SUTRO TOWER DIGITAL TELEVISION PROJECT

Draft Environmental Impact Report

Planning Department Case No. 2007.0206E
State Clearinghouse No. 2008012005

Draft EIR Publication Date: May 17, 2008
Draft EIR Public Hearing Date: June 26, 2008
Draft EIR Public Comment Period: May 17, 2008 through July 1, 2008

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TO: Distribution List for the Sutro Tower Digital Television Project EIR

FROM: Bill Wycko, Acting Environmental Review Officer

SUBJECT: Request for the Final Environmental Impact Report for the Sutro Tower Digital Television Project (Case No. 2007.0206E)

This is the Draft of the Environmental Impact Report (EIR) for the Sutro Tower Digital Television 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 entitled "Comments and Responses," which will contain a summary of all relevant comments on this Draft EIR and our responses to those comments, along with copies of the letters received and a transcript of the public hearing. The Comments and Responses document may also specify changes to this Draft EIR. Public agencies and members of the public 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; others may receive such copies and notice on 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 then 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 Environmental Impact Report. The Final EIR will add no new information to the combination of the two documents except to reproduce the certification resolution. It will simply provide the information in one rather than two documents. 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.

We are aware that many people who receive the Draft EIR and Comments and Responses document 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, in Adobe Acrobat format on a compact disk (CD), to private individuals only if they request them. Therefore, if you would like a copy of the Final EIR, please fill out and mail the postcard provided inside the back cover to the Major Environmental Analysis 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.

Thank you for your interest in this project.

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Summary

A. Project Description (p. 15)

Location and Setting

The approximately 5.6-acre project site, in San Francisco's Midtown Terrace neighborhood, is roughly bounded by Dellbrook and Clarendon Avenues, Panorama Drive, and Farview and Clairview Courts. The Sutro Tower facility, which is enclosed within a security fence, includes a 977-foot-tall steel communications tower, a transmitter building, a garage and storage building, a guard station, emergency generators, ancillary antennas and equipment associated with radio communications, and a surface parking lot. The facility is owned and operated by Sutro Tower, Inc., the project sponsor. The project site is about one-quarter mile south of the University of California at San Francisco (UCSF) and about one-eighth mile east of Clarendon Alternative Elementary School. Located just southeast of Mount Sutro, Sutro Tower is at an elevation of 834 feet above sea level and is widely visible. The site is in a RH-1(D) (single-family, detached) use district and a 40-X height and bulk district (40-foot height limit; no bulk limit). Surrounding uses of site are predominantly low-density, single-family residences, with some institutional and open space uses. The project site is immediately surrounded by open space that spans much of the area between Twin Peaks and Mount Sutro. The closest residences to the project site are located along Dellbrook Avenue, Farview Court, and Palo Alto Avenue; the nearest dwelling is approximately 200 feet from the tower. Nearby open spaces include the Midtown Terrace Playground, across Panorama Drive and Dellbrook Avenue (less than one-fourth mile away); the Interior Greenbelt, along Clarendon Avenue and between Stanyan Street and the UCSF Medical Center; the UC-owned Mount Sutro Open Space Reserve, across Clarendon Avenue; and Twin Peaks, one-third mile to the southeast. Institutional uses in the area include UCSF Medical Center, Clarendon School, San Francisco Fire Station No. 20, at Clarendon Avenue and Olympia Way, Laguna Honda Hospital, Youth Guidance Center, and four city reservoirs (Summit, Twin Peaks, Sutro, and Laguna Honda Reservoirs). The nearest concentration of commercial uses is about two-thirds of a mile south of the project site, on Portola Drive.

Project Components

The project sponsor proposes to convert the television antennas on Sutro Tower from the current combination of analog and digital to an all-digital system, to comply with a federal requirement to convert all television broadcasting to digital signals by February 2009. Project components would include:

1. Replacement of the nine existing analog main antennas at the top of Sutro Tower (762 feet to 977 feet above ground level (AGL)) with no more than five digital main antennas at the same location;

2. Structural upgrades to the tower to enable the tower to meet *Building Code* wind resistance requirements for an "essential facility" and to accommodate the placement of new digital television equipment on the tower;

3. Removal of four digital main television antennas between Levels 5 and 6 of Sutro Tower;

4. Removal of nine analog auxiliary television antennas on Level 2 and installation of two digital auxiliary antennas extending between Levels 3 and 4 and one digital auxiliary antenna at Level 2;

5. Alteration, replacement, or addition of small ancillary and accessory antennas and equipment associated with the operation of Sutro Tower broadcasters; and

6. Addition of auxiliary equipment, and electrical, elevator, and public safety improvements associated with the proposed project.

