewed for the current investigation is Appendix E of this report, (Figure E-1). Crestmont Hills Study Area provided in Appendix E, which shows the approximate locations of the studies with respect to the project site and surrounding area. Each study area was given a letter designation (e.g. Study Area A). Each geotechnical investigation was given a designation which includes the Study Area as defined above and a document number. For instance, Document Number 1in Study Area A would have the designation "A-1." For the remainder of this report, wherever we are presenting information obtained from a prior geotechnical investigation, the reference document will be indicated in parentheses along with the year of the report (e.g. A-1, 1959).

Copies of subsurface information from the prior studies are also included in Appendix E.

2.02 Review of City and County Records

We reviewed public information available in the files maintained at SFDBI. We obtained copies of permits for construction activities in the vicinity of the project site. We reviewed available foundation plans for existing structures in the immediate vicinity of the project site, but City policy does not allow copying of permitted plans without a signed affidavit from the property owner. With the assistance of the project architect, we were able to obtain copies of some of the plans which we reviewed.

We solicited and obtained some information from the City and County of San Francisco Department of Public Works (SFDPW). Specifically, we obtained available information regarding the sanitary sewer/storm drain located on the unpaved road and extending downslope through the project site to Fifth Avenue. On February 2, 2005, we obtained an undated copy of a plan from SFDPW showing the approximate location of the sanitary sewer/storm drain.

We reviewed this information in order to obtain data relevant to our current study including foundation information for existing structures and/or other improvements in the immediate vicinity of the project site.

Information obtained from our review of SFDBI and SFDPW records is incorporated into appropriate portions of the report. References for the plans reviewed are included at the end of this report. A brief summary of the information obtained from our review of plans and permits is summarized in Appendix F.

2.03 Review of Published Materials

A variety of published sources were reviewed to evaluate geotechnical data relevant to the subject parcel. These sources included geotechnical literature, reports, and maps published by various public agencies. Maps which we reviewed included topographic and geologic maps prepared by the United States Geological Survey, as well as geologic and fault maps prepared by the California Geological Survey (formerly the California Division of Mines and Geology). The purpose of this review was to assist with geologic and geotechnical characterization of the project site. Information obtained from our review of published documents is summarized in Section 3.02 of this report. A list of published documents reviewed for this investigation is presented in the references section of this report.

2.04 Aerial Photo Review

Twenty-five sets of aerial photographs were reviewed as part of our study. These photographs were taken during the period from 1935 to 2000 and ranged in scale from 1:7200 to 1:36000. All of the photographs were black and white images with the exception of the 1991 photographs, which were color images. A complete listing of all photographs reviewed for our study is included in the references section of this report. The findings from the review of the aerial photographs are incorporated into the relevant portions of "Section 3.01, History of Site and Vicinity."

2.05 Site Reconnaissance

On October 7, 2004, our geologist and geotechnical engineer performed a preliminary reconnaissance of the site and portions of the immediate surrounding properties to evaluate general geotechnical and geological conditions. On December 21, 2004, our geotechnical engineer performed a more detailed site reconnaissance focusing primarily on the slope and existing structures located upslope of the project site. We did not have permission to access the MSWHOA property or the upslope lots; therefore, our observations were made from the unpaved road and Crestmont Drive. At this time, we also obtained representative photographic documentation of existing conditions, specifically including the conditions of all the existing developments adjacent to the project site. These photographs will be maintained in our project files. Our geologist performed a more detailed reconnaissance of the site and surrounding area from February 4 through 10, 2005. A final site visit was performed on October 2, 2006 to observe conditions in response to the June 26, 2006 letter from TPGC.

Information obtained from our reconnaissance of the project site and surrounding vicinity is summarized in the appropriate sections of this report.

2.06 Geologic Mapping

Our geologist performed preliminary geologic mapping on October 7, 2004. More detailed geologic mapping was performed from February 4 through 10, 2005. The findings of our geologic mapping are described in Section 3.02.2, as well as presented graphically on Figures 3 and 6. In general, artificial fill is not mapped unless the fill is more than 5 feet thick. In general, areas of artificial fill are not shown where the fill is less than 5 feet thick.

2.07 Subsurface Exploration

Small diameter borings for the subsurface exploration program were drilled at the project site from September 22 to October 7, 2004. A total of 12 small diameter exploratory borings were drilled. Eight of the borings were drilled using truck-mounted rotary wash drilling equipment to depths ranging from about 36 to 51½ feet below existing grade. These borings were located along the unpaved road at the upslope portion of the project site and within the gently sloping area at the west end of the project site. Four additional borings were drilled using portable Minuteman drilling equipment to depths ranging from about 21½ to 35½ feet below existing grade. The Minuteman borings were located on the existing slope north of the unpaved road within the cleared areas of the project site.

Following the meeting with the PRC, four large diameter borings were drilled at the project site from February 4 to 10, 2004 to depths ranging from 55 to 65 feet below existing grade. The large diameter borings were located along the unpaved road and within the gently sloping area at the west end of the site.

The subsurface materials encountered within the exploratory borings are described in "Section 3.04, Subsurface Conditions." The locations of exploratory borings are shown graphically on Figure 3, Site Plan and Geologic Map. Additional information regarding the subsurface investigation along with logs of borings is presented in Appendix A.

2.08 Laboratory Testing

Water content, Atterberg Limits, particle size analyses, dry density, compaction characteristics and strength tests were performed on selected subsurface samples obtained during our subsurface exploration. Additional information regarding the laboratory testing is provided in Appendix B. The laboratory test results are summarized at the appropriate depth on the boring logs in Appendix A and the graphic results of strength tests are presented in Appendix B.

2.09 Meeting with Peer Review Consultant

We met with the PRC and several others involved with the development of the Crestmont Drive Hills project including representatives from SFDBI, Levy Design Partners, and GCA Strategies Community and Government Relations. A copy of the memorandum dated December 21, 2004, which documents the meeting with the PRC, is attached in Appendix C.

3.00 SITE CONDITIONS

3.01 History of Site and Vicinity

3.01.1 Development of Site and Vicinity

The 1935 aerial photographs show the surrounding areas and streets at the base of Mount Sutro had been developed (to about Seventh Avenue and Kirkham Street). The areas upslope and to the south of Kirkham Street and to the east of 7th Avenue were undeveloped and had some tree cover. A small quarry was located between Kirkham Street and Lawton Street in the area of the future Locksley Avenue (more detailed information regarding the quarry is included in Section 3.01.4. The project site was undeveloped and was located on a steep north-facing slope with light tree coverage. A swale was located at the base of the slope in the area of the current apartment buildings located at the end of Fifth Avenue. The swale generally extended upslope in a southeasterly direction passing just east of the eastern-most portion of the site**.** The swale appeared to be partially filled with colluvium. No indications of instabilities were visible on or near the project site. No major changes in the site conditions were observed on the 1938 aerial photographs.

Some rough grading was observed in the 1946 aerial photographs in the area of the current apartment buildings at the end of Fifth Avenue, and the project site was more densely covered with trees than in earlier photographs. By 1948, the aerial photographs indicated additional rough grading had occurred in the area of the current apartment buildings at the end of Fifth Avenue, and the project site was heavily covered with trees.

Aerial photographs from 1955 show unpaved haul roads had been excavated in the western portion of the project site and in the area south of the site. Some side cast fill had been placed along the edges of the haul roads. The apartments currently existing at the end of Fifth Avenue had been constructed and Locksley Avenue was being rough graded. Permit records at the SFDBI indicate that permits were issued for the construction of the apartment buildings at the end of Fifth Avenue were approved in 1949. The currently existing steel bin retaining wall behind the southeast building of the apartment complex at the end of Fifth Avenue does not appear to be present (more detailed information regarding the bin wall is included in Section 3.01.7). A small landslide is visible in the ravine in the area of the future bin wall.

Grading operations in the vicinity of the project site began in 1958 with the Lawton Heights subdivision. The Lawton Heights subdivision is the area currently occupied by 104 to 184 Locksley Avenue, 400 to 480 Warren Drive, and extending approximately an additional 260 feet south along Warren Drive (A-1, 1959). The locations of specific addresses in the immediate vicinity of the project are site are shown on Figure 4. The western section of the unpaved road currently existing on the project site had been graded by 1958 (1958 aerial photograph), and the road extended to the south of the site. The grading for the Forest Knolls Subdivision Unit No. 3 was completed concurrently with the Lawton Heights subdivision. The grading for both Lawton Heights and Forest Knolls Subdivision Unit No. 3 was completed by the end of 1959 (G-L-1, 1960). We would like to point out the Forest Knolls Subdivision Unit No. 3 appears to include the project site for Crestmont Hills and extends south to at least Devonshire Way. The copy of the report which we reviewed does not include the plan which shows the limits of the subdivision, locations of borings, or grading details conducted for this project. The report completed for Lawton Heights Subdivision does include a plan which shows the limits of the Lawton Heights Subdivision and locations of some of the borings performed for the Forest Knolls Subdivision Unit No.3.

By 1961, aerial photographs indicate the western end of the unpaved road, currently existing at the top of the slope adjacent to the project site, had undergone additional grading; however, the grading operations had not yet reached the eastern end of the unpaved road where it currently meets Crestmont Drive. A small road (likely used as a haul road during grading in the vicinity) was observed to cross the north-facing slope of the project site in the area just above the existing bin wall behind the apartments at the end of Fifth Avenue.

By 1969, aerial photographs indicate the section of Crestmont Drive upslope of the project site and the majority of the lots along this area had been constructed. The existing unpaved road on the project site had been graded to approximately its current configuration. No major changes in the site configuration were observed in the 1972 aerial photographs.

The 1977 aerial photographs indicate fill had been placed above the existing unpaved road below 391/393 and 405/407 Crestmont Drive. This fill appears to have been placed to provide support to an older, near vertical cut located just below the buildings.

No major changes in the site conditions were observed on the aerial photographs taken between 1979 and 1986 with the exception that by 1983, all the structures on Crestmont Drive had been constructed. In addition, by 1985, the undeveloped slopes above and below the project site had become densely vegetated.

No major changes in the site conditions were indicated on the aerial photographs taken between 1995 and 2000 with the exception that by 2000, the trees on the project site appeared to have been recently cleared.

3.01.2 Historic Documentation of Subsurface Conditions

The historic geotechnical investigation reports prepared previously at the project site and in the surrounding area are in general agreement that the area is generally underlain by the Jurassic-Cretaceous Age Franciscan Assemblage. In the following discussion, “site” generally refers to the study area for the historic investigations referenced. The approximate limits of Study Areas are shown on Figure E-1 in Appendix E. This usage of the word “site” only applies to this section of the report. In the remaining sections of this report “site” refers to the Crestmont Hills development.

Grading operations for the Forest Knolls Subdivision Unit No. 3 included placement of fills up to 37 feet deep graded to inclinations of 1.5:1. Cuts up to 25 feet high were excavated into rock and were generally graded to inclinations of 1.5:1 within some localized steeper cuts massive rock outcrops. The subsurface materials encountered during grading for Forest Knolls Subdivision Unit No. 3 consisted predominantly of thinly bedded chert underlain by intrusive basalt and hard peridotite, which in several places had been serpentinized to dark black and flaky rock. The exposed chert had irregularities in its topographic appearance which included buried ravines of structural and erosional origin. Water was encountered in most of the test borings at depths ranging from about 10 to 25 feet below grade. The report indicated that nine of the test borings were located in the area of active springs, and the source of the water was traced to a brecciated zone in the bedrock that extended from the site and up the slope to Mount Sutro. Subdrains were placed during construction within the area of springs. Weak zones were encountered at or close to the contact between the chert and the underlying intrusive rock and occasionally at the contact of the alluvium and the underlying rock (G-L-1, 1960).

Exploratory borings for the geotechnical investigation of the area bounded by Locksley Avenue and Warren Drive, south of Lawton Street and north of Oakhurst Lane, encountered artificial fill, surficial soils, and bedrock. The soils were described as firm clays with variable amounts of rock fragments and were generally located on the level, western portion of the site. Relatively stable bedrock essentially covered the rear of the northern portion of the site on the existing 1:1 slope. The southern half of the site on the existing 2:1 slope encountered approximately 2 to 3 feet of firm rocky clay material. These rocky clay materials were described as materials that experienced a loss of strength upon saturation. This loss of strength was evidenced by several small slides on the southern half of the site at the toe of the slope where seepage zones were encountered in four borings within the upper 8 feet. The report stated that a spring had historically contributed to the seepage in this area but had been drained due to the development above and east of the site (B-1, 1961).

A geotechnical investigation for the development of 301 through 359 Crestmont Drive encountered subsurface materials consisting of about 5 to 7 feet of wet cherty clays that generally got stiffer and less compressible with depth. These soils were underlain by fractured chert bedrock (J-1, 1963).

A geotechnical investigation was performed for the development of the existing structures upslope of the project site (443-507 Crestmont Drive) as well as portions of the unpaved road, the eastern portion of the project site, and the undeveloped lot immediately east of the project site. The subsurface materials encountered during the geotechnical investigation consisted of about 1 to 11½ feet of surficial soils overlying bedrock. The surficial soils consisted of loose to medium dense, very clayey silt with chert fragments. The bedrock consisted of very fractured chert bedrock (G-1, 1965).

A geotechnical investigation in the vicinity of 478-480 Warren Drive documented that the Franciscan Assemblage consisted primarily of alternating beds of hard red-brown radiolarian cherts, jaspers, and dark grey shale. The rock unit was intensely sheared and tightly folded with major joint planes and bedding plane shears visible on the rock units. Some slickensides were also evident between bedding plane shears in the rock slope. The bedding dipped generally to the southwest at the crest of the exposure with a strike varying from N 35°W to N 35°E. Water was seeping from many of the bedding planes in the rock face (E-1, 1972).

A subsequent geotechnical investigation which included some of the same lots included in the 1965 geotechnical investigation by Woodward-Clyde-Sherard & Associates, as well as additional lots to the west and south of the previous study area, described the underlying bedrock as rhythmically bedded radiolarian chert and shale. Chert was the predominant material; but was anticipated to be underlain by shale and sandstone in the eastern portion of the study area. These rocks were highly fractured and thinly bedded. The chert and shale beds were made up of hard angular fragments and, because of their tight interlocking structure, were relatively stable materials. The bedrock was locally overlain by fill and surficial soils. The depth of the fill at the crest of the slope varied from about 4 feet on Lot 2 (491-493 Crestmont Drive) to 20 feet where an old natural drainage way was filled on Parcel 5 (505-507 Crestmont Drive). The maximum fill thickness and depth to rock at the crest of the slope were summarized in Table E-3 in Appendix E**.** The native subsurface materials encountered in the borings beneath the fill typically consisted of 2 to 7 feet of stiff to very stiff, red-brown, cherty clay underlain by dense fractured chert and shale. No water was encountered in the borings (H-1, 1976).

Fill was encountered to depths ranging from 13 to 14 feet for the geotechnical investigation of 247, 251 and 255 Crestmont Drive. The fill was underlain by colluvial soils to a depth of about 19 feet, which was in turn underlain by chert bedrock (K-1, 1977).

The steep slope behind 375-377 Crestmont Drive was underlain by interbedded chert and shale of the Franciscan Assemblage. The exploratory borings in this area encountered soil overlying weathered bedrock. The soil was approximately 1 to 4 feet thick and consisted of stiff, dry silty clay with rock fragments. The upper portion of the bedrock consisted of severely weathered, interbedded chert and shale. The shale was found to be more severely weathered than the chert, and generally decomposed to soil. Indications of shallow landslides were observed on the steep slope behind the structures. The landslides reportedly occurred within the upper four feet of surficial soils and were caused by the steep slope (approximately 1:1) and saturation of the surficial soils (I-1, 1985).

A geotechnical investigation of a landslide behind 400-402 Warren Drive generally described subsurface conditions consisting of bedrock with a soil cover. Bedrock encountered consisted of Franciscan Assemblage shale and sandstone on the lower portion of the slope and chert and siltstone in the upper portion of the landslide and the slope above the landslide. Where bedding attitudes were observed, strike was documented as North 5° to 35° West and dipping 25° to 35° West, within the individual bedrock units. The contacts between the major sandstone and shale units had a strike of North 70° to 80° West and dipping 40° to 50°. The report concluded that "bedding orientation within the sandstone and shale are orthogonal to the slope and, therefore, the bedrock structure itself did not appear to represent a geologic hazard." Groundwater seepage was observed at a depth of about 2 to 3 feet in one boring and one test pit, as well as on the face of the slope. Two unnamed northwest-southeast trending faults joined together near the intersection of Locksley and Warren Drive and bounding the site (F-1, 1998).

A geotechnical investigation of a landslide located between 128 through 140 Locksley Avenue and 455 through 485 Warren Drive encountered landslide debris/fill to depths of about 3½ to 14 feet. The slide debris was underlain by stiff silty and sandy clays and medium-dense clayey sands that extended to depths of about 6 to 18 feet. These soils were underlain by fractured and weathered interbedded sandstone and siltstone that extended to the maximum depths explored of 8 and 19½ feet. Groundwater was not encountered in any of the borings during drilling; however, groundwater was at a depth of about 6½ feet in most of the downslope borings 38 days after drilling. In addition, several seepages were observed on the slope in select locations during the initial site reconnaissance (C-1, 1998).

3.01.3 Foundation Types for Existing Offsite Structures

We obtained information regarding recommended foundation types and depths from our review of available plans for structures located on properties immediately adjacent to the project site. Records, including foundation plans, obtained from the SFDBI were available for most but not all of the existing structures in the immediate vicinity of the project site. Review of consultant files provided information regarding installed depths of foundations for selected residences on Crestmont Drive. In general, our review suggests that the existing residences located upslope of the project site along Crestmont Drive are supported either on foundations consisting of a combination of drilled piers and footing foundations or entirely on drilled piers. Grade beams are generally included. The apartment buildings at the base of the slope on Warren Avenue, Locksley Avenue, and Fifth Avenue are supported on shallow footing foundations. The types and depths of foundations for individual structures are summarized in Appendix F.

3.01.4 Historic Documentation of Springs and Seepage

Active springs were observed during exploration and grading activities for the Lawton Heights and Forest Knolls Subdivision Unit No. 3 (G-L-1, 1960). Borings located within the area of former springs are shown on Figure 6. Seepage was observed in the upper 8 feet of borings drilled downslope of the active spring area, and several small landslides were documented in this area (B-1, 1961).

A geologic investigation performed for 478-480 Warren Drive documented water seeping from many of the bedding planes in the rock face located above the apartment building (E-1, 1972).

Several seepages were observed on the slope between 128 through 140 Locksley Avenue and 455 through 485 Warren Drive (C-1, 1998).

3.01.5 Quarry

Quarry activities were observed on aerial photographs taken between 1935 through 1958. The approximate upper limits of the quarry is shown on Figure 3 and 6. The aerial photographs indicate that the quarry operations started between Kirkham and Lawton Streets in the area currently occupied by the northern portion of Locksley Avenue. The quarry operations continued to move eastward into the existing west-facing slope. The 1948 aerial photographs show that the quarry had undergone more expansion with near vertical cuts present west of the project site. By 1955, the quarry had greatly expanded and cuts along the east side of the quarry had been extended into the project site. By 1958, the slope at the west end of the site had been excavated to a configuration similar to the current condition. The slope is a steep cut with small north-south trending vertical cuts at the top. Some sloughing and erosion on the lower portion of the quarry slope was visible. The 1958 aerial photographs also indicate that the quarry excavations at the base of the slope extended below adjacent grades and a lake had formed. By 1961, the quarry excavation at the base of the slope had been filled, and the apartment buildings at 6 and 8 Locksley Avenue had been constructed in approximately the same location. The 1961 aerial photographs indicate the quarry slope at the west end of the project site had been freshly graded to an inclination of about 1.5:1, but appeared to be relatively loose and disturbed.

The quarry slope near the western portion of the project site was described as about 150 feet high and having inclinations of .75:1 in the upper 75 feet and about 1:1 or flatter in the lower portion of the slope. The slope was reported as stable and free from deep-seated landslides; however, it was indicated that some shallow raveling and sloughing could occur following the study. (G-1, 1965).

Erosion was visible on the west-facing quarry slope in the 1969 aerial photographs, and by 1977 the slope had become covered with brush.

A geologic investigation performed for 478-480 Warren Drive (E-1, 1972) documents the quarry operations resulted in a relatively level, but gradually sloping building area adjacent to Warren Drive and a steep cut bank that extended up the east half of the Warren Drive property. The rock cut slope rose at an inclination of about .5:1 (horizontal to vertical) with some localized steeper areas and slope inversions resulting from rock fall. No evidence of massive rock slides were observed. The rock unit was intensely sheared and tightly folded with major joint planes and bedding plane shears visible on the rock units. Some slickensides were also noted between bedding plane shears in the rock slope. The bedding was documented as having dips generally to the southwest at the crest of the exposure with a strike varying from N35°W to N35°E. Water was seeping from many of the bedding planes in the rock face (E-1, 1972).

A possible slide was observed on the 1989 aerial photographs in the quarry cut located north of the western end of the project site. In the 1993 aerial photographs, a large shallow slide is visible on the slope which may extend into the western end of the project site. The slide scar is still visible in the 1994 aerial photographs.

We attempted to obtain information from the SFDBI regarding the slide activity on the west-facing quarry cut; however, they indicated they were not able to locate their records.

3.01.6 Storm Drain/Sanitary Sewer on Unpaved Road

We received an undated copy of a plan showing the alignment of the sanitary sewer/storm drain in the vicinity of the Crestmont Hills project from the SFDPW on February 10, 2005. This map shows a sanitary sewer/storm drain line extending along the northern portion of Crestmont Drive and down the unpaved road. The plan also shows a collector pipe extending north (downslope) from the unpaved road towards Fifth Avenue at about the midpoint of the main line on the unpaved road. No information regarding pipe sizes, invert elevations, gradients, or construction method was provided by the SFDPW. Based on discussions with the SFDPW, this sanitary sewer/storm drain line is located within a private easement; therefore, the installation was not a public project. The alignment maps were provided to the City by the original developer and appear to be an approximate alignment rather than a surveyed alignment.

A topographic survey of the project site was provided by Martin M. Ron Associates and dated March 9, 2005. The survey shows the location of existing manholes on the unpaved road and on the paved section of Crestmont Drive, immediately east of the unpaved road. The survey also shows the approximate flow direction, invert elevations, and size of the sewer/storm drain laterals and sewer/storm drain main that were observed entering the manhole junctions. A 10-foot wide easement is shown approximately 108 feet west of Lot 25, eastern lot line, and extends north (downslope) towards Fifth Avenue. The locations of the easement and manholes, along with corresponding rim and invert elevations and approximate direction of flow are available on the base plan for Figure 3. We have reduced the scale of the original document, and the reader should refer to the original survey information for specific details. The alignment map provided by the SFDPW appears to be in general agreement with the surveyed locations of manholes and easement.

Based on the topographic survey, it appears a 10 to 12-inch sewer/storm drain main is present underneath the unpaved road. Three manholes are located along this alignment. The eastern manhole, located on Crestmont Drive, has rim and invert elevations of 609.76 and 601.8 feet, respectively, which correspond to a pipe depth of 7.96 feet. The middle manhole, located on the unpaved road has rim and invert elevations of 577.89 and 570.9 feet, respectively, which correspond to a pipe depth of 6.99 feet. The western manhole, located on the unpaved road, has rim and invert elevations of 584.41 and 578.1 feet, respectively, which correspond to a pipe depth of 6.31 feet. The eastern and western manholes are high points while the middle manhole is the low point. A 12-inch pipe exits the eastern manhole and slopes west generally towards the middle manhole with a flow gradient of approximately 13.6 percent. A 10-inch pipe exits the western manhole and slopes east generally towards the middle manhole with a flow gradient of approximately 3.4 percent. A 12-inch pipe exits the middle manhole and slopes north (downslope) towards Fifth Avenue (gradient unknown). The flow direction of the pipe exiting the middle manhole is generally consistent with the location of the sanitary sewer/storm drain easement.

Several laterals were observed to enter the three manhole junctions. A 6-inch lateral pipe with an invert elevation of 580.1 feet enters the western manhole from the upslope properties. A 10-inch lateral pipe with an invert elevation of 573.0 feet enters the middle manhole from the upslope properties. Three 12-inch lateral pipes with invert elevations of 602.6, 603.8, and 601.8 feet enter the eastern manhole from the north, east, and south, respectively.

3.01.7 Miscellaneous Landslides

Several landslides were documented in the previous engineering studies on the project site or in the surrounding area. The approximate locations of the more significant landslides are shown on Figure 6 and the following paragraphs summarize the historic references to landslide activity.

Several small landslides were documented in the area downslope of the active springs identified in the vicinity of Oakhurst Lane between Oak Park Boulevard and Warren Drive (B-1, 1961).

Evidence of a possible slide located above the unpaved road about 100 feet south of the site was observed on the 1969 aerial photographs.

An earth flow occurred in the vicinity of 302 to 340 Warren Drive following the construction of Warren Drive in the fall of 1962 (M-3, 1980).

The 1975 photographs show small slides had occurred to the south of the western end of the site, both above and below the existing unpaved road. These landslides were close to the southern site margin but did not extend into the site. No additional landslides were visible within the site.

Some sloughing and raveling was noted on portions of the existing slope above the unpaved road for the project site. A small slide having a depth on the order of 4 to 5 feet was observed at the toe of Lot 10 (451 Crestmont Drive). This slide was about 40 feet long on the slope just above the unpaved road at the bottom of the lot. Shallow raveling was observed on the step rock slope on Parcel 4 (375-411 Crestmont Drive). There was no indication of any large landsliding or major instability (H-1, 1976).

Indications of shallow landslides were observed on the steep slope behind the 375-377 Crestmont Drive. The subsurface materials consisted of about 1 to 4 feet of soils overlying interbedded chert and shale bedrock. The landslides occurred within the upper four feet of surficial soils and were caused by the steep slope (approximately 1:1) and saturation of the surficial soils (I-1, 1985).

A shallow slide occurred on a private road behind 455, 475, 485 Warren Drive. The likely causes of the slide were heavy precipitation, surface runoff from an upslope driveway, improper functioning of a concrete drainage ditch, an oversteepened fill slope, and suspected leaks of the sewer beneath the driveway. (D-1, 1998)

3.01.8 Fifth Avenue Bin Wall

There is an existing bin wall located downslope of the eastern end of the project site behind 1580 Fifth Avenue. The face of the bin wall is constructed of interlocking metal bin elements which are approximately 10 feet in length and 1 foot high. The bin wall is approximately 40 feet wide and 15 feet tall relative to the adjacent pavement surface behind 1580 Fifth Avenue.

In our review of public documents on file at the SFDBI and SFDPW, we were not able to locate any information regarding the design and/or construction of the bin wall. We also did not locate any permits regarding the construction of the bin wall. We did, however, find information indicating that up to about 20 feet of fill was placed in the swale area upslope of the bin wall for the development of 505-507 Crestmont Drive (H-1, 1976). In our review of aerial photographs, the bin wall appears to have been constructed between 1955 and 1958, after the construction of the apartments at the end of Fifth Avenue.

Our geologic site mapping identified a landslide located in the swale upslope of the bin wall. The landslide was not readily observable in the aerial photographs reviewed; however, the aerial photographs indicate that the landslide occurred prior to 1958.

In summary, the bin wall appears to have been constructed in the mid 1950s. We judge it is likely a landslide developed in the swale may have been affected by the placement of fill within the swale area. The bin wall was probably constructed to retain the landslide mass. We judge that the depth of slide is up to about 20 feet based upon the height of the wall, the likelihood of a toe failure of the landslide debris, and the documentation regarding the thickness of fill placed in the upper portion of the swale. The bin wall generally appears to be performing satisfactorily, with the exception that debris and/or colluvial deposits have continued to accumulate behind the wall. At the time of our study, the accumulated debris appears to be on the verge of overtopping the bin wall. Clearing of some of the accumulated debris would be prudent.

3.01.9 Warren Drive Rock Bolt Repair

A geologic investigation performed for 478-480 Warren Drive (E-1, 1972) documented the site was originally a hill from which rock had been quarried. The quarry operations resulted in the relatively level, but gradually sloping, building area on the western half of the property and the steep cut bank that extended up the eastern half of the property. The rock slope on the eastern side of the property rose at an inclination of about .5:1 with some localized steeper areas and slope inversions resulting from rock fall. No evidence of massive rock slides was observed. The site was generally underlain by the Jurassic-Cretaceous age Franciscan Assemblage which consisted primarily of alternating beds of hard, red-brown radiolarian cherts, jaspers, and dark grey shale. The rock unit was intensively sheared and tightly folded with major joint planes and bedding plane shears visible on the rock units. Some slickensides were also evident between bedding plane shears in the rock slope. The bedding dipped generally to the southwest at the crest of the exposure with a strike varying from N 35°W to N 35°E. Water was seeping from many of the bedding planes in the rock face.

Excavations made at the toe of the rock slope during the construction of 478-480 Warren Drive caused localized rockfalls and sloughing (E-2, 1973). The rock slope was considered safe against deep-seated or massive sliding, but could have been prone to occasional rock fall; as such, rock bolts were recommended (E-3, 1974). Rock falls occurring in the winter of 1974/1975 augmented the need for rock bolts in the lower portion of the slope. Scaling of the slope was needed to remove overhanging and/or loose rocks (E-4, 1975).

A total of 83 rock bolts were installed and all but six rock bolts were drilled to the minimum recommended depth of 15 feet. The first several rock bolts failed during the load tests and the number of bags of cement and epoxy was increased in order to reach the design strength. These failed rock bolts were removed, the holes were redrilled, and the rock bolts reinstalled per specifications. Three rock bolts were installed in highly fractured material and the depths were extended to 20 feet. Three other rock bolts were located very close to the building, were angled downwards at 45°, and the embedment depth was increased to 21 feet. Steel reinforcing was placed and consisted of 3/8-inch diameter reinforcing steel. The steel reinforcing was placed 2 inches away from the rock face at a spacing adjusted to meet the design given in a letter dated October 6, 1975 (this letter recommended ½-inch diameter reinforcing steel). Gunite was applied over the reinforcement so that there was at least 2 inches of gunite coverage over the reinforcing steel. After the gunite cured, steel plates were placed over the rock bolts and the rock bolts were tensioned to the design load (E-5, 1976).

Thirty-eight hydraugers were installed to a minimum depth of 10 feet at an upward angle and cased with perforated pipe to facilitate the flow of water. Weep holes were also installed at various locations through the gunite covering (E-5, 1976). A chain-link fence was installed above the rock bolt facing to contain debris from shallow raveling and sloughing on the slope above the rock bolt facing.

3.01.10 Warren Drive Landslide

An earth flow occurred in the vicinity of 302 to 340 Warren Drive following the construction of Warren Drive in the fall of 1962 (M-3, 1980). The location of this landslide is south of the Crestmont Hills site, well beyond the limits of our investigation. The earth flow was repaired by excavating a keyway, keying and benching compacted fill materials, and excavating two benches on the slope (K-1, 1977). The resultant gradient was 1.3 to 1.4:1 with 8-foot wide benches. No drainage was installed as part of the repair. Shallow sloughing and several minor slides were identified after the slope repair (M-2 1979).

A landslide occurred in the same vicinity in June 1979. Initial grading in the vicinity of the Warren Drive landslide consisted primarily of excavating of cut slopes with inclinations on the order of 1.2 to 1.5:1. An underground drain placed during the original grading crosses the project site and was encountered in the test pit for the 1979 geotechnical investigation. The upper part of the slope consists of structural fill placed for the building pads located along Oak Park Drive. Building pads were being excavating when the 1979 slide occurred. The slide was approximately 140 feet long and 160 feet wide. The scarp at the top of the slide was about 9 feet high and there were numerous secondary scarps of about 1 foot high. The landslide extended about 18 feet below grade. The bedding and some joint planes had adverse orientations with dips ranging from 34°to 62° downslope. Following the slide, the City and County of San Francisco engaged a consultant to investigate and provide recommendations for the repair. A contractor was then hired to construct a buttress from the edge of Warren Drive to the uphill limits of the excavation (M-2, 1979).

Following the 1979 slide, Dames & Moore was retained by the City and County of San Francisco to provide recommendations for temporary corrective measures which included placing a buttress fill over the toe of the slope, backfilling the tension cracks, installing survey points to monitor movement, temporarily evacuating 332 Warren Drive and 505, 509, and 515 Oak Park Drive, demolishing the destroyed home at 328 Warren Drive, and removing the foundation elements that were impinging on 332 Warren Drive. No attempt was made to unload the top of the slide. Within one week after implementations of the above measures, the monitoring points indicated the slide had stabilized (M-3, 1980).

Several soil stabilization schemes were presented, but ultimately a tied-back retaining wall system was chosen for the design. This system supported the upper slope, and worked in conjunction with a drainage gallery installed above the tied-back wall which discharged onto Warren Drive was chosen for the design. The retaining wall system was to resist high lateral earth pressures. This system was subsequently installed.

3.01.11 Kirkham Avenue Soil Nail Slope Repair

Copies of plans received from SFDBI, which were prepared by Civil Engineer, Paul A. Strusinski, in 2002 provide information regarding the soil nail slope repair at the end of Kirkham Street, downslope of 1550 Fifth Avenue. (A soil nail slope repair generally consists of grouting steel reinforcing bars, called nails, into closely spaced drilled holes in a slope or excavation to reinforce the ground. Normally, a construction facing of shotcrete reinforced with welded wire mesh is placed over the nailed area). The plan of existing conditions indicates the I-beam with the wood-lagging retaining wall on the south side of the private driveway, at the end of Kirkham Street, was already present at the time of the slide. The slide developed downslope of 1550 Fifth Avenue and extended partially behind the wood-lagging retaining wall. Aerial photographs suggest the slide occurred between the years 1993 and 2000. We do not have information regarding the construction of the planned repair.

The plans indicate the soil nail slope repair would extend approximately 100 feet parallel to the extension of Kirkham Street and up to 33 feet south towards 1550 Fifth Avenue. The eastern portion of the soil nail slope repair is located upslope and behind the existing wood lagging retaining wall.