With implementation of the proposed project, the total number of television antennas operating at Sutro Tower would be reduced from 22 antennas (nine existing analog main antennas, nine existing analog auxiliary antennas, and four existing digital main antennas) to eight antennas (five digital main antennas and three digital auxiliary antennas). Nine existing radio station antennas would remain, and the transmitter building at the base of the tower, the garage, and the guard station would remain unchanged.

As part of the proposed project, structural upgrades would be made to the tower to enable the tower to meet *Building Code* wind resistance requirements for an "essential facility" and to accommodate the placement of new digital television equipment on the tower. These improvements would include strengthening of one of three columns on each of the three tower legs above tower Level 3 and replacing "splice plates" between lengths of each of the columns with higher-strength plates; reinforcement at Levels 2 through 5 of the connections between the horizontal trusses and the three tower legs; the addition of new braces to convert locations with single diagonal braces to an "X-braced" system; upgrading bolted connections to welded connections on the Level 6 horizontal "outriggers" that anchor guy wires supporting the vertical masts atop the tower; adding welded steel tabs where these same horizontal trusses connect to the tower legs; adding welded L-shaped steel angles to the same trusses at certain locations between the tower legs; and replacement of bolted connections with welded connections, along with the addition of stiffener plates to existing triangular gusset plates, on existing diagonal braces within the tower legs at various locations between Levels 1 and 2, Levels 2 and 3, and Levels 5 and 6.

The project also includes installation of 14 new panel antennas and a microwave dish antenna for two high-speed wireless data services. Following replacement of the existing analog antennas atop the tower's highest level by digital antennas and reconfiguration of the mast assemblies that support the antennas, the

uppermost point of all three mast assemblies would remain the same as under existing conditions: that is, the topmost points, including new digital antennas, would remain at 977 feet above ground level (AGL). A new 300-square-foot rooftop equipment enclosure on top of the transmitter building would be required to house digital combining equipment for the new digital television antennas. The five new digital antennas would serve 11 television stations that currently broadcast from Sutro Tower (KTVU, KRON, KPIX, KGO, KQED, KBHK, KBWB, KMTP, KCSM, KFSF, and KCNS).

Approximately 184 other existing small antennas and ancillary equipment that currently exist at Sutro Tower would remain. Some of these smaller-scale antennas and equipment are accessory to the television and radio station tenants, or are the primary broadcasting equipment for telecommunications and public safety tenants. Other smaller-scale antennas and facilities include point-to-point microwave "dishes" (similar to a home satellite dish) between two and 10 feet diameter; "whip" antennas two to three inches in diameter and less than 15 feet in height; flat panel antennas between eight to 10 inches wide and one to two feet tall; and weather cameras and weather monitoring stations, usually smaller than two feet in any dimension. The smaller-scale antennas and accessory equipment are located on the tower itself, on the transmitter building rooftop, and in a few cases, on the secured grounds of Sutro Tower. As part of the proposed project, a new 2-foot microwave dish and 14 new 36-inch by 30-inch by 2-inch panel antennas would be installed at Level 3 (385 feet AGL) for two new high-speed wireless data service tenants. Other smaller-scale antennas and equipment may be altered, replaced, or added to the tower and roof of the transmitter building in the future, subject to broadcasting requirements, the availability of appropriate technology, and the availability of space within the transmitter building for necessary cabling and equipment. For analysis of the tower's structural capability, it was conservatively assumed that up to 6,000 pounds of equipment could be added in the future at each of Levels 2, 3, and 4, and 2,000 pounds at Level 5.

Additional electrical, elevator, and public safety improvements (including fire suppression, security, and emergency notice improvements) could also be included as part of the operation of Sutro Tower.

Schedule

Project construction is anticipated to commence in the latter half of 2008 and would take approximately 12 to 16 months to complete with an estimated cost of $1.75 million. The entire project would be completed as a continuous process. The project would not require excavation.

Approvals Required

Communication facilities such as Sutro Tower are conditionally permitted in an RH-1(D) district as "Public Facilities and Utilities" under *Planning Code* Section 209.6. Because the proposed project does not include major remodeling of the tower, expansion of the transmitter building at the base of the tower, or a change in use, an amendment to the existing conditional use authorization would not be required for the proposed project. However, pursuant to City Planning Commission Resolution No. 11399, adopted July 14, 1988, the Planning Commission will hold a public hearing to review the proposed project under

its Discretionary Review authority. The project would not increase the height or bulk of the tower; thus, the proposed project would be consistent with the height and bulk controls, as it would not change the height of a legally noncomplying structure.