The soil nail slope repair was to include three rows of soil nails installed 5 feet on center horizontally. The rows of soil nails were to be spaced 8 feet apart with the lowest row at a distance of 7 feet upslope from the adjacent roadway grade. The soil nails were to extend 28, 36 and 42 feet into the hillside at angles varying from 50° to 60° downward, relative to horizontal with the deepest embedments in the upper row of soil nails. The soil nails were to be stressed to 20 kips maximum, and 5 percent of the anchors were to be tested.

Both an uphill key and a downhill key were planned. The uphill key would consist of 4-inch Schedule 40 perforated PVC pipe embedded within ¾-inch drain rock. The subdrain excavation was to be 12 inches wide and extend a minimum of 18 inches below grade. The filter fabric and rock were to be wrapped in 18 mils non-woven filter fabric. The detail for the uphill key suggested the drain rock would extend to the ground surface. The detail for the downhill key suggests concrete would be keyed a minimum of 1-foot deep and 1-foot wide at the base of the repair.

Two rows of weepholes are shown on the planned cross-section at heights of 3 and 18 feet above the adjacent roadway grade. The weepholes were to consist of 2-inch diameter Schedule 80 PVC pipe extending through the shotcrete surfacing. The detail indicates a bench would be excavated into the hillside before placement of the shotcrete and the bench would be lined with 18 mil non-woven filter fabric. The bench would then be filled with ¾-inch drain rock. The slope was then to be surfaced with 5 inches of shotcrete.

3.01.12 Eighth Avenue Slope Stabilization

A conceptual design study was performed for the stabilization of the hillside along the easterly side of Eighth Avenue between Moraga and Ortega Streets (N-1, 1990). The site of this investigation is southwest of the Crestmont Hills project site, well beyond the limits of our investigation. The homes in this area were built during the period spanning from about the early 1900s through the 1930s. Several of the homes experienced creep movements, and some of the homes moved up to about 6 inches as a result of the 1957 Daly City earthquake. The Loma Prieta earthquake of 1989 triggered movements that resulted in both vertical and lateral displacements.

The slope consisted of a deep deposit of largely loose, dune sand that had been undergoing creep movements prior to the Loma Prieta earthquake, and the earthquake accelerated the rate of creep. The study concluded that portions of the hillside were marginally stable under existing static conditions, and additional seismic events would cause acceleration of slope movements.

Seismic refraction studies and subsurface exploration performed for the study indicated that the upper portion of the Eighth Avenue hillside was underlain by loose- to medium-dense dune sand to a depth of at

least 75 feet. Franciscan Assemblage shale was encountered at a depth of 57 feet at the base of the slope for the study area. Groundwater was encountered at depths ranging from 55 to 65 feet below grade.
Slope stability analyses for the existing slope were performed assuming a uniform acceleration of 0.3g. This acceleration was two-thirds of an estimated PGA of 0.45 which corresponded to an earthquake with a magnitude of 7.5 on the northern extension of the San Andreas fault. The peak ground acceleration recorded in the vicinity of the project during the Loma Prieta earthquake was about 0.1g.

The recommended remediation for the existing slope was to install a soldier pile/tie-back retaining wall. We do not have any documents related to the construction of this remediation.

3.02 Geology

3.02.1 Regional Setting

San Francisco is within the Coast Ranges geomorphic province of California. This region is characterized by northwest-trending ridges and valleys that generally parallel the principal geologic structures, such as the San Andreas fault system. The oldest widespread rocks within the region are marine sedimentary and volcanic rocks of the Mesozoic-age (the period from about 230 to 65 million years before present) Franciscan Assemblage (Blake, et al., 1974 Schlocker, 1974). Within the City of San Francisco, the Franciscan Assemblage consists chiefly of sheared sandstone and shale, greenstone (a metavolcanic rock), chert (a silicious sedimentary rock) and serpentinite. The Franciscan Assemblage has been extensively deformed by past episodes of faulting and folding. Geologic structure within the Franciscan rocks is typically complex and the rocks are commonly extensively sheared and fractured.

In San Francisco, the Franciscan bedrock is locally overlain by sediments of Quaternary age (the period from about 1.5 million to the present). These marine and non-marine deposits generally consist of clay, silt, sand, and gravel. In San Francisco, these deposits include large areas of Bay Mud, wind-blown dune sand, colluvium, and alluvium. In addition, large areas of man-made fill have been placed in many areas.

3.02.2 Local Geology

Schlocker (1974) prepared a detailed geologic map of the San Francisco North quadrangle, which includes the subject site. A portion of the map is reproduced on Figure 5, Regional Geologic Map. The Schlocker geologic map shows that both the site and the upper portions of Mount Sutro are underlain by chert of the Franciscan Assemblage. These rocks are described as consisting of hard, brittle chert with thin interbeds of shale. The entire subject site is mapped as chert. The lower slopes to the west and north of the site are mapped as greenstone, chert or sandstone, which are also considered a part of the Franciscan Assemblage. The swale to the north of the site is shown to contain a deposit of slope debris and ravine fill. These Quaternary-age deposits are described as consisting of rock fragments in a matrix of sand, silt and clay. The low-lying areas west of the site are shown to be underlain by wind blown dune sand of Quaternary age.

Blake et al., (1974) shows similar geologic conditions to those illustrated on the Schlocker map. Wagner et al., (1990) shows similar, though more generalized, geologic conditions in the site vicinity.

Youd and Hoose (1978) show that ground failures triggered by earthquakes have not been reported at the site or in the immediate vicinity during previous historic earthquakes.

Ellen and Wentworth (1995) prepared a description of hill slope materials in the Greater San Francisco Bay Area. The site is shown to be underlain by chert of the Franciscan Assemblage. These materials are described as consisting of brittle chert with interlayered firm shale. The unit is described as having low to moderate fracture permeability, thin bedding, closely spaced fracturing, and is considered to be non-expansive.

3.02.3 Geologic Reconnaissance

A detailed surface reconnaissance of geologic features on the site and the surrounding area was performed. The more pertinent geologic observations are discussed below. These and other geologic observations made in the area are shown on Figures 3 and 6. Geologic features observed during our reconnaissance will be discussed from east to west. In general, we documented observations of bedrock outcrops, bedding attitudes, fill limits, landslides, and seepage. However, fill is not shown on the geologic map if it is less than 5 feet thick.

At the north end of Crestmont Drive near the east end of the site, several chert outcrops are present. A large outcrop of thin-bedded chert is present at the northeast corner of the terminus of Crestmont Drive as shown on Figures 3 and 6. Additional chert outcrops are present along the slope above Crestmont Drive to the south of the site and at the southwestern corner of the intersection of the unpaved road and Crestmont Drive.

The easternmost home sites within the project are on the margin of a steep northwesterly trending swale. In the upper portions of this swale near the intersection of the unpaved road and Crestmont Drive, some fill was apparently placed in conjunction with construction of the road and residence in that area. Below this fill, the swale appears to be filled with colluvium. The lower margin of the swale contains a landslide. The upper southernmost margin of this landslide extends into the easternmost portion of the project site. The landslide contains a fresh eroded scarp approximately five to ten feet in vertical height. The landslide debris appears to consist primarily of colluvium and plant debris. Below the site at the rear of the Fifth Avenue apartments, a steel bin wall is present, which was apparently placed to stabilize the existing landslide.

The eastern and central portions of the site lie along a relatively natural north-facing slope inclined at about 1.5:1. No rock outcrops are visible in this area. In general, rock fragments contained in the soil on the lower portion of the slope in this area indicate the underlying bedrock is sandstone.

The upper portion of the slope near the unpaved road generally contains fragments of chert suggesting the underlying rock in that area is primarily chert. Scattered chert outcrops occur on the slope above the site downslope of the residences located at 475, 427, 419 and 391 Crestmont Drive, as shown on the area geologic map, Figure 6. All of these exposures appear to be the result of shallow cuts made into the slopes in those areas. Bedding attitudes in these exposures range from moderate westerly dips below 475 Crestmont Drive to gentle southeasterly or southwesterly dips in the western locations. No evidence of landslides was observed on the slope above the site in this vicinity; however, some evidence of erosion was observed, probably owing to localized concentration of runoff on the slope. In addition, there are trenches on the slope which contain buried pipes and which have experienced some erosion and are locally exposed.

The western portion of the site includes the westernmost portion of the north-facing slope, and at the extreme west end, a west-facing cut slope and minor landslide scar. Typically, these slopes are relatively steep and are inclined at around 1.5:1. Bedding measurements made near the top of the cut slope at the southernmost tip of the site show bedding dips approximately 40° West in that area. Bedding measurements made in the cut slope at the western end of the site dip to the southwest at approximately 17°. To the north, bedding measurements made within the cut slope typically display some low amplitude folding with bedding dipping gently to the east or west at inclinations varying from near horizontal to approximately 15°. At the toe of the cut slope near the Locksley Avenue Apartment Towers, additional outcrops of chert are present directly downslope of the site. In this area, the observed bedding dips to the north at approximately 22°. Near the north end of the parking lot for the Locksley Avenue Apartment Towers, several outcrops of greenstone are present. Locally, bedding attitudes were observed to vary significantly over a small distance as a result of tectonic folding.

No springs or areas of seepage were observed within the subject site, and the closest historic documentation of seepage was more than 50 feet southwest of the site. Phreatophyte vegetation was observed in the landslide scar near the eastern tip of the site. Surface drainage within the site is presently uncontrolled. Surface drainage from roughly the eastern half of the site and the slope above drains to a low spot near the center of the site and is discharged onto the slope, which constitutes the central portion of the site, eventually reaching the area of the Fifth Avenue Apartments. Surface drainage from the western portion of the site generally flows in a westerly direction and is discharged onto the existing steep cut slope.

Some areas of fill are present in the western portion of the site. A relatively large fill has been placed in the western portion of the site extending into the property upslope in the vicinity of the residences at 391-393 and 383-387 Crestmont Drive. This fill was apparently placed to support a steep cut slope previously present in that area.

Minor side cast fill is present along the north margin of the unpaved road and haul road in the central portion of the site. This fill is typically relatively minor on the order of one to three feet in thickness. Because of the relatively small size of this fill, it is not shown on Figure 3.

3.02.4 Faulting and Seismicity

Seismicity in the San Francisco Area is mainly related to activity on the San Andreas fault system, including major active faults both east and west of the site. The principal active faults in the vicinity are the San Andreas, 5 miles to the west, the San Gregorio, 7.5 miles to the west, the Hayward, 13.5 miles to the northeast, the Calaveras, 24 miles to the east, the Rodgers Creek, 19 miles to the north, and the Concord-Green Valley, 27 miles to the east. The site is not within one of the Alquist-Priolo Earthquake Fault Zones established by the California Geological Survey (CGS), formerly Division of Mines and Geology around known active faults. The closest known active fault is the San Andreas, which crosses the continental shelf west of San Francisco, approximately 5 miles west of the site.

The San Francisco Bay Area has experienced several large earthquakes during historical times (San Francisco Department of City Planning (SFDCP), 1992). The largest of these was the great California earthquake of April 18, 1906, which had an estimated magnitude of 8.3. Its epicenter was immediately west of San Francisco, offshore on the San Andreas fault (Goter, 1988). Other large earthquakes affecting the San Francisco area occurred in the early and mid-1800s. The more notable of these occurred on the San Andreas fault in 1838 and 1865. Surface breakage in 1838 extended from San Francisco to a point near Santa Clara, and although San Francisco was largely undeveloped at that time, serious damage occurred to Mission Dolores and the Presidio (Tocher, 1959). The 1865 event was in the vicinity of the Santa Cruz Mountains, but it caused severe damage to structures on filled ground in San Francisco.

Another damaging earthquake that affected San Francisco occurred on the Hayward fault in 1868. That earthquake caused considerable damage to buildings on filled ground in San Francisco (Lawson, 1908). A damaging earthquake also occurred on the Calaveras fault in the Dublin area in 1861.

The more recent earthquakes in the region include the October 17, 1989, Loma Prieta earthquake on the San Andreas fault with magnitude of 7.1; the Hollister, Coyote Lake, and Morgan Hill earthquakes of 1974, 1979, and 1984, on the Calaveras fault, with magnitudes of 5.2, 5.9, and 6.2. respectively; the 1957 Daly City earthquake on the San Andreas fault with a magnitude of 5.3; and the two Santa Rosa earthquakes of 1969 on the Healdsburg-Rodgers Creek fault with magnitudes of 5.6 and 5.7.

Locations of significant active faults and epicenters for earthquakes of magnitude 3.0 and greater which occurred between 1808 and 1987 are presented on Figure 7, Locations of Fault and Earthquake Epicenters.

Studies by the United States Geological Survey's Working Group on California Earthquake Probabilities (WGCEP, 2003) have estimated a 62 percent probability of at least one magnitude 6.7 or greater earthquake occurring in the Saboring n Francisco Bay Region before the year 2032. As part of their prediction, they estimated the probability to be 27 percent and 21 percent for a magnitude 6.7 or greater earthquake to occur on the Hayward/Rodgers Creek and San Andreas faults, respectively, by the year 2032.

The California Geological Survey (CGS) has recently released a map of this area which indicates areas that may be prone to earthquake-induced ground failure during a major earthquake. Although the map indicates that sufficient concern exists in the designated areas to merit a site-specific evaluation, it does not necessarily indicate that the hazard is actually present. The subject site is located in an area along the north and east side of Crestmont Drive that requires an evaluation of earthquake-induced landsliding (CGS, 2001).

3.03 <u>Surface Conditions</u>
3.03.1 Surface Improvements

The project site and surrounding area are located on the western flank of Mount Sutro in San Francisco, California. The project site is located south of the terminus of Fifth Avenue and north of Crestmont Drive Road. The site is accessible via an unpaved road that extends from Crestmont Drive Road (between 505-507 and 495-497 Crestmont Drive Road) to the western end of the project site. There is an existing sanitary sewer/storm drain within the unpaved road; this drain continues down the slope through the eastern portion of the site to Fifth Avenue. The sanitary sewer/storm drain was discussed previously in greater detail in Section 3.01.6.

There are existing residential structures upslope to the south of the site, and there is one residential structure east of the site. The information we reviewed regarding the foundation supporting conditions for these residences is summarized in Table F-1-in Appendix F. These structures appear to consist predominantly of single-family residences and duplexes. Apartment buildings have been constructed downslope of the project site along Warren Drive, Locksley Avenue, and Fifth Avenue.

The apartment building north of the site at 1585 Fifth Avenue has a small patio area at the rear of the building with a concrete retaining wall at the toe of the slope. There is a concrete drainage channel upslope of the retaining wall which has been partially obstructed by soil and vegetation. There is a metal bin wall at the toe of the slope northeast of the site behind 1580 Fifth Avenue. The metal bin wall was described in greater detail in Section 3.01.8. The apartment buildings to the west of the site at 480 Warren Drive have a soil nail slope repair behind the structure. This tie-back retaining wall is located at the toe of the slope. The rock bolt repair at 480 Warren Drive is described in greater detail in Section 3.01.9.

3.03.2 Topography

The elevations at the unpaved road vary from about 560 feet at the southwest end of the roadway to about 610 feet at the eastern end of the roadway. To the north and west of the unpaved road, the site is a steep slope having a gradient of about 1.5:1 (horizontal to vertical), with locally steeper areas. From the unpaved road, the slope drops down to about elevation 520 feet near the end of Fifth Avenue north of the site. The slopes at the western portion of the site drop down about 200 feet towards Warren Drive.

The topographic survey for the project indicates that Crestmont Drive is at about elevation 625 to 650 feet above the western end of the project site and about elevation 625 feet above the eastern end of the project site. The elevation difference between Crestmont Drive and the downslope unpaved road is on the order of 65 to 90 feet in the western portion of the project site and 15 feet in the eastern portion of the project site. The toe of the slope below Crestmont Drive appears to vary relative to the edge of the existing unpaved road. The toe of the slope is generally indicated on Figure 3 as the upslope limit of detailed surveying. Although we do not have a detailed topographic map of the slope above the unpaved road, we estimate that the slope gradient generally varies from about 2:1 to 1:1, and may be steeper locally.

3.03.3 Vegetation

The slope above and below the unpaved road were covered with vegetation and trees at the time of our geotechnical investigation. During the summer of 2004, portions of the slope below the unpaved road were partially cleared by others in order to facilitate completion of a site survey and the surface and subsurface exploration for this geotechnical investigation. Four swaths about 50 feet wide were partially cleared from the unpaved road to near the downslope property line. The portions of the site that were partially cleared are generally represented in the Site Plan, Figure 2 as the areas where topographic contours are provided. Topographic information, with the exception of spot elevations, was generally <u>not</u> provided within areas that had not been cleared. The portions of the site that were partially cleared suggest that the site had been cleared previously; however, the felled trees and vegetation were not removed from the site. The ground surface is covered with abundant remnants of felled trees and accumulated organic debris. The ground surface was not readily visible throughout the majority of the site due to the accumulation of organic debris.

3.03.4 Erosion

The eastern portion of the unpaved road contains incised erosion gullies where surface waters flow from the concrete apron at the eastern end of the unpaved road onto the unpaved section of the roadway. The erosion scars were approximately 4 to 6 inches deep and extended approximately 140 feet westward into the unpaved portion of the roadway at the time of our site reconnaissance in December 2004.

There is some minor erosion occurring on the slopes above the unpaved road. Some evidence of erosion, probably due to localized concentration of runoff was observed. In addition, the slope, which is very steep, contains some trenches with buried pipes, which have experienced some erosion of backfill materials. In some locations, drain pipes are exposed on the slope without soil cover. During our site reconnaissance, we observed running water exiting the toe of slope onto the unpaved road below the residences at 465-467 and 475-477 Crestmont Drive. The sound of running water in a conduit was very distinct when this observation was made. We suspect that there may be a ruptured lateral drain line in this area.

3.04 Subsurface Conditions

Our subsurface geotechnical investigation included twelve small diameter borings and four large diameter borings. The subsurface materials observed in these borings are discussed in Section 3.04.1 in general order from east to west. Observations of existing fill and surficial soils are summarized in Section 3.04.2 and observations of the bedrock are summarized in Section 3.04.2. Cross-Sections A-A'; B-B'; C-C'; and D-D', which graphically present the subsurface conditions in relation to the project cross-sections, are presented on Figures 8 through 12.

3.04.1 Subsurface Exploration

Borings B-4, B-8, B-12, and LD-3 were drilled in the eastern portion of the site as shown on the Site Plan and Geologic Map, Figure 3. Borings B-4 and B-12 were drilled along the downslope margin of the unpaved road in the eastern portion of the site. Both borings were located in an area of cut along the road shoulder and no surficial soils were present. Both borings encountered chert, which was closely fractured and severely to moderately weathered to a depth of about 13 feet. Below that depth, both borings encountered sandstone and siltstone bedrock to the full depths explored, which was 51 and 44 feet, respectively. Some interbedded shale was encountered intermixed with the sandstone.

Boring B-8, located downslope of Boring B-12, encountered clay surficial soil to a depth of approximately six feet. Below that depth, sandstone, with some interbedded siltstone, was encountered to the full depth explored, which was 35 feet. No chert was encountered in the boring. Based on the results of Borings B-4, B-8, B-12, it is apparent the contact between chert and sandstone is located on the upper portion of the site above Boring B-8.

Large diameter Boring LD-3 was drilled along the unpaved road in the east central portion of the site. Boring LD-3 encountered about 2.5 feet of gravelly fill overlying approximately 1.5 feet of sandy silty surficial soil. Below the surficial soil, the boring encountered reddish brown chert and shale from a depth of about four feet to approximately 15.5 feet. The chert was moderately closely fractured and contained some interbedded shale. Below a depth of about 15.5 feet, the boring encountered sandstone with minor amounts of siltstone and shale. Bedding observed in the chert at a depth of about 14 feet is parallel to the contact at approximately 15.5 feet and dips westward at approximately 23°. No shearing or clay seams were present along the contact.

Borings B-2, B-6, B-7 and B-10 were excavated in the vicinity of Section B-B' in the east central portion of the site. Borings B-2 and B-10 were located along the downslope margin of the unpaved road. These borings encountered some fill and surficial soil to depths of eight and three feet, respectively. Below those depths both borings encountered chert with interbedded shale to depths of 13 and 22, feet respectively. Below the chert, both borings encountered sandstone and siltstone to the full depth explored, which was

36 and 51 feet, respectively. Correlation of the chert/sandstone contact in these borings suggests that the contact in this area dips gently to the east.

Borings B-6 and B-7 were located downslope of Borings B-2 and B-10. Both borings encountered sandstone bedrock near the ground surface. Surficial soil was absent in Boring B-7 (probably due to a small excavation in that area). Approximately six feet of sandy silty clay surficial soil was encountered in Boring B-6. Some shale and siltstone was interbedded with the sandstone, which extended to the full depths explored, which were 21.5 and 31.5 feet, respectively.

Large diameter Boring LD-4 was excavated near the central portion of the site along the margin of the unpaved road. Boring LD-4 encountered gravely clay surficial soil to a depth of approximately 2.5 feet. Below the surficial soil, the boring encountered chert, which was thin-bedded, moderately to closely fractured, and moderately weathered to a depth of approximately 16 feet. Bedding within the chert dips consistently to the west or southwest at inclinations varying from 22° to 36°. At approximately 16 feet, the contact between chert and sandstone was encountered. This contact was observed to be parallel to bedding in the chert and dipped westward approximately 36°. Minor shearing and some apparent gouge were observed along the contact, although the gouge was not continuous along the contact, and the overall amount of shearing appeared to be minor. Below the chert/sandstone contact, LD-4 encountered siltstone to a depth of approximately 24 feet where chert was encountered. The chert extended to a depth of 27.5 feet. The contacts at the top and bottom of the chert generally dips southwest at 35° to 38°. Below 27.5 feet, the boring encountered sandstone with some intermixed siltstone and shale to the full depth explored, which was 55 feet.

Borings B-1, B-5, and B-9 were excavated in the west central portion of the site as shown on Figure 3. Chert with some interbedded shale was encountered in the upper portions of all three borings. These subsurface conditions are consistent with Boring WC-5 drilled in the same general area (G-1, 1965). Boring B-1 encountered chert with some interbedded shale to a depth of approximately 32 feet. From 32 feet to the bottom of the boring at 41.5 feet, the boring encountered shale with some intermixed chert and sandstone. B-1 did not penetrate to the sandstone encountered in Boring LD-4 and other borings to the east.

Boring B-5 located downslope of Boring B-1 encountered chert bedrock to a depth of 19.5 feet. Below that depth, sandstone with some intermixed chert and shale was encountered to the full depth explored, which was 35.4 feet.

Boring B-9 encountered chert with some interbedded shale to a depth of 46.5 feet. Below that depth, the boring encountered sandstone. This sandstone is interpreted to be interbedded with the chert and does not correlate stratigraphically with the sandstone encountered in the lower portions in borings to the east.

Borings LD-1, LD-2, B-3 and B-11 were drilled in the western end of the site as shown on Figure 3. All four borings showed that a large fill ranging up to about 11 feet in depth is present in the western portion of the site. This fill probably represents material placed in a quarry road during the 1950s. All of these borings encountered chert with some interbedded shale and sandstone to the full depth explored, which varied from 42-65 feet.

In Boring LD-1, fill was observed to a depth of 9 feet. From a depth of 9 to 22 feet, shale and claystone were encountered. Below 26 feet, the boring contained a mixture of interbedded chert and claystone with minor interbedded sandstone to the full depth explored, which was 65 feet. Bedding attitudes within the boring were variable. A majority of bedding attitudes dip to the southwest or northwest at a moderate to moderately steep inclination. However, some east and southeast dipping bedding attitudes were observed.

Boring LD-2 near the southern end of the site encountered fill to a depth of about 11 feet. The fill was underlain by a thin section of sandstone and siltstone to a depth of 12.5 feet. Below 12.5 feet, chert with interbedded shale was encountered to the full depth explored, which was 60 feet. Bedding attitudes throughout the boring were consistent with strikes to the northeast and dipping moderately steeply to the northwest.

Borings B-3 and B-11 encountered seven to eight feet of fill consisting primarily of gravelly to silty clay overlying chert bedrock. The chert extended to the full depth explored, which was 42 and 46.5 feet, respectively.

3.04.2 Bedrock

The site is underlain by two distinct bedrock units both of which are a part of the Franciscan Assemblage of Mesozoic Age. The upper unit consists principally of very thin-bedded chert with some interbedded shale, siltstone, claystone and sandstone. Rocks within this unit typically range from weak to moderately strong and are closely to intensely fractured. The lower unit consists of brown to yellowish-brown sandstone with small amounts of interbedded shale. Typically, the sandstone is moderately to closely fractured, weak to moderately strong and very thick bedded. The amount of interbedded shale is relatively minor in most areas and the shale typically consists of dark gray shale that is weak, closely to intensely fractured and very thin bedded.

The contact between the chert and sandstone units appears to be a depositional contact. In both LD-3 and LD-4, the contact was observed to be parallel to bedding in the overlying chert. There is little or no evidence of shearing along this contact. In addition, very little shearing was observed within either of the bedrock units. Very little clay is present within either bedrock formation. Clay seams were not typically observed along bedding planes within either unit. Occasional discontinuous seams of clay were locally observed along fractures and bedding planes; however, these clay seams do not appear to be laterally continuous.

The test borings indicate that the contact between the chert and sandstone is relatively flat-lying in the central and eastern portions of the site and typically ranges from about 10 to 30 feet below the ground surface in that area. This contact orientation is in reasonable agreement with bedding observations made in adjacent outcrops as shown on Figures 3 and 6.

In the western portion of the site, west of about LD-4, the chert unit thickens abruptly and the contact between the chert and sandstone plunges steeply to the west. Our reconnaissance found that chert is present along the entire cut slope below the west end of the site extending down to the parking lot for the Locksley Apartment Towers.

3.04.3 Groundwater

Of the test borings drilled for our investigation, groundwater observations were recorded for Borings B-5 through B-8 and LD-1 through LD-4. Groundwater observations were not made in the remaining borings because of the rotary wash drilling method used to advance the borings. Groundwater was not observed within the depths explored within Borings B-5 through B-8 and LD-4 at the time of drilling. Within

Borings LD-1 through LD-3, the overall amount of water was relatively minor and was limited to isolated zones of seepage, which appeared to be flowing along fractures in the rock.

Within Boring LD-1, slight seepage was encountered at 46 feet with additional seepage entering the hole below 56 feet. During the time the boring was open, approximately six inches of water accumulated in the bottom of the hole over a period of about four hours.

Boring LD-2 encountered very slight seepage at depths of 37, 48, and 55 feet. Overall, the volume of seepage was minor and no water accumulated at the bottom of the hole during logging.

Boring LD-3 encountered slight seepage at depths of approximately 9, 28, 31 and 34 feet. No water accumulated in the bottom of the boring during logging. We should point out that Boring LD-3 is located near the path of surface water flowing along the unpaved road during rainstorms.

4.00 DISCUSSION AND PRELIMINARY CONCLUSIONS

4.01 Introduction

Based on the results of our geotechnical investigation and review of historic documents related to the project site and vicinity, it is our opinion the project site is suitable for the proposed construction of either the Crestmont Hills project or the alternative project from a geotechnical standpoint provided that modern hillside engineering techniques and construction methods are employed. All of the conclusions and preliminary recommendations presented in this report should be incorporated in the design and construction of the project to minimize possible geotechnical problems. Also, when project details are finalized, we should assess the design elements and submit a final geotechnical investigation report.

The following sections of this report provide a discussion of various aspects of existing conditions, proposed construction, and construction considerations along with their geotechnical implications for the proposed development. Conclusions are also provided regarding appropriate geotechnical methods for mitigation of each concern.

4.02 Existing Conditions

4.02.1 Existing Fill

Based on the results of our subsurface exploration, review of aerial photographs, and review of historic geotechnical investigations, it appears that portions of the site are underlain by fill soils. Some of the fill was placed during the initial grading for the project site and surrounding area which was performed in the late 1950s. Review of aerial photographs and historic investigations indicate that additional fills were placed subsequent to the initial grading activities.

Specifically, fills are present along the access roadway and temporary haul roads, at the west end of the project site, and within a previous swale located offsite and immediately east of the project site. Each of these areas of fill is discussed individually in the following sections.

4.02.1.01 Roadway Fill

The earliest grading activities on the project site, observable in 1955 aerial photographs, consisted of haul roads in the western portion of the site. By 1958, the western section of the unpaved road on the project site had been graded, and was completed to its current condition by 1969. A haul road was visible on the northern slope of the project site in 1961 aerial photographs.

Grading for the Lawton Heights and Forest Knolls Unit No. 3 was completed in 1959. Grading documents prepared for the original grading (A-1, 1959 & G-L-1, 1960) suggest that fills were compacted and drainage measures were installed. Although it appears that the project site and the northern portion of Crestmont Drive were included in the grading activities performed for the Forest Knolls Unit No. 3 project, we do not have specific information regarding the locations of fills and/or drains placed for the Forest Knolls Unit No.3 grading. However, aerial photographs suggest that fills placed at the current project site during the initial grading activities consisted predominantly of fills placed along the downslope portion of the existing site access road and side cast fills for temporary haul roads.

The existing unpaved road was apparently graded by cutting into the upslope portion of the alignment and placing fill on the downslope portion of the roadway. As a result, there is fill located along the downslope side of the unpaved road. As observed in exploratory borings for this investigation (Borings B-1, B-2, B-4, B-9, B-10, B-12, LD-3 and LD-4), this fill varies up to about four feet thick. In Borings B-2 and LD-3, surficial soils were observed beneath the fill. The locations of roadway fill are not shown on Figure 3 because they are generally less than five feet thick.

Some temporary construction haul roads were also graded on the west-facing slope of the project site. These haul roads were likely constructed similarly to the access roadway and likely have minor fill on the downslope portions of the haul road. We did not observe any of these fills at our subsurface exploration locations.

The grading report for the Forest Knolls Unit No. 3 project provides documentation for fill placement but we do not have information regarding the locations of these compacted fills. We do not have any documentation regarding the placement of subsequent fills in this area or placement of the roadway fills on the project site. We did not observe any cleanouts or other indications that subsurface drains were installed within existing fill areas.

The observation of fill overlying native soils in Boring B-2 suggests that the above-described roadway fills were not keyed into bedrock or placed in a manner which would be acceptable under current standards of practice. As such, these fills would not provide acceptable supporting conditions for the proposed improvements in this area and would need to be removed and recompacted.

4.02.1.02 Fill at Western End of Site

We observed fill in the western portion of the project site in Borings B-3, B-11, LD-1 and LD-2. The depth of this fill at the boring locations varied from about 7 to 11 feet. Our review of aerial photographs suggests that this fill was apparently placed during quarry operations prior to 1958. Aerial photographs taken in 1977 further indicate that additional fill was placed to form a fill slope above the access road and below the residences at 391 to 407 Crestmont Drive. The fill observed in the large diameter borings appears to be moderately compacted but was apparently not placed in thin lifts. Both large diameter borings exhibited a relatively level contact surface at the base of the fill. Some wood debris is present in the fill. We conclude that the fill was not placed in accordance with generally accepted standards.

In our judgment, this fill would not provide acceptable supporting conditions for the proposed improvements in this area and would need to be removed and recompacted.

4.02.1.03 Swale Fill East of Project Site

Fill was placed in a swale east of the project site. The swale extends from the current location of the bin wall at the end of Fifth Avenue and upslope to the southeast toward 491-493 and 495-497 Crestmont Drive. The approximate limits of the fill in this area are shown on Figure 3. Historic documentation suggests that the fill is up to about 20 feet thick in this area.

We do not have any documentation regarding the placement of fill in this area. Hallenbeck, 1977 indicates that the building sites in the vicinity of 505-507 Crestmont Drive “had been excavated down below street level. The soil generated from the excavation was placed to form a wedge of fill at the toe of the slope below (this area). We did not test or inspect the placement of this fill.”

The swale fill is located offsite; however, a portion of the fill extends beneath the eastern portion of the proposed new access roadway. This fill would not provide acceptable supporting conditions for the proposed access roadway in this area; therefore, remedial work will be needed in this area to protect the access roadway within the limits of the grading activities for the project development.

4.02.1.04 Conclusions Regarding Site Fill

In summary, the existing fills on the project site were generally not placed in accordance with current engineering standards. When improperly placed fill soils are located on moderate slopes, they have a tendency to creep downhill. In addition, these materials could settle if loads were applied directly to them. Where existing fill is located beneath the proposed new access roadway, removal and recompaction of these fills would be recommended. For the fill below the eastern portion of the access roadway, the lateral limits of fill removal and recompaction may be dictated by the limits of the grading activities for the project development.

Where fills are located beneath proposed new structures such as buildings and retaining walls, drilled pier foundations extending through the fill soils into competent underlying bedrock materials would mitigate the potential adverse impacts of the existing fill soils. Due to the potential for downward creep of the fill, the piers should be designed to resist a substantial creep load in addition to the creep load from the native soils.

4.02.1.05 Offsite Fill

A significant amount of fill has been documented beyond the project limits, specifically in the vicinity of the existing upslope structures along Crestmont Drive. These fills appear to have been placed in the late 1950s and 1960s and are estimated to be up to about 15 feet in thickness. By 1969, the majority of the existing upslope residences had been constructed.

A shallow slide was previously documented on the slope above the unpaved road below 451 Crestmont Drive. The approximate location of this slide is shown on Figure 6. This documented slide area is currently covered with vegetation, and the slide is not readily visible. This slide may have been partially triggered by the existing fills placed for grading of the building area. This existing slide could reactivate and impact the new access roadway.

A portion of the slope below 391 to 407 Crestmont Drive is composed of fill. This fill extends from the edge of the unpaved road some distance up the slope and may have been placed to support a steep cut formerly present in that area.

Conclusions from a previous investigation which documented portions of these fills (H-1, 1976) include the following:

- “Reports indicating that the fill was properly compacted or describing the methods used to place the fill” were not available.

- The investigation included “a compaction test on a sample of the fill and compared the densities obtained in the samples recovered from the test borings with the maximum dry density obtained from the compaction test. … Most of the results are below the 90% standard that was recommended in the original soil reports for this development.”

- "Current fills should not be counted on for supporting building foundations."
- Pier foundations extending through the fill, designed to resist creep loads were recommended.