Every Sutro Tower building permit since 2000 has been subject to a series of "Standard Sutro Tower Conditions" imposed by the Planning Commission, which require mandatory structural inspections, monitoring of radio frequency radiation (RFR), and communications with neighborhood organizations . The project may also require building and electrical permits to allow Sutro Tower and/or its tenants to make improvements to their leased space to accommodate the described antenna and accessory equipment or to alter, replace, or add small-scale accessory and ancillary equipment in the future.

Project Sponsor's Objectives

The primary objective of Sutro Tower, Inc. as project sponsor is to replace the existing analog television facilities with digital television (DTV) facilities to comply with the FCC's mandate to consolidate all United States television broadcast operations to DTV by February 17, 2009, after which time analog transmission will not be allowed. Sponsor's objectives are presented in detail in the Project Description, p. 29.

B. Main Environmental Effects

Aesthetics and Visual Quality (p.36)

Sutro Tower is an existing facility and the appearance of the tower and its antennas, as well as that of the ground-level building and other equipment, are part of the existing setting. Consideration of the project's aesthetic impacts is limited to effects of the proposed digital television conversion project and equipment changes or alterations associated with continuation of Sutro Tower for radio frequency communications, as well as the potential future replacement, alteration and/or installation of an unknown number of smaller-scale antennas and accessory equipment.

It is not expected that the change in antennas or their reconfiguration would be generally noticeable. Neither the replacement of existing auxiliary analog antennas at Level 2 with new auxiliary digital antennas that would be attached between Levels 3 and 4 (approximately 460 feet above ground level at the midpoint between these levels) nor the replacement of existing main antennas atop Level 6 (above 762 feet AGL) with new digital main antennas and reconfiguration of the supporting mast assemblies would result in a substantial visual change, particularly in the context of the tower's existing cross-bracing, cable-ties, trusses, and existing antennas. From longer-range views, the antenna reconfiguration would not be noticeable, as these elements start to blend in with the tower's main structural elements. In general, it is expected that visual changes as a result of the project would be difficult to detect from both nearby ground-level views and in mid- and long-range views of the tower, even upon close inspection.

Similarly, the potential future alteration, replacement, and/or installation of an unknown number of smaller-scale antennas and accessory equipment would also not result in a substantial visual change,

assuming such smaller-scale equipment would be approximately the same size and scale as has been the case in the past, because such equipment has historically been small enough as to be nearly indistinguishable in both nearby ground-level views of Sutro Tower and in mid- and long-range views of the tower. Thus, this impact would be less than significant, both individually and cumulatively.

Because the tower is situated within stands of mature Eucalyptus trees, the ancillary structures and 150 to 200 feet of the tower's base are partially screened from view from many off-site locations. Therefore, changes to the ancillary structures on the ground, such as the addition of new rooftop equipment enclosures on top of the transmitter building, would not be visible from most public views, except for locations to the east-southeast, such as along Farview Court and Marview Way. The expansion of rooftop equipment facilities might be visible from some of these locations, but would not substantially change the appearance of the transmitter building and associated equipment, as the expansion would be small in the context of existing partial views of the transmitter building.

Thus, in the context of the tower's existing physical elements, it cannot be concluded that the proposed project would result in a substantial, demonstrable negative aesthetic effect or would substantially degrade the existing visual character of the site and its surroundings. Therefore, the proposed project would not result in significant impacts related to visual quality.

Geology, Soils, and Seismicity (p.45)

The proposed project site is located in a seismically active region. According to the U.S. Geological Survey Working Group, the project site (and the Bay Area) will likely experience one or more earthquakes of Richter magnitude 6.7 or greater within the next 30 years. Sutro Tower was constructed in 1972. A supplemental seismic evaluation analysis was conducted in 1997 to review the structure under the 1995 revision of the *San Francisco Building Code*. In 1997, the Planning Department determined that Sutro Tower was a critical component of the City's emergency communications system and designated it as an "essential facility" subject to more restrictive seismic design criteria than ordinary structures. In order to meet the *Building Code* standards for an essential facility, a revised seismic and structural analysis was conducted by EQE International and is summarized in the document entitled, "Seismic/Structural Analysis of Sutro Tower," dated June 1999. This analysis resulted in upgrades to the tower's structural design in 2004 – 2005 consisting of local reinforcement of a small percentage of the structure's braces, columns, and connections.