Additional information regarding the fill thicknesses can be found in Appendix E. We did not have any information regarding the handling of spoils during pier drilling operations for the upslope residences. In general, if the spoils were left in a loose condition on the existing slope, this would create a condition prone to accelerated erosion and shallow instability.

4.02.2 Native Soils

The native soils form a relatively thin mantle over the underlying bedrock materials. Generally, the native soils are less than 5 feet thick. Because of the steepness of the existing slopes, there will be some tendency for the native soils to creep downslope. There may also be some shallow sloughing within the native soils. Drilled piers embedded into competent bedrock materials underlying the native soils will protect the proposed structures from the potential for creep and/or sloughing of the native soils. Erosion control measures, such as installation of netting and erosion resistant vegetation on the slop will reduce the risk of sloughing. Construction of a debris wall near the downslope property line will prevent movement of potential slough material onto the adjacent downslope property in areas where more significant sloughing could occur.

4.02.3 Geologic Framework

Our geotechnical investigation found that the contact between the sandstone and chert bedrock units is relatively flat-lying in the central and eastern portion of the site and dips steeply westward at approximately 1:1 in the western portion of the site. Because the contact does not appear to be significantly sheared and because of the orientation and location of the contact, we conclude that the contact does not represent a significant risk of slope instability for the north-facing slope of the proposed project.

The orientation of bedding within the chert unit in the western portion of the site was a significant concern at the outset of our geotechnical investigation. There is considerable variation of bedding orientations within the chert, indicating that beds have been subject to small scale folding (e.g. Chevron Folding). This has resulted in abrupt changes in bedding orientation over relatively small distances. Consistent with observations at the toe of the western slope (H-1, 1976), we observed some clay infilling of fractures, predominantly in the shallow more weathered zone of the bedrock. We also observed isolated seepage zones within the bedrock. However, we did not observe any slickensides or shears. Our subsurface geotechnical investigation found that although the orientation is adverse with respect to the cut slope at the western end of the project, the chert has been folded, resulting in an undulating bedding surface. The general conclusion of our investigation that global stability is not a concern is consistent with the conclusions of historic investigations performed in the immediate vicinity.

The slope generally shows few indications of prior downslope creep or landsliding. The only exceptions are the surficial failures of a near-vertical cut in the northwestern portion of the site and a small landslide in the swale at the east end of the site. Overall, we judge the strength of the chert and shale layers is relatively high.

4.02.3.01 Groundwater

Minor seepage zones were observed within three of the four large diameter borings performed for this investigation, and were not observed within any of the portable access borings. Groundwater observations were not possible within the rotary wash borings. The quantity of water observed in the three large diameter borings was relatively small, and the water appeared to be migrating on bedded and fracture surfaces within the highly fractured bedrock.

4.02.3.02 Existing Landslide Features

There are two areas of potential slope instability that may have impacts to the proposed development. These include an existing landslide located northeast of the project site and the steep cut slope in the western portion of the project site.

<u>Offsite Landslide</u>

The existing landslide located northeast of the project site is predominantly an offsite feature, but extends partially into the northeast corner of the project site. There is the possibility that this existing landslide could reactivate in the event of an earthquake or other environmental conditions such as periods of heavy precipitation or unanticipated break in water pipes or underground utilities. Remediation measures should be included in the project site in the vicinity of the landslide in order to minimize the risk of encroachment of the existing landslide into the proposed building footprint.

There is a remote possibility that this landslide feature could impact the eastern portion of the proposed access roadway for the proposed development. Although we consider the likelihood of such an impact to be low, the combination of the existing landslide feature and the presence of undocumented fills in this area suggest that some mitigation measures should be included in the proposed project to protect the access roadway. Such mitigation measures may include removal and recompaction of existing fills beneath the access roadway, installation of a retaining wall along the downslope portion of the access roadway, and a deepened drilled pier foundation system for the roadway retaining wall. Appropriate methods of mitigation will be determined when the grading in this area has been better defined.

<u>Western Cut Slope</u>

The steep cut slopes in the northwest portion of the project site have experienced some shallow sloughing/raveling, and may be subject to continued shallow sloughing/raveling. However, our analyses of slope stability (see Appendix D) indicate that the risk of deep-seated landslides on this west-facing slope is low.

Erosion was visible on the west-facing quarry slope in the 1969 aerial photographs. A possible slide was observed on the 1989 aerial photographs in the quarry cut located north of the western end of the project site. In the 1993 aerial photographs, a large shallow slide was visible on the slope which may extend partially into the western end of the project site. The slide scar is still visible in the 1994 aerial photographs.

During our site reconnaissance, we observed a rock slide scar which extends partially into the northwestern portion of the project site (see Figures 3 and 6). The limits of the shallow slide observed in the 1993 and 1994 aerial photographs were not readily observable. Shallow raveling is currently occurring on the west-facing slope.

The risk of upward encroachment of the shallow instabilities and ongoing sloughing/raveling could be mitigated by installation of stitch piers near the western property line and the western portion of the north property line. The potential for debris generated from shallow sloughing/raveling to extend downslope and offsite could be mitigated by installation of a debris wall in combination with the stitch piers. Stitch piers and debris walls are discussed in greater detail in Section 4.04.1

4.02.3.03 Historic Performance

The slopes on the project site and in the immediate vicinity are underlain by shallow competent bedrock. The bedrock in the eastern portion of the site consists predominantly of sandstone with some chert in the upper portion of the site. The sandstone is hard and has a high strength, and the contact surface at the base of the chert is generally flat-lying which is typically not prone to instability. The north-facing slope of the project site where the proposed structures would be located is a generally untouched natural slope, which does not exhibit evidence of recent instability.

The west-facing slope is a cut slope with some adverse bedding within the chert bedrock and the contact between the chert and the intermediate sandstone/shale layer. Although the bedding is generally adverse on the west-facing slope, the bedrock units have been folded as a result of tectonic activity resulting in variable bedding attitudes. This variability of the bedding confirms the folded nature of the bedrock and the undulating bedding and contact surfaces between intermediate layers. In terms of slope stability, the undulating bedding surface introduces additional strength and stability to the bedrock units. Although there are adverse bedding conditions on the west-facing slope of the project site, we did not observe evidence of occurrences of bedrock failures with the exception of shallow sloughing and/or erosion caused primarily by the oversteepened slopes and inadequate or non-existent drainage provisions. The historic landslide documented on the slope below 451 Crestmont Drive was not visible during our site reconnaissance; however, there is the possibility that it could reactivate resulting in debris moving onto the access roadway for the Crestmont Hills development.

Even under seismic loading, deformations do not appear to have occurred within the existing slopes. The apparent favorable historic performance of the existing slopes, even with the adverse bedding conditions on the west-facing slope, tends to validate the findings of our subsurface exploration program that the bedrock is not prone to global instability and has increased strength as a result of the interlocking nature of the chert bedrock and the undulating bedding and contact surfaces.

4.02.3.04 Seismic Hazards

As noted earlier, the subject site is located in the highly seismic San Francisco Bay Area, and there is a strong probability that a moderate to severe earthquake will occur during the life of the structure. The site is not mapped in the immediate proximity of any active or inactive faults; therefore, the likelihood of fault rupture directly below the proposed structures is very remote.

During strong earthquakes, various forms of ground failure can occur, such as liquefaction, lateral spreading, and lurch cracking. Existing landslide deposits can also undergo renewed movements as the result of the earthquake shaking. However, our evaluation of the ground conditions at the subject site indicates it is very unlikely the site is susceptible to ground failure during an earthquake. The only exception is the existing landslide feature located near the northeast corner of the project site which extends offsite to the north and east. A discussion of this hazard has already been presented in “Section 4.02.3.02, Existing Landslide Features.” The remainder of the project site is underlain by relative shallow bedrock. Slope stability analyses of the west-facing and north-facing slopes of the project site indicate that the existing slopes have a pseudo-static factor of safety of at least 1.15. (The factor of safety is the ratio of the strength of the hillside resisting sliding divided by the forces which would destabilize the hillside). The results of our slope stability analyses summarized in Section 4.03 and are presented in Appendix D. It is our opinion the risk of earthquake-induced landsliding is very low with the exception of the landslide northeast of the project.

The proposed structures will very likely experience strong ground shaking during a major earthquake in the life of the structures. The Uniform Building Code has adopted provisions for incorporation of strong ground shaking into the design of all structures. Our recommendations for geotechnical parameters to be used in the structural seismic design of the structures are presented in “Section 5.07, 1997 UBC Seismic Design Criteria.”

4.03 Slope Stability

In order to evaluate the effects of existing topography, geologic conditions, and proposed construction on slope stability, we drew five cross sections through the project site (see Figures 8 through 12). The cross sections illustrate our conclusion that the thickness of the chert deposits becomes increasingly thicker from east to west across the project site. The chert is typically underlain by sandstone with interbedded siltstone and shale. The contact between the chert and sandstone unit is a depositional contact. The sandstone unit is less fractured than the chert and has a higher strength than the chert. The bedrock on the project site and surrounding area has been folded as a result of tectonic activity which explains the variable attitudes of bedding and the chert/sandstone contact surface. The tectonic folding has resulted in undulating bedding and contact surfaces which generally increases overall strength and stability.

For the north-facing slope of the project site, we judge that Section C-C’ is the most critical section because it has the deepest thickness of chert that extends upslope beneath the upslope residences. Since a critical surface on this section would not follow bedding, we analyzed this section using a circular search.

For the west-facing slope, we judge that Section D-D’ is the most critical because it is roughly perpendicular to slope contours and parallel to the dip of the bedding. The bedrock material on this section consists of a deep chert deposit with some minor interbedded sandstone/siltstone. A critical surface on this section would likely follow the dip of the chert bedding; therefore, we analyzed the slope stability using a search for the critical wedge.

Sections C-C’ and D-D’ were extended upslope and/or downslope of the project site in order to consider global effects of slope stability. We performed slope stability analyses for existing static conditions, post-construction static conditions, and pseudo-static conditions to model the effects of earthquake loading. A more complete description of our slope stability analyses, including selection of strength parameters, groundwater effects, selection of a pseudo-static coefficient, and a summary of the results of slope stability analyses are presented in Appendix D. Also included in Appendix D are Figures D-1, D-2 and D-3 which show the locations and details of cross-sections utilized for slope stability analyses.

The results of our slope stability analyses for the project are summarized in the following table.

	Factor of Safety		
Cross-Section	**Static, Existing**	**Static, Post Construction**	**Pseudo Static (0.15g/0.30g)**
Section D-D’	2.40	2.39	1.62/1.32
Section C-C’	2.18	2.15	1.41/1.16

We should note there does not appear to be a significant change in the stability results assuming the alternative project is constructed instead of the project.

4.04 Proposed Construction

For both the project and the alternative project, the proposed footprints of the structures will cover the majority of the project site. The proposed building footprints would extend to within about 10 to 20 feet of the downslope property line along the northern portion of the project. In the southwestern portion of the project site, the proposed building footprint would extend to within about 5 to 10 feet of the downslope property line.

The proposed development includes construction of 17 two-unit buildings in four groupings of 4 to 5 buildings each. The alternative project, while maintaining the same number of stories, massing and general appearance as the original scheme, will technically be four multi-unit buildings with 8 or 10 duplex units each. The proposed 4-story buildings would be located on the steeply inclined north and west-facing slopes of the project site. The inclination of these slopes is typically on the order of about 1.5:1 with some localized steeper areas. These slopes extend beyond the downslope limits of the proposed building footprints. Similarly, steeply inclined slopes on the order of 1.5:1, and locally steeper, extend upslope from the access road to the existing upslope residences along Crestmont Drive. The existing steep slopes will require some design considerations related to the following:

- Slope Protection;
- Foundations;
- Retaining Walls; and
- Drainage Considerations.

The considerations related to the above categories are further explained in the following sections of this report.

4.04.1 Slope Protection

The steep inclination of the existing slopes above and below the project site may experience some shallow sloughing and/or raveling, as well as erosion. The currently proposed building footprints suggest that the distance between each group of structures is relatively small. For closely spaced buildings and/or the presence of stairs/decks and/or other surficial features between buildings, the risks associated with shallow sloughing/raveling or erosion are significantly reduced because direct rainfall impact in the constrained area will be relatively small.

For slopes above and below the proposed buildings (and downhill of the external retaining wall below the buildings in the alternative project), design measures to mitigate encroachment caused by sloughing/raveling or erosion would include stitch piers, debris walls, and erosion control measures. In areas where adverse bedding is a concern for shallow stability, soil nails may be used. Each of these slope protection measures is discussed in the following sections.

4.04.1.01 Property Line Stitch Piers

The adverse bedding conditions on the west-facing slope of the project site, as well as the existing landslide northeast of the project site, could result in encroachment onto the project site. The encroachment of offsite instabilities could be minimized by the installation of stitch piers near the property line. Stitch piers are closely-spaced drilled piers designed to resist lateral loads such as those associated with sloughing/raveling and landslide movements. Stitch piers are a below-grade feature. The existing slopes at the site are steep and the shallow bedrock and/or soils may have a tendency to creep away from the piers resulting in a gap between the pier and the soil. Therefore, the stitch piers would have to be designed to resist the lateral loads due to shallow stabilities. In addition, they would have to be designed as freestanding columns to the depth of creep movements or potentially unstable materials.

The adverse bedding conditions within the chert bedrock on the west-facing slope of the project site, may result in some shallow sloughing and/or raveling of the bedrock materials. As previously discussed, deep landslides or global stability are not a concern in this area. We estimate that the depth of this shallow sloughing/raveling, similar to creep movement, may be on the order of about 5 feet. If left unmitigated, sloughing/raveling of the portion of the slope extending below the western property line and the western section of the northern property line could encroach upon the project site. Installation of stitch piers along the western property line and the western portion of the north property line in the vicinity of the previous quarry activities would mitigate upward encroachment onto the project site. Re-entrant stitch piers would also be needed on the southern portion of the site to protect against undermining of the west property line stitch piers by potential downslope movements. Typically, stitch would be installed with some lagging installed from the upslope side of the stitch piers. If slope materials move downslope over time exposing the stitch piers, additional lagging should be installed to provide continued containment. Long-term maintenance for the site should include observations of the slope conditions below the stitch piers.

We would like to point out that there may be criteria established by the City and County of San Francisco and/or other governing codes/regulations that requires improvements to be offset from the property line. Placement of the stitch piers as close as possible to the property line would provide the best overall performance.

The existing landslide located northeast of the project site, which extends partially into the northeast corner of the project site, could experience continued movements. The slide limits extend offsite to the north and west. We estimate that the maximum depth of the potentially unstable materials within this slide is on the order of 20 feet. The portion of the slide that extends to the proposed building footprint (and external building wall in the alternative project) in this portion of the project site is estimated to be on the order of 10 feet deep. Installation of stitch piers near the northwest corner of the project site would help to deflect the slide movements and prevent encroachment of slide debris onto the project site. As previously mentioned, the landslide in this area, in combination with existing fill and colluvial soils, may have impacts on the access roadway. Mitigation measures for the eastern section of the access roadway will be provided when grading in this area is better defined.

The approximate limits of proposed stitch piers along the property lines for mitigation of offsite encroachment of shallow sloughing/raveling and landslide debris are shown on Figure 13.

4.04.1.02 Debris Wall

A debris wall is an above-grade retaining wall that provides for the collection of debris generated upslope of the wall. Typically, a debris wall would have an access path behind the wall to allow for removal of accumulated debris from behind the wall. Because of the steep slopes, the access path upslope of the debris wall should be as narrow as practical while still allowing for the access to clear accumulated debris. The access path may require installation of a retaining wall along the upslope edge of the path in order to create a path that has sufficient width to allow for access for clearing operations. The anticipated methods for clearing of debris should be considered in the actual design of the access path.

The steep area of the slope within the upper portion of the quarry cut on the northeast corner of the project site could experience some shallow sloughing/raveling. Such shallow sloughing/raveling could result from debris from the project site extending beyond the property limits. Installation of a debris wall as close as possible to the property line would mitigate the movement of slope debris beyond the project site. The debris wall in this area would be installed on top of the stitch piers.

The existing slope above the proposed access roadway could also experience shallow sloughing/raveling and erosion. The toe of this slope extends very near to or beyond the upslope limits of portions of the access roadway. A debris wall, installed near the upslope limits of the access roadway, would help to prevent encroachment of debris generated from offsite and upslope onto the access roadway. In the portion of the access roadway located below documented landslides, the debris wall should be bigger and stronger in order to resist the potentially higher loads associated with landslide debris. The approximate limits of debris walls are shown on Figure 13.

The actual locations and lateral limits of debris walls depend upon the final building and improvement layout, as well as governing codes/regulations.

4.04.1.03 Soil Nails

When site clearing has been completed in accordance with the recommendations of this report, it is possible that localized areas of adverse bedding conditions may be observed which require installation of soil nails to provide stabilization of shallow adverse bedding conditions. Also, some of the larger excavations may require the use of soil nails for temporary support during retaining wall construction. Therefore, the locations where soil nails will be required, if at all, will not be known until the initial stages of construction. Additional analyses would be required in order to design soil nails, and would be based upon the locations of the slope repair, the exposed adverse bedding conditions, and the inclination of the finished slope. If conditions are encountered during construction which suggest the need for soil nails, we would perform the required analyses in order to provide recommendations for the design of the soil nails.
Typically, rows of soil nails are installed extending down into the slope. A slope facing, consisting of wire mesh and gunite, would cover the slope repair area. Drains would need to be installed behind the slope facing.

4.04.1.04 Drainage and Erosion Control

Incorporation of drainage and erosion control measures into the project design help to improve the stability of slopes and reduce the risk of downslope migration of slope debris. Collected surface and subsurface water would ultimately flow by gravity or be pumped to discharge into the existing sanitary sewer/storm drain system. Drainage provisions would include the following:

- Concrete v-ditches for the collection and routing of surface water flows;
- Swales and catch basins that collect and direct the flow of surface water;
- Collection of roof water using downspouts that are connected to a system of pipes that discharge into a drainage system in the access roadway or into a v-ditch located downslope of the structures; and
- Subdrains behind proposed retaining walls.

Because the existing vegetation on the project site will mostly be removed for the construction of the proposed development, erosion resistant vegetation would need to be installed on the temporary slopes if the construction spans the rainy season as well as on the finished slopes. Erosion control for temporary slopes could include grading to prevent water from flowing over the top of slope, vegetation including quick-growing native grasses and weeds, hay waddles, and silt fences. For finished slopes, vegetation that is deeply rooted, includes dense growth at or near the ground surface, and requires minimum irrigation would provide the greatest level of protection against erosion. A dense vegetative cover, especially near the downslope property line will help to reduce the risk of slope debris extending beyond the property line.

4.04.2 Foundations
4.04.2.01 Drilled Pier and Grade Beams

Typically, structures built on hillsides are supported on drilled pier and grade beam foundations which are designed to resist creep loads. The surficial subsurface materials on hillsides have a tendency to “creep” downslope as a result of gravity loading. Specifically, with respect to the project site, the mantle of soils overlying the shallow bedrock has a tendency to creep downslope. In addition, because of the granular nature of the bedrock itself, the upper portion of the bedrock may have a tendency to ravel and/or slough. We estimate the depth of creep/sloughing/raveling associated with either movement of the surficial soils or the upper portions of the bedrock would be on the order of 5 feet before grading. In the northeast portion of the project site in the vicinity of the existing landsliding, we estimate the depth of landslide movement which may impact the development is on the order of 10 feet. Foundations should be designed to resist the additional lateral load induced by these downslope soil/rock movements.

Another effect of creep movements is that the subsurface materials tend to move away from the foundation, leaving a portion of the foundation unsupported. The unsupported portion of the foundation should be designed as a free-standing column.

Drilled piers installed on a steep slope also have significantly reduced passive resistance. Specifically, the slopes at the project site are generally on the order of 1.5:1. The upper portion of drilled piers gains little benefit to resist lateral loading because there is not sufficient space to mobilize full passive resistance. Therefore, the upper portion of drilled piers would be disregarded for passive resistance calculations.

In addition to the effects of the existing steep slopes, the existing landslide near the northeast corner of the project site also influences lateral loads and the ability of drilled pier foundations to resist lateral loads. Similar to creep loads, renewed movement of the landslide leaves the upper portion of drilled piers unsupported. Creep loads, as well as the depth at which passive pressure is mobilized, would extend to the base of landslide debris. We estimate that the depth of sliding within the currently proposed limits of the building footprint is on the order of 10 feet. If the slide debris within the northeast corner of the project site were overexcavated and recompacted with the installation of subdrains, the adverse impacts to the design of drilled pier foundations could be significantly reduced.

Based upon preliminary plans of the proposed development, we have identified 5 categories of slope conditions where drilled pier foundations would be needed. Representative locations of the various categories of foundations are shown on Figure 14. These categories are summarized as follows:

Category	Description
1	Areas within the building footprint with cuts in excess of five feet
2	Areas within or immediately downhill of the building footprint where existing grade is relatively undisturbed or where fills are planned
3	Support of retaining wall on downslope limits of access roadway
4	Support of retaining wall on upslope limits of access roadway where cuts do not expose bedrock
5	Building foundation support in the northeast portion of the project site in the vicinity of the existing landslide

For each of these categories of drilled pier foundations, we have outlined the anticipated depth of creep, depth to which passive resistance should be disregarded, and depth to which piers should be designed as free standing columns. These values are summarized in the following table.

Category	Depth of Creep (ft)	Depth to Disregard Passive Resistance (ft)	Depth of Free Standing Column (ft)
1	0	0	0
2	5	5	5
3	0	5	5
4	5	0, 2 (paved, unpaved)	0
5	5	10	10

The combined effects of the creep loading and reduced lateral resistance at the project site warrants the use of deep drilled pier foundations that extend well below the anticipated depth of creep movements and into the zone of passive resistance. Drilled piers would also need to have a wider diameter than typically used in order to provide sufficient reinforcing to resist the anticipated lateral loading.

4.04.2.02 Footings

Because the existing access roadway was constructed by cutting into the upslope edge of the hillside, we anticipate that bedrock will likely be encountered at or very near the ground surface within the upslope limits of the proposed new access roadway. Grading for the proposed development may include additional cuts up to about 6 feet deep at the upslope limits of the new roadway. Therefore, we anticipate that conventional shallow footing foundations bearing on undisturbed rock will be acceptable for support of proposed retaining walls in this area.

In the alternative project, large excavations into bedrock will likely occur below a number of the buildings. It is possible some use of footings may be considered for support of buildings and building retaining walls. This issue will be considered further in the final geotechnical investigation report when the ultimate plan details are developed.

4.04.3 Retaining Walls

Preliminary project plans indicate the retaining walls would be constructed for some of the same categories outlined above in Section 4.04.2, specifically for Categories 1 through 4. Each of these categories has a different combination of active and passive resistance scenarios, as well as type of retaining wall (restrained vs. unrestrained). Representative locations of the various categories of retaining walls are shown on Figure 14. The various scenarios which impact design of retaining walls are outlined in the following table.

Category	**Type of Wall**	**Slope Above Wall**	**Slope Below Wall**	**Estimated Maximum Cut/Fill (ft)**
1	Restrained	1.5:1	Less than 4:1	21' cut
2	Restrained	Less than 4:1	1.5:1	23' fill
3	Restrained	Less than 4:1	1.5:1	14' fill
4	Unrestrained	1.5:1	Less than 4:1	6' cut/fill

We would also like to point out that retaining walls in Category 3 could have significant surcharge loads related to traffic loading. In addition, retaining walls in Categories 2 and 3 would have significant additional loads related to compaction of fill behind the retaining walls. The compaction load on retaining walls is generated during construction by the combined weight of compaction equipment and the physical compaction effort; however, these compaction loads remain as a permanent load on the retaining wall. Use of smaller light-weight compaction equipment, especially within 5 feet of the retaining wall can help to reduce compaction loads. Where compaction loads are applicable, deflection of the top of the wall can occur. If compaction of the retaining wall backfill is completed before the building framing is placed, the effects of compaction related deflection on the performance of the building can be significantly reduced. Finally, if the external retaining walls proposed downhill of the buildings in the alternative project are constructed, significant surcharge loads from the building foundations may be imposed on the walls.

Where debris walls are constructed on top of retaining walls, as in Category 4, the retaining wall should be designed to resist the impact loads associated with the debris wall. This additional load on the retaining wall is considered as an additional surcharge load.

4.04.4 Groundwater Considerations

Groundwater in the form of a static phreatic surface was not observed during our subsurface exploration or within our review of historic geotechnical investigations. We did observe some seepage within the large diameter borings within the chert bedrock. Because of the sloping conditions at the project site, we anticipate that seepage could occur within proposed excavations.

4.04.5 Construction Considerations
4.04.5.01 Steep Slope Issues

Because of the steep slopes at the project site, some temporary access roads will likely be needed in order to install foundations, retaining walls, and other structures. The amount of grading for temporary access should be kept to a minimum in order to reduce the disturbance to the hillside. Depending upon the locations of the temporary access roads, some grading may be required in order to provide a stable finished slope. A representative of our firm should provide input regarding grading of the finished slope, which may include fill placement and compaction. These grading activities should conform to the recommendations provided in this report.

4.04.5.02 Excavatability

Based on our evaluation of the subsurface conditions and our experience with excavations in similar subsurface materials, it is our opinion the difficulty of excavation of these materials will be variable. The surficial soils and severely weathered bedrock can be easily excavated; however, areas of moderately weathered bedrock may be more difficult to excavate. Where difficult excavation is encountered, heavier equipment may be required.

4.05 Maintenance

Following completion of the proposed development, on-going maintenance would be required for the following geotechnical aspects of the project:

- Checking and clearing of drain outlets, v-ditches, and catch basins;
- Clearing of debris from debris walls;
- If materials move away from debris wall, lagging may need to be installed; and
- Repairs and partial to full replacement of the any of the above items, as needed.

A homeowners association or other entity may be best suited for these general maintenance issues which affect the performance of the overall subdivision. A maintenance entity typically provides more uniform and consistent practices with respect to maintenance, as opposed to imposing these responsibilities on the individual homeowners.

4.06 Project Versus Alternative Project Comparison

From a geotechnical perspective, it appears the alternative project is somewhat superior to the project (although both are geotechnically suitable for the site as noted in "Section 4.01, Introduction"). The alternative project has more excavation, which generally will improve overall slope stability. The larger excavations may need more shoring or soil nails for support during construction, but this will also improve long-term stability. In addition, the reduction in the height of retaining walls supporting fill near the downslope end of the building in the alternative project approach, as well as making these walls separate from the building foundations, are also benefits in comparison to the project approach.

4.07 No Project Option

At the present time, unstable slopes are present in the northwest and northeast corners of the property. In both the project and alternative project approaches, the areas of instability within the site would be stabilized. If no project were constructed, and these areas were not stabilized,a continuing risk would exist to the downslope properties.

There is a significant amount of uncontrolled water which is being discharged by the homes immediately uphill of the site along Crestmont Drive. This uncontrolled flow contributes to erosion and shallow sloughing uphill and within the site. Various drainage measures are proposed by the project and alternative project to properly collect and convey this water to reduce this problem. If no project were built and these measures were not installed, continued erosion and sloughing would occur.

5.00 PRELIMINARY RECOMMENDATIONS

5.01 General

It is the responsibility of you or your representative to confirm that the geotechnical recommendations presented in this report and our final report are called to the attention of the contractor, subcontractors, and any governmental body which may have jurisdiction and that these recommendations are carried out in the field.

In addition to the preliminary recommendations in this report, all applicable City and County of San Francisco ordinances should be followed. The contractor engaged to perform the work should have a working knowledge of these regulations and should keep copies of the applicable documents at the job site during construction. The contractor should be responsible for obtaining the appropriate permits or approvals to perform the work. We would like to point out the City and County of San Francisco or other governing codes/regulations may require a set-back of any or all improvements from the property lines. This set-back restriction may also be applicable for grading activities.

The contractor should be solely responsible for the safety of personnel and equipment at all times. Prior to the commencement of any field work, we recommend that our field engineer confirm the general limits of grading work with the contractor's field personnel. All property lines should be located and staked by a licensed land surveyor. In addition, all underground utilities in the vicinity should be located and staked by the property owner (on private property) or by the appropriate utilities company (on easements).

5.02 Site Preparation and Grading

5.02.1 Site Clearing and Grubbing

The site should be cleared of all obstructions including designated trees, shrubs, designated utility lines, and any other debris including previously felled trees and brush. Holes resulting from the removal of trees and underground obstructions that extend below the proposed finish grade should be cleared and backfilled with suitable material compaction to the requirements provided in the subsequent sections. We recommend that the removal of any major trees and the backfilling operations for these excavations be carried out under our observation, so that all roots are removed and the excavations are properly backfilled. The cleared materials should be removed from the project site.

After clearing, the portions of the site to be developed which contain surface vegetation or organic laden topsoil should be stripped to an appropriate depth to remove these materials. The amount of actual stripping should be determined in the field our representative at the time of construction. The stripped materials should be removed from the site or stockpiled for later use in landscape areas, if desired.

Oversteepened portions of the slope, including the near vertical slide scarp at the western and northwestern portion of the project site should be scaled to leave a resultant slope no steeper that 1:1. (This area is described uner "Western Cut Slope" in Section 4.02.3.02, Existing Landslide Features). The engineering geologist should re-evaluate the slope following scaling to assess further needs. The scaled material should not be allowed to fall down the slope. A temporary catchment system should be installed downslope of scaling operations. The material generated from scaling operations may be stockpiled for later use in fill areas as long as it meets the requirement for fill materials. Under no circumstances should the scaled material be allowed to remain on the slope in a loose condition.

5.02.2 Fill Placement on Slopes

Existing fills located within and below the proposed roadway alignment should be removed and recompacted. Any filling operations on slopes steeper than 6:1 should be keyed and benched into the weathered bedrock materials. Loose soils resulting from excavations should either be removed from the site or placed and compacted as engineered fill.

A keyway should be constructed at the downslope limits of fills placed in the northeast portion of the project for partial removal of the existing landslide debris. The need for keyways in other areas of the project site should be evaluated by a representative of our firm during construction. The keyway should be at least 10 feet wide, and the base of the keyway should extend a minimum of 2 feet into undisturbed bedrock. The keyway should have a minimum slope of 2 percent toward the upslope edge of the keyway. If the fill slope is greater than 10 feet high, benches should be excavated into the slope before placing the fill at vertical intervals of no more than 10 feet. These benches should be at least 5 feet wide. However, the actual dimensions of the benches should be determined by the geotechnical engineer at the time of construction.

A subdrain consisting of 4-inch diameter perforated PVC pipe should be installed at the rear of the keyway with the perforations facing down. Cleanouts should be installed at the ends of the subdrain and at distances no greater than 150 feet along the subdrain alignment. If there are turns within the subdrain alignment that are sharper than 45°, a cleanout should be installed at the turn. The keyway should then be backfilled with engineered fill that is placed in accordance with the recommendations of this report.

5.02.3 Excavations

After the site has been cleared and stripped, the excavations for the site retaining walls should be made. Based on our review of the preliminary plans, it appears that significant excavation work resulting in large cuts will be required to develop the site. We would anticipate that the height of these cuts would be up to about 15 feet. Based on the information obtained from our exploratory borings, we anticipate that the materials exposed in the proposed cuts will consist of silty and sandy clay surficial soils and bedrock. The surficial soils should be classified as a "Type B" material and the rock is considered stable according to the Cal-OSHA classification system. Therefore, if the anticipated materials are encountered at the time of excavation, according to Cal-OSHA regulations, it may be appropriate to slope the surficial soils back at an inclination of no steeper than 1:1 or temporarily shore the cuts if they are made at steeper inclinations. Temporary cuts in stable rock may be cut near vertical. Temporary shoring should be used as required to prevent the movement of materials exposed in the face of the excavation.

Additional precautions will be required if excavations are made during the rainy season. Such precautions may include diversion of surface water flows, covering the excavation with water-repellent tarp to prevent saturation and weakening, temporary shoring, and/or reduction of the steepness of the cuts.

We recommend a representative of our firm be present as the excavation is made to evaluate whether adverse geotechnical conditions are exposed. If adverse conditions are encountered, our recommendations may need to be revised. We recommend the excavation and subsequent wall construction be continuous in order to minimize the length of time the temporary slope is exposed. However, since we have no control over the methods and timing used by the contractor, the stability of any temporary cut slopes is solely the responsibility of the contractor. The excavated materials can be selectively stockpiled for backfill behind the wall. However, all excess materials derived from the excavation should be removed from the site.

5.02.4 Fill Materials

All on-site soils below the stripped layer and having an organic content of less than 3 percent by volume are suitable for use as fill. Fill materials should not contain rocks or lumps larger than 6 inches in greatest dimension and with not more than 15 percent larger than 2.5 inches. Clayey soils with a high plasticity index may be difficult to moisture condition (drying, or mixing with drier materials) and compact, particularly during or after the wet winter season. Imported fill material used at the site should be a non-expansive material with a plasticity index of 12 or less.

Should lightweight materials be proposed for retaining wall backfill, we should review and approve the anticipated materials at the time of final design.

5.02.5 Subgrade Preparation

The subgrade surface in those areas to receive fill, slabs-on-grade, or pavements should be firm and unyielding. Soft or yielding subgrade soils should be excavated to expose firm, non-yielding materials. The exposed soils in those areas receiving structural fill should be scarified to a depth of 6 to 8 inches or the full depth of any existing shrinkage cracks. The scarified soils then should be moisture conditioned to slightly above optimum water content and compacted to a minimum relative compaction of 90 percent, as determined by ASTM Test Designation D1557-02.

5.02.6 Placement and Compaction Fill

Fill material should be spread and compacted in lifts not exceeding 8 inches in uncompacted thickness. Fill should be compacted to at least 90 percent relative compaction at or above optimum moisture content, as determined by ASTM Test Designation D1557-02. Compaction should be performed using conventional compaction equipment such as a sheepsfoot compactor or equivalent.

5.02.7 Trench Backfill

Pipeline trenches should be backfilled in accordance with the requirements of San Francisco Department of Building Inspection (SFDBI) or the following recommendations.