For the currently proposed DTV project, changes to the structure's design were evaluated against the current *San Francisco Building Code* requirements for essential facilities. Using the base model originally developed by EQE International, an additional seismic and structural analysis was conducted by structural engineers Simpson Gumpertz & Heger in 2008. The model used for the 2008 seismic and structural analysis accounted for the existing structure, including modifications made as part of a wind upgrade undertaken in connection with the earlier installation of DTV antennas, the modifications included as part of the seismic upgrade completed in 2005, and the weight of the currently proposed DTV equipment. Additionally, a conservative allowance was made for some 6,000 pounds of equipment that could be

added in the future at each of Levels 2, 3, and 4 of Sutro Tower, and 2,000 pounds at Level 5, as included in the project description.

The current analysis recommends a series of structural upgrades to enable Sutro Tower to accommodate the proposed reconfiguration of broadcast equipment and to meet all *Building Code* wind and seismic criteria for essential structures. As described in more detail in Section III.B, Geology, Soils, and Seismicity, these improvements would include: strengthening of one of three columns on each of the three tower legs above tower Level 3 and replacing "splice plates" between lengths of each of the columns with higher-strength plates; reinforcement at Levels 2 through 5 of the connections between the horizontal trusses and the three tower legs; the addition of new braces to convert locations with single diagonal braces to an "X-braced" system; upgrading bolted connections to welded connections on the Level 6 horizontal "outriggers" that anchor guy wires supporting the vertical masts atop the tower; adding welded steel tabs where these same horizontal trusses connect to the tower legs; adding welded L-shaped steel angles to the same trusses at certain locations between the tower legs; and replacement of bolted connections with welded connections, along with the addition of stiffener plates to existing triangular gusset plates, on existing diagonal braces within the tower legs at various locations between Levels 1 and 2, Levels 2 and 3, and Levels 5 and 6.

Although the proposed project would change the overall seismic demand on the structure during the modeled ground shaking scenarios due to the reconfiguration of antennas on the tower, the recommended structural upgrades, which are proposed by the sponsor as part of the proposed project, would compensate for the increased seismic demand. Therefore, the project would have a low potential for adverse effects related to seismic ground shaking. Seismic-related ground failure is not anticipated due to the fact that the original seismic analysis of the structure concluded that the rock formations encountered during the test borings would provide adequate support for both downward and uplift loads. Furthermore, the original foundation investigation provided recommendations for foundation considerations based on dead load plus live load plus seismic load. As part of the current structural analysis for the tower, Simpson Gumpertz & Heger reviewed the loads imposed by the tower to confirm it was within the parameters set in the original investigation. Therefore, the proposed project would result in a less-than-significant impact with regard to strong seismic ground shaking. Likewise, the project would not result in substantial adverse effects related to catastrophic failure from ground shaking.

According to the Seismic Hazard Zones map for the City of San Francisco, the project site is located at the margin of an area mapped as susceptible to earthquake-induced landslide or slope failure. The project site is also shown to be within an area subject to potential landslide hazard according to Map 5 of the *General Plan* Community Safety Element. Landslide-susceptible areas are generally characterized by steep slopes and downslope creep of surface materials. The topography in the vicinity of the project site is characterized by a generally level area that is oblong in shape and oriented in a northeast/southwest trending direction, and that includes the concrete-topped Summit Reservoir and Sutro Tower and its transmission building and parking lot. Due to the relatively flat topography in the vicinity of the project area, the slope on which the tower was constructed is considered relatively stable. Southwest of the tower,

the topography slopes relatively steeply down to Dellbrook Avenue and Clarendon Avenue below, and the slope above Dellbrook Avenue is mapped as being within an area susceptible to seismically inducted landsliding.

Slope stability can depend on a number of complex variables. The geology, structure, and amount of groundwater in the slope affect slope failure potential, as do external processes (i.e., climate, topography, slope geometry, and human activity). The factors that contribute to slope movements include those that decrease the resistance in the slope materials and those that increase the stresses on the slope. Because the tower is anchored to its foundation, which sits atop bedrock, and because the increase in total mass of the structure and its equipment (assuming the addition of up to 20,000 pounds of future small equipment) would be relatively small, the proposed project is not expected to alter the current slope stability. Therefore, this impact is considered less than significant.

The proposed project would not result in significant effects with regard to seismically induced ground shaking or landslides. Accordingly, and because other geologic factors such as liquefaction, ground rupture, and expansive soils would result in less-than-significant impacts, it can be concluded that the project site is not on a geologic unit or soil that is unstable, nor would the site become unstable as a result of the project and, therefore, the project would not result in landslides, lateral spreading, subsidence, liquefaction or collapse.

In light of the above, the proposed project would not expose people, including nearby residents, or structures, including nearby reservoirs or Clarendon Elementary School, to risk of injury or death or structural loss due to seismic ground shaking or landslides. The project would not be located on an unstable geologic unit or soil, nor would the underlying geologic unit or soil become unstable as a result of the project. The project would not result in landsliding, lateral spreading, subsidence, liquefaction or collapse. Therefore, effects related to geology, soils, and seismicity would be less than significant.

Radio Frequency Radiation (p.62)

Radio frequency radiation (RFR) emissions from existing antennas at the Sutro Tower site, from conditions during construction, and for conditions following completion of the project were evaluated by Hammett & Edison, broadcast engineers for Sutro Tower. Existing RFR conditions were based on field measurements of RFR exposure levels; conditions during construction and following completion of the project were calculated according to Federal Communications Commission (FCC) methodology for evaluating RFR exposure. These calculated RFR emissions levels for the construction and with-project scenarios include several “worst-case” assumptions and, therefore, are expected to overstate actual power density levels. For project conditions, the anticipated RFR exposure levels under with-project conditions were calculated for standard operation on the main antennas, operation of the main and auxiliary antennas during construction, and the unlikely, theoretical operation of all FM and/or TV auxiliary antennas at the same time. Results are compared to the FCC’s maximum permissible exposure limits for field strength and power density. These regulations provide separate limits for occupational and public exposure

conditions. The public exposure conditions, used in this analysis, are generally five times more restrictive. These limits are intended to provide a prudent margin of human safety.

Measured maximum existing RFR exposure levels at ground level for the Sutro Tower project area for all broadcast facilities under normal main antenna operation is 8.5 percent of the FCC public exposure limit, for any publicly accessible location. Auxiliary antennas are permanent standby facilities used during routine maintenance or failure of the main antennas. Although it is not unusual for individual stations to transmit from their auxiliary antennas for short periods of time, transmissions from the auxiliary antennas by all stations simultaneously is atypical. For the existing auxiliary TV antennas, the combined operation of all eight antennas could theoretically result in exposure levels equal to 99 percent of the FCC public exposure limit, and the combined operation of these auxiliary antennas, along with all other existing FM and ancillary antennas, could theoretically exceed the FCC public exposure limit. To ensure that no combination of auxiliary antennas is energized at the same time such that cumulative RFR exposure levels at ground level would exceed the FCC public exposure limit, the maximum individual contribution of each auxiliary antenna is restricted by a "Table of Contributions," an operational procedure that describes the maximum limit for each station. This established operational procedure requires that certain broadcasters operate at reduced power from auxiliary antennas, depending on the operating status of other broadcasters.

During construction, the maximum RFR exposure levels would be 3.9 percent of the public exposure limit at any publicly accessible location during operation on the main digital antennas and 15.3 percent of the public exposure limit at any publicly accessible location during operation of auxiliary DTV antennas, which would be used when worker access to the main DTV antenna areas is required. This would be higher than current measured RFR exposure levels of 8.5 percent. This higher level of exposure would occur only during daytime hours when worker access to areas near the existing main DTV antennas is required, because at these times, the auxiliary DTV antennas would be use to avoid worker exposure to RFR in excess of permitted limits. At all other times during construction, when the new main DTV antennas are operating, the RFR levels would be 3.9 percent of the public exposure limit.

With completion of the project and during future normal operation of main DTV antennas, the calculated maximum RFR level following completion of the proposed project would be 8.4 percent of the public exposure limit at any publicly accessible location, reduced incrementally from the existing measured level of 8.5 percent, due to the reconfiguration of antennas. The cumulative RFR exposure levels from the theoretical operation of all auxiliary TV, FM and ancillary antennas would be unchanged from existing conditions for both the construction phase and operations following completion of the proposed project, and in each instance, the agreed-upon Table of Contributions would continue to be required to achieve compliance with the FCC public exposure limit.

The mandatory RFR measurement program (found within the Standard Sutro Tower Conditions adopted in 2000) stipulates that "Sutro Tower Inc. shall measure RFR public exposure levels at 200 publicly accessible sites within 1,000 feet of the tower. Measurements shall be made within six months of the

activation of any 'DTV' broadcasting antenna, or within six months of any increase in power from any main DTV antenna, whichever is earliest." Therefore, in connection with the currently proposed project, Sutro Tower Inc. will measure RFR public exposure levels at 200 publicly accessible sites within 1,000 feet of the tower after installation of the new shared DTV auxiliary antennas and again after installation of the new DTV main antennas