Trench backfill should be placed in lifts not exceeding 6 inches in uncompacted thickness. Trench backfill should be compacted to a minimum relative compaction of 90 percent at or above optimum moisture content. This assumes that the pipe is bedded in granular materials and that the bedding extends approximately 1 foot above the top of the pipe to create a "cushion" layer around the pipe. The cushion layer should be compacted to approximately 85 percent to 90 percent relative compaction. In addition, if the trench backfill will be a portion of subgrade beneath the pavement and baserock, the upper 6 inches should be compacted to at least 95 percent relative compaction.

If drain rock (open graded without fines) is used, then the portion of drain rock backfill should be wrapped in an appropriate geotextile filter fabric. Drain rock backfill should be compacted mechanically with vibration-type equipment.

For trenches which descend down steep slopes, dams may be required within the trench backfill to minimize erosion. A representative of our firm should be advised of any such conditions during construction so that we can assist with recommendations regarding the location and installation of dams.

All compaction operations should be performed by mechanical means only. If imported granular soil (sand) is used, sufficient water should be added during the trench backfilling operations to prevent the soil from "bulking" during compaction. We do not recommend “jetting” of backfill materials.

Finally, because of the potential for catastrophic collapse of trench walls, we recommend that the contractor carefully evaluate the stability of all trenches and use temporary shoring where appropriate. The design and installation of the temporary shoring should be wholly the responsibility of the contractor. In addition, all state and local regulations governing safety around such excavations should be carefully followed.

5.02.8 Slopes

New cut or fill slopes for the proposed development can be graded to inclinations of 2:1. The surface of all fill slopes should be either back-rolled or compacted beyond the limits of the slope and cut back in order to achieve satisfactory compaction. At these inclinations cut and fill slopes generally provide acceptable long-term performance. However, there may be localized areas of shallow surficial sloughing and minor erosion that could require periodic maintenance. To minimize the potential for shallow surficial sloughing and minor erosion, we recommend surface water run-off collection and erosion control methods be implemented (see “Section 5.06, Drainage and Erosion Control”).

Drainage ditches designed to intercept surface runoff should be constructed along the upslope boundary of the proposed access roadway to intercept runoff from the existing slope located above the project site. These drainage ditches should be concrete-lined and should have catch basin located every 100 feet along the alignment of the proposed access roadway. Likewise, a drainage ditch should be constructed downslope of the structures to collect surface runoff as well as discharge of collected surface and subsurface water. These drainage ditches and associated catch basins should drain by gravity to the existing sanitary sewer/storm drain.

The materials exposed on cleared slopes should be evaluated by our representative at the time of grading. In cases where the exposed materials are weak and unstable, the slope should be rebuilt with engineered fill. If adverse bedding is exposed, soil nails may be required to provide adequate stability.

5.03 Foundations

5.03.1 Drilled Pier and Grade Beams

We recommend the proposed structures and retaining walls tied to the structures be supported on drilled, cast-in-place, straight-shaft piers which are designed to develop their load carrying capacity through friction between the sides of the piers and the surrounding subsurface materials. Friction piers should have a minimum diameter of 24 inches for building foundations. There should be a minimum center-to-center spacing of at least three pier diameters between adjacent piers. Minimum pier diameters and minimum pier embedments below lowest adjacent grade or into rock, whichever is deeper, are outlined in the following table. The two different supporting conditions for piers are distinguished between piers supported the structures (building foundation) and piers which are not structurally tied to the buildings (non-building foundation).

	Minimum Pier Diameter (inches)	**Minimum Pier Embedment in feet (below grade/into rock)**
Building Foundation	24	20/10
Non-Building Foundation	16	10/5

To determine whether the depths outlined in the above table are adequate to carry the structural loads of the buildings, use allowable friction values of **800 psf** for dead plus live loads and **1100 psf** for all loads, including wind or seismic. These values can be used starting at the anticipated depths of creep for the various categories as outlined in Section 4.04.02. The table from Section 4.04.02 is copied for easy reference.

Category	Depth of Creep (ft)	Depth to Disregard Passive Resistance (ft)	Depth of Free Standing Column (ft)
1	0	0	0
2	5	5	5
3	0	5	5
4	5	0, 2 (paved, unpaved)	0
5	5	10	10

To minimize damage resulting from the potential surficial soil creep movements, we recommend the piers for the structures be designed to resist an ultimate, uniform lateral pressure of 300 psf acting against the projected diameter of the pier to the depth of creep outlined in the above table for the various categories. Lateral loads on the piers may be resisted by passive pressures acting against the sides of the piers. We recommend an allowable passive pressure equal to an equivalent fluid weighing 400 psf per foot of depth to a maximum value of 4000 psf. This value can be assumed to be acting against 1.5 times the diameter of the individual pier shafts starting at the depths given in the above table as “Depth to Disregard Passive Resistance.”

When surficial soils creep downhill, a void may be created along the downslope sides of the piers, leaving this portion of the pier unsupported. Therefore, we recommend the piers be designed as free-standing columns for the depth outlined in the above table as “Depth of Free-Standing Column.” Applicable City and County of San Francisco Code requirements should be followed with respect to design and/or installation of drilled piers.

The bottom of pier excavations should be reasonably free of loose cuttings and soil fall-in prior to installing reinforcing steel and placing concrete. It is our recommendation the contractor be made aware of the subsurface conditions outlined in this report and he obtain construction equipment appropriately sized to perform the recommended work. In particular, the piers must extend a minimum of 20 feet below the ground surface, which will be 20 feet into bedrock in areas. Equipment capable of performing this recommendation should be employed.

Any accumulated water in pier excavations should be removed prior to placing reinforcing steel and concrete, or the concrete should be tremied from the bottom of the hole.

The piers should be tied together with grade beams and tie beams that extend up and down the slope between the piers, as well as across the slope between the piers. The maximum horizontal distance between the grade beams and tie beams should be approximately 20 feet. The grade beams and tie beams should be designed to span between the piers in accordance with structural requirements. If the grade beams or tie beams are to retain soil, they should be designed to resist the appropriate lateral earth pressures provided in "Section 5.04.1, Retaining Walls."

The proper handling of spoils excavated during the pier drilling is very important. If these materials are left in a loose condition on a slope, they will have a tendency to creep downhill and/or erode during periods of heavy rainfall. Therefore, we recommend these materials be removed from the site, placed and compacted as engineered fill, or placed as wall backfill where settlement would not cause a problem.

Observations during pier drilling operations should be performed by a representative of our firm to confirm that anticipated conditions are being encountered. If drilling refusal is encountered, we can coordinate a review of the conditions and drilling equipment adequacy, as well as conduct discussions with the project structural engineer.

The floor system should be structurally supported and derive all of its support from the pier and grade beam foundations.

5.03.2 Footing Foundations

We recommend that in areas where site excavations have removed the surficial soils and exposed underlying non-expansive bedrock, footing foundations may be used as an alternative to drilled piers. Based on our evaluation of your preliminary plans, we anticipate footings could be used to support the retaining wall at the upslope edge of the access roadway. It may also be possible to use footing foundations in the large excavations proposed below the buildings if the alternative project is built. We recommend all footings consist of conventional, continuous spread footings that bear on bedrock.

Footings may only be used where the toe of the footing is located a minimum distance of 5 feet from the edge of a natural slope. All footings should extend at least 24 inches below the lowest adjacent finished grade. In addition, any footings located adjacent to utility trenches should also have their bearing surfaces below an imaginary 1:1 (horizontal to vertical) plane projected upward from the edge of the bottom of the adjacent trench.

At the above depths, the footings may be designed for an allowable (factored) bearing pressure of 3000 pounds per square foot (psf) due to dead loads (factor of safety $\approx$ 3), 4500 psf due to dead plus live loads (factor of safety $\approx$ 2), and 6000 psf for all loads including wind or seismic (factor of safety $\approx$ 1.5). These allowable bearing pressures are net values; therefore, the weight of the footings can be neglected for design purposes. However, all footings should have a minimum width of 14 inches, and all continuous footings should be tied together with reinforcing steel.

Lateral load resistance for footing foundations may be developed in friction between the foundation bottom and the supporting subgrade. An allowable friction coefficient of 0.35 is considered applicable. As an alternative, an allowable passive resistance equal to an equivalent fluid weighing 350 pounds per cubic foot acting against the foundation may be used. If the foundations are poured neat against the soil, friction and passive resistance may be used in combination.

5.03.3 Stitch Piers

We recommend that stitch piers be installed as close as possible to the property line at the western portion of the site and the eastern portion of the site, while maintaining compliance with set-back regulations established by the City and County of San Francisco and/or other governing codes/regulations. The approximate locations of stitch piers are shown in plan view on Figure 13 and on a typical mitigation section on Figure 14. The stitch piers will serve as a permanent below grade retaining system and should be designed to resist an ultimate, uniform, lateral pressure of 500 pounds per square foot (psf) over the tributary area equal to the creep depth and length of wall. The pressure should be assumed to act over the tributary area equal to the depth of creep (10 feet) and the length of the wall.

Passive pressures may be used to resist the lateral loads on the piers. We recommend an allowable passive pressure equal to an equivalent fluid weighing 400 pounds per cubic foot per foot of depth. This value can be assumed to act over the tributary area equal to the pier length a depth of 10 feet and the length of the wall.

The laterally unstable materials may have a tendency to move away from the pier, creating a void along the downslope sides of the piers and leaving them unsupported. Therefore, we recommend that the piers be designed as freestanding columns to a depth of 10 feet.

Piers should have a minimum diameter of 24 inches, and they should have a center-to-center spacing no more than 3 pier diameters between adjacent stitch piers. Due to the potential presence of laterally unstable materials downslope of the stitch piers, the proposed piers should generally extend to a depth adequate to provide at least 30 feet of embedment below existing grade or 10 feet into competent bedrock, whichever is greater. Stitch piers should be tied together with a grade beam.

Adjacent stitch piers should not be drilled consecutively. Rather, alternating piers should be drilled and the concrete poured with some time allowance for concrete strength gain prior to the drilled of intermediate piers.

5.04 Retaining Systems

5.04.1 Retaining Walls

Retaining walls should be designed to resist both ultimate (non-factored) lateral earth pressures and any additional lateral loads caused by surcharge loads on the adjoining ground surface. We recommend walls be designed to resist the equivalent fluid pressures indicated in the table below. The appropriate design values should be chosen based on the assigned category of wall types. These categories were defined in Section 4.04.02 and are shown on Figure 14. Unrestrained wall pressures should only be considered applicable where it would be structurally and architecturally acceptable for the wall to laterally deflect 2 percent of the wall height.

Category	Description	Active Earth Pressure (pcf EFW)[1]
1	Building Retaining Wall to Support Proposed Cuts (Unrestrained condition)[2]	95
2	Building Retaining Wall to Support Proposed Fills (Unrestrained condition)[3]	70
3	Downslope Edge of Access Roadway (Unrestrained condition)[3]	50
4	Upslope Edge of Access Roadway (Unrestrained condition)[2]	85

[1] pcf EFW = pounds per cubic foot equivalent fluid weight
[2] Assumes 1.5:1 slopes above the retaining wall
[3] Assumes 4:1 or flatter slope above the retaining wall
[4] Will be reduced if light weight backfill is used

- For surcharge loads, increase the ultimate (non-factored) design pressures behind the wall by an additional uniform pressure equivalent to one-half (for restrained condition) or one-third (for unrestrained condition) of the maximum anticipated surcharge load applied to the surface behind the wall. Category 4 retaining walls should include an additional surcharge load equivalent to the impact load of the debris wall which is constructed on top of the retaining wall. External retaining walls considered in the alternative project should have surcharge loads from adjacent building foundations added to the wall pressures.

The above pressures assume that sufficient drainage will be provided behind the walls to prevent the build-up of hydrostatic pressures from surface and subsurface water infiltration. Adequate drainage may be provided by a subdrain system (see Typical Retaining Wall Subdrain Detail, Figure 15) consisting of a 4-inch, rigid, perforated pipe, bedded in ¾-inch, clean, open-graded rock. As shown on Figure 15, the recommended location of the subdrain pipe is behind the heel of the footing. Although we have observed the subdrain pipe is often placed on top of the heel of the footing, it has been our experience that this may lead to moisture seeping through the wall, resulting in dampness and staining on the opposite wall face despite the application of waterproofing. However, if such seepage or dampness is acceptable (where retaining walls do not double as building walls, for example), then the subdrain pipe may be placed on top of the heel of the footing. To prevent ponding of water on top of the heel of the footing, we recommend that the top of the heel be sloped to drain away from the wall with a minimum positive gradient of 5 percent. The perforated drainpipe should be sloped to drain with a minimum positive gradient of 2 percent. The entire rock/pipe unit should be wrapped in an approved, non-woven, polyester geotextile such as Mirafi 140N or 140NL, or a 4-ounce equivalent. The rock and fabric placed behind the wall should be at least one foot in width and should extend to within one foot of finished grade, with the exception of category 2 retaining walls where the rock should be extended to the ground surface. The upper one foot of backfill (6 inches for walls less than 5 feet in height) should consist of on-site, compacted, relatively impervious soils, with the exception of category 2 retaining walls which can have the drain rock extended to the ground surface. We should note flexible, perforated pipe (flexline), 2000-Pound Crush, Leachfield, and ASTM F810 pipe are not acceptable for use in the subdrain because of the likelihood of damage to the pipe during installation and the difficulty of future cleaning with mechanical equipment without damaging the pipe. We recommend the use of Schedule 40 PVC, SDR 35

PVC or ABS, Contech A-2000 PVC drainpipe, or equivalent for the drain system. The subdrain pipe should be connected to a system of closed pipes (non-perforated) that lead to suitable discharge facilities. At the location where the perforated subdrain pipe connects with the solid discharge drainpipe, drainrock backfill should be discontinued. A "clay plug" should be constructed out of relatively impervious soils to direct collected water into the perforated pipe and minimize the potential for water collecting around the solid drainpipe and saturating the adjacent soils. We recommend waterproofing be applied to any proposed retaining walls where applicable. The specification of the type of waterproofing and the observation of its installation should be performed by the architect and/or structural engineer.

In addition to the drainage details noted above, the "high" end and all 90-degree bends of the subdrain pipe should be connected to a riser which extends to the surface and acts as a cleanout. The number of cleanouts can be reduced by installing "sweep" 90-degree bends or pairs of 45-degree bends in succession instead of using "tight" 90-degree bends. "Sweep" 90-degree bends are similar to those used in sanitary sewer pipe connections.

Lined surface ditches with a minimum width of 12 inches should be provided behind any walls that will have an exposed sloping surface steeper than 4:1 behind them, with the exception of retaining walls that have a patio area downslope of the wall. These ditches, which will collect runoff water from the slopes, should be sloped to drain (minimum 2 percent positive gradient) to suitable discharge facilities. If the lined surface ditches consist of reinforced concrete, expansion joints should be provided every 10 feet. The top of the walls should extend at least one foot above the ditch (6 inches for walls less than 5 feet in height). All structural backfill placed behind retaining walls should be compacted in accordance with the requirements provided in “Section 5.02, Site Preparation and Grading.” Special care (such as the use of lightweight equipment) should be taken during wall backfill compaction operations to minimize overstressing of the wall.

Retaining walls should be supported on pier foundations designed in accordance with “Section 5.03.1, Drilled Pier and Grade Beams.”

5.04.2 Debris Walls

Debris walls should be constructed as close as possible to downslope property lines in the northwest and northeast corners of the project site to prevent shallow sloughing and/or erosion from encroaching on adjacent properties. In addition, a debris wall should be constructed upslope of the proposed access roadway to reduce the encroachment of debris onto the access roadway. The approximate locations of debris walls are shown on Figure 13. The actual limits of debris walls will be dependent upon the final layout of buildings and improvements as well as limits imposed by governing codes/regulations.

The debris wall should be a minimum of 4 feet high, with the exception of debris wall located downslope of shallow slide areas which should be a minimum of 8 feet high. Along the portions of the property line where stitch piers are installed, the debris wall should be constructed on top of the stitch piers. Debris walls located at the upslope limits of the access roadway should be constructed on top of the proposed retaining wall or supported on footing foundations upslope of the retaining wall. Debris walls should be designed to resist an impact load of 250 psf.

Consideration should be given to installing either an access gate or staggered retaining wall/debris wall near the central portion of the debris to be installed at the upslope limit of the access roadway. This would allow for easy maintenance access without having to move to the extreme limits of the access roadway.

Regular maintenance of the debris wall will be required. Specifically, a path should be graded behind the debris wall to allow for access of equipment to check for and remove accumulated slope debris.

5.05 Slabs and Pavements

5.05.1 Slab-on-Grade

We do not anticipate that interior slabs-on-grade will be included in the proposed development. However, if they are proposed in the future, we would provide recommendations at that time. This may particularly be true if the alternative project is adopted since this approach has a number of areas where floors would be built in deep excavations.

We recommend for any exterior slabs-on-grade (and the garage slabs as applicable) not underlain directly by bedrock be supported on a minimum of 6 inches of imported, compacted, non-expansive fill. Because water may collect in non-expansive materials such as sand and gravel when placed below exterior slabs, it may be necessary to slope the bottom of the imported materials to one or more low points where drainage discharge can be provided. In areas of existing fill where new slabs are proposed, we recommend any old, existing fill underlying any proposed slabs be removed and recompacted to the requirements of structural fill. If all of the old fill under proposed slabs cannot be removed, then some settlement, tilting, and cracking of the slab should be expected. In addition, a gap should be created between the foundation for the structures and any slabs located adjacent to the structures.

In order to minimize volume change of the subgrade soils, these materials should be scarified to a depth of 6 inches, moisture conditioned to slightly above optimum water content, and compacted to the requirements for structural fill. Prior to the construction of the slabs, the subgrade surface should be proof-rolled to provide a smooth, firm surface for slab support.

Because of the potential for future alternative uses of garages, we recommend that 4 inches of free draining gravel be placed beneath the garage slab-on-grade to serve as a capillary barrier between the subgrade material and the slab. A vapor retardant membrane (minimum 10 mil) should be placed over the gravel, and the membrane should be covered with 2 inches of sand to protect it during construction. The gravel, membrane, and sand layer can be used in lieu of 6 inches of non-expansive import fill recommended under slabs.

We also recommend that the specifications for slab-on-grade floors require that moisture emission tests be performed on the slab prior to the installation of the flooring. No flooring should be installed until safe moisture emission levels are recorded for the type of flooring to be used.

The slabs should be structurally independent from the perimeter grade beams and be free floating. Score cuts or construction joints should be provided at a maximum spacing of 10 feet in both directions. The slabs should be appropriately reinforced according to structural requirements; concentrated loads may require additional reinforcing. Minor movement of the concrete slab with resulting cracking should be expected. Therefore, partition walls or doorway trim boards should not be supported directly on the concrete slab and steps to the house from the slab area should be created with a void between the steps and the house foundations. The recommendations presented above, if properly implemented, should help minimize the magnitude of this cracking. It has been our experience that the installation of wire mesh for slab reinforcement has often not been performed properly during construction of the slab. As a result, we recommend that steel bar reinforcement be used to reinforce any proposed slabs.

5.05.2 Pavement

Pavement for the access roadway should be designed and constructed in accordance with SFDBI recommendations. We recommend the upper 6 inches of subgrade as well as base rock be compacted to a minimum relative compaction of 95 percent at or above optimum moisture content.

5.06 Drainage and Erosion Control

5.06.1 Subsurface Drainage

We recommend that a subsurface drainage system be constructed on the upslope sidewall (back cut) and the bottom of the base of any keyways. Typically, these drainage systems are composed of rigid perforated pipe bedded in clean drainrock and wrapped in an approved geotextile. The drainrock should be clean, open-graded gravel and be a minimum of 18 inches thick. Six-inch diameter rigid perforated plastic pipes should be placed, with perforations down on at least 4 inches of rock. SDR 35 drainpipe or equivalent should be used where fill thickness is less than 30 feet. SDR 23.5 drainpipe or equivalent should be used where fill thickness is greater than 30 feet. Rock should then be placed to the top of the subsurface drainage area. An approved, non-woven, geotextile should wrap the entire gravel and pipe blanket. The pipes should drain to the low point (or points) in the drain system and then be connected to an appropriate discharge facility. The gravel blanket should terminate where connections to solid pipes or structures are made to outlet the collected water.

Clean-outs with terminal risers should be provided at the upslope boundary of each subsurface pipeline. Segments of solid discharge pipe should have cleanouts with terminal risers at least every 100 feet. In addition, the "high" end and all 90 degree bends of the subdrain pipe should be connected to a riser which extends to the surface and acts as a cleanout. The number of cleanouts can be reduced by installing "sweep" 90-degree bends or pairs of 45-degree bends in succession instead of using "tight" 90-degree bends. "Sweep" 90-degree bends are similar to those used in sanitary sewer pipe connections. The final discharge locations should be reviewed by our representative in the field at the time of construction.

We recommend that the project surveyor locate all subsurface drains, solid pipes, clean-outs, and discharge points on an as-built drawing of the repair area. This plan will assist in locating the pipes in the future, should any repair work be necessary.

5.06.2 Surface Drainage

We recommend that surface water flow across the face of the new slopes be controlled. Project design should include improvements to collect and channel surface water run-off. These improvements should include grading to minimize the flow of water over the top of new slopes.

Concrete lined V-ditches should be installed to assist with collection and discharge of water run-off. Our firm should review the planned slope design to evaluate areas where v-ditches would be appropriate. The ditches should slope at a gradient of at least 2 percent and the collected water should be placed into solid pipes to transmit the water to an appropriate discharge location. Lined ditches should be paved with reinforced concrete not less than 3 inches in thickness or an approved equal paving. We should note that reinforcing for the concrete should consist of reinforcing bars; wire mesh is not a suitable reinforcing material. Appropriate expansion joints should be provided in all V-ditches.

Positive surface drainage should be provided adjacent to the structures to direct surface water away from the foundations of the building into closed pipes. Where possible, the collected water including roof water, should discharge to the access roadway where it should be directed to catch basins that drain by gravity to the existing sanitary sewer/storm drain easement. Collected water that cannot be directed to the access roadway should be carried to a tight line that drains by gravity and is discharged into a v-ditch downslope of the structures. The v-ditch should in turn drain by gravity or pumping to the existing sanitary sewer/storm drain easement. The connection to the existing sanitary sewer/storm drain pipe should be installed in accordance with City and County of San Francisco regulations.

Ponding of surface water should not be allowed adjacent to the structure or on pavements. We recommend that the landscape architect, general contractor, and landscaping contractor on this project be advised of this recommendation to minimize the potential for its omission during construction.

Where pavements will abut landscaped areas, the pavement baserock layer and subgrade soils should be protected against saturation from water in the landscaped areas by means of a concrete curb and gutter or thickened asphalt concrete section. The concrete curb and gutter or thickened asphalt section should extend to a depth of at least 2 inches below the bottom of the baserock layer.

Flexible drain pipe (flexline), 2000-pound crush pipe, leachfield, and ASTM F810 pipe are not recommended for use in these drainage systems because of the likelihood of damage to the pipe during installation due to the weak strength of these pipes. In addition, these drainpipes are sometimes difficult to clean with mechanical equipment without damaging the pipe. We recommend the use of Schedule 40 PVC, SDR 35 PVC or ABS, Contech A-2000 PVC drainpipe, or equivalent for the drain system. Ponding of surface water should not be allowed in any areas adjacent to the structures. Concentrated flows of water should not be allowed across the top of slope or the rear slope as erosion or weakening of slope could occur.

Some nominal maintenance of the drainage facilities should be expected after the initial construction has been completed. To assist in maintaining proper drainage and erosion control measures for the site, we have included a "Guide to the Maintenance of Hillside Home Sites," Appendix G.

We recommend a copy of this report be given to each homeowner. In addition, owners should be encouraged to provide a copy of this report to new owners in the case of ownership transfer.

5.06.3 Erosion Control

The organic topsoil removed during the grading process can be spread uniformly over the repair area after the completion of earthwork and drainage construction. All graded areas should be hydromulched with low-water, deep-rooted, fast-growing vegetation, hydromulch containing a tackifier. Other temporary erosion control improvements such as silt fences, hay bales, and silt ponds may be required if the earthwork spans more than one construction season and/or during the first winter after the grading work is completed. An erosion control plan should be prepared by the project civil engineer and reviewed by this firm for conformance to our geotechnical recommendations.

5.07 1997 UBC Seismic Design Criteria

Based on our review of the site geology and the 1997 Uniform Building Code (UBC), we recommend an S_C soil profile be used for seismic design of the structures. (An Sc soil profile is used for very dense soils and soft bedrock and is one of six soil profiles that can be used in code-based seismic design).The nearest active fault is the San Andreas fault, located about 5 miles to the west. It is a Type A fault as identified in Table 16-U of the 1997 UBC. The site is located within Seismic Zone 4 as determined from Figure 16-2 of the 1997 UBC. We recommend near-source factors of N_A=1.08 and N_V=1.36. (N_A is the near-source factor used to determine the acceleration-based seismic coefficient C_A in seismic Zone 4 related to proximity of the site to highly active faults. N_v is the comparable factor for velocity-based coefficient C_v).

5.08 Plan Review

We recommend our firm eventually be provided the opportunity for a general review of the geotechnical aspects of the final plans and specifications for this project in order that the geotechnical recommendations in our final geotechnical investigation report may be properly interpreted and implemented. Specific items which we recommend our firm review and which the plans should contain include, but are not limited to, the following:

- General: a citation of our final geotechnical investigation report (in the general notes);

- Earthwork: limits of cuts/fills, keyways, subdrains, subgrade preparation, compaction criteria;

- Foundations: pier dimensions and depth of embedment, footing dimension, stitch pier dimensions and depth of embedment;

- Retaining systems: retaining wall foundation requirements (as noted above), wall drain system, impermeable plug above drain, surface ditch and freeboard, as appropriate, debris wall locations and dimensions; and

- Slabs and pavement: import fill depth, recompaction of subgrade, vapor retarder;

- Drainage: gradient away from structure, downspout collector pipes, surface or subdrain collector system and discharge location.

If our firm is not accorded the privilege of making the recommended review, we can assume no responsibility for misinterpretation of our recommendations.

5.09 Construction Observation and Testing

The analyses and preliminary recommendations submitted in this report are based in part upon the data obtained from the 16 exploratory borings. The nature and extent of variations across the site may not become evident until construction. If variations then become apparent, it will be necessary to re-examine the recommendations of this report.

We recommend our firm be retained to provide geotechnical engineering services during the earthwork, foundation construction, and drainage phases of the work. This is to observe compliance with the design concepts, specifications, and recommendations and to allow design changes in the event that subsurface conditions differ from those anticipated prior to the start of construction. Specifically, we recommend that a representative of our firm observe the following aspects of the construction:

- Earthwork: site clearing and debris removal, excavations, subgrade preparation for slabs or filling, compaction operations including retaining wall or trench backfill;

- Foundations: pier drilling, footing excavations, stitch pier drilling; and

- Drainage: retaining wall subdrains, downspouts, area drains, v-ditches, positive surface gradients adjacent to the structures, crawlspace drainage and discharge location.

In order to effectively accomplish our observations during the project construction, we recommend that a pre-construction meeting be held to develop a mechanism for proper communications throughout the project. We also request that the client or the client's representative (the contractor) contact our firm at least two working days prior to the commencement of any of the items listed above. If our representative makes a site visit in response to a request from the client or the client's representative and it turns out that the visit was not necessary, our charges for the visit will still be forwarded to the client.

5.09.1 Wet Weather Construction

Although it is possible for construction to proceed during or immediately following the wet winter months, a number of geotechnical problems may occur which may increase costs and cause project delays. The water content of on-site soils may increase during the winter and rise significantly above optimum moisture content for compaction of subgrade or backfill materials. If this occurs, the contractor may be unable to achieve the recommended levels of compaction without using special measures and would likely have to:

- Wait until the materials are dry enough to become workable;

- Dispose of the wet soils and import dry soils; and

- Use lime or cement on the native materials to absorb water and achieve workability.

If excavations, utility trenches, or pier holes are exposed during winter rains, then caving may occur. Also, if the pier holes fill with water during construction, or if saturated materials are encountered at the anticipated bottom of the excavations, the piers may need to be extended to greater depths to reach adequate support capacity than would be necessary if dry weather construction took place.

We should also note that it has been our experience that increased clean-up costs will occur, and greater safety hazards will exist, if the work proceeds during the wet winter months. Furthermore, engineering costs to observe construction are increased because of project delays, modifications, and rework.

5.09.2 Contingencies

As with any type of construction, project delays could result from unfavorable environmental conditions or unanticipated site conditions. As discussed in “Section 5.09.1, Wet Weather Construction,” poor weather, particularly heavy rains, could saturate site soils such that the recommended levels of soil compaction could not be attained without the use of special construction measures. Heavy rains could also cause caving of existing excavations, pier holes, or trenches that may require the contractor to perform clean-up and additional excavation work to meet project specifications. The presence of unanticipated old fill, buried debris, or deeper bedrock could also require the contractor to perform additional work to remove these materials or extend proposed foundations to deeper depths. Project delays resulting from unfavorable or unanticipated conditions cannot be predicted but should be incorporated into the overall planning of the project as a contingency in both the project schedule and budget.

Delays may also result from poor project management and/or poor contractor performance. Typical problems that may occur during construction include scheduling conflicts, failure to schedule our representative's site visits efficiently, poor contractor performance, or failed tests. Good project communication between our firm's representative(s) and you and/or your representative should help to reduce the occurrence of these problems.

However, despite thorough planning and effective communication, delays on some projects are unavoidable and will often result in additional engineering and construction costs. Based on our experience with similar projects, a contingency fund of about 10 to 15 percent of the total project cost should be included in the final project budget to cover these additional expenses.

5.10 Post Construction Maintenance

Following completion of the proposed development, maintenance should be performed as follows:

- Surface Drainage: V-ditches and catch basins should be monitored for collection of debris, and collected debris should be removed. Above grade piping should be checked at least annually for leaks and repairs implemented, as appropriate;

- Subsurface Drainage: Subdrain outlet pipes should be checked for flow of water during the occurrence of precipitation. Lack of drainage may indicate blockage within the subdrain pipe. Clean-outs should be checked and flushed, as appropriate;

- Stitch piers: If sloughing/raveling downslope of stitch piers results in the portions of the stitch piers becoming exposed, installation of lagging would be needed to prevent loss of ground upslope of the stitch piers.

- Debris Walls: Debris walls should be monitored for accumulation of slope debris, and cleared, as appropriate.

5.11 Future Performance

All owners or occupants of homes on hillsides should realize that landslide movements are always a possibility, although generally the likelihood is very low that such an event will occur. The probability that landsliding will occur is substantially reduced by the proper maintenance of drainage measures at the site (see detailed discussion in Appendix G). Therefore, the homeowners should recognize their responsibility for performing such maintenance. Consequently, we recommend that a copy of our report be provided to all homeowners in the development. Should ownership changes occur, a copy of this report should be provided to future owners.

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Aerial Photographs

Type	Date	Scale	Photo No.	Source
Black and White, Stereo Pair	1935	1:16,500	AV 248-05- 07, 08	Pacific Aerial Surveys
Black and White, Stereo Pair	03/21/38	1:20,000	AV 08-03- 05, 06	Pacific Aerial Surveys
Black and White, Stereo Pair	07/29/46	1:23,600	AV 09-08 03, 04	Pacific Aerial Surveys
Black and White, Stereo Pair	07/28/48	1:7,600	AV 17-06- 08, 09	Pacific Aerial Surveys
Black and White, Stereo Pair	05/10/55	1:10,000	AV 170-04- 07, 08	Pacific Aerial Surveys
Black and White, Stereo Pair	03/01/58	1:36,000	SF-AREA 01- 66, 67	Pacific Aerial Surveys
Black and White, Stereo Pair	04/23/58	1:7,200	AV 279-05- 10, 11	Pacific Aerial Surveys
Black and White, Stereo Pair	06/20/61	1:12,000	AV 432-04- 11, 12	Pacific Aerial Surveys
Black and White, Stereo Pair	04/18/68	1:30,000	GS-VBZJ-01- 114, 115	United States Geological Survey
Black and White, Stereo Pair	10/29/69	1:12,000	AV 933-04- 07, 08	Pacific Aerial Surveys
Black and White, Stereo Pair	05/10/72	1:12,000	AV 1045-04- 08, 09	Pacific Aerial Surveys
Black and White, Stereo Pair	04/28/75	1:12,000	AV 1188-03- 06, 07	Pacific Aerial Surveys
Black and White, Stereo Pair	05/27/77	1:12,000	AV 1356-03- 07, 08	Pacific Aerial Surveys
Black and White, Stereo Pair	05/30/79	1:12,000	AV 1705-03- 07, 08	Pacific Aerial Surveys
Black and White, Stereo Pair	06/19/81	1:12,000	AV 2020-03- 06, 07	Pacific Aerial Surveys

Black and White, Stereo Pair	05/11/83	1:12,000	AV 2265-03-06, 07	Pacific Aerial Surveys
Black and White, Stereo Pair	10/14/85	1:12,000	AV 2670-03-06, 07	Pacific Aerial Surveys
Black and White, Stereo Pair	10/01/86	1:20,400	AV 2944-02-05, 06	Pacific Aerial Surveys
Black and White, Stereo Pair	06/19/89	1:12,000	AV 3556-03-05, 06	Pacific Aerial Surveys
Color, Stereo Pair	09/24/91	1:20,400	KAV 4115-102-06, 07	Pacific Aerial Surveys
Black and White, Stereo Pair	08/27/93	1:12,000	AV 4515-04-05, 06	Pacific Aerial Surveys
Black and White, Stereo Pair	06/10/94	1:12,000	AV 4661-03-06, 07	Pacific Aerial Surveys
Black and White, Stereo Pair	09/07/95	1:12,000	AV 4916-04-06, 07	Pacific Aerial Surveys
Black and White, Stereo Pair	06/23/97	1:12,000	AV 5434-104-05, 06	Pacific Aerial Surveys
Black and White, Stereo Pair	08/15/00	1:12,000	AV 6600-04-06, 07	Pacific Aerial Surveys

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San Francisco Overlook Development Residential Project Draft
Environmental Impact Report
(2004.0093E)

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ENVIRONMENTAL IMPACT REPORT*

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REQUEST FOR FINAL ENVIRONMENTAL IMPACT REPORT
San Francisco Overlook Development Residential Project
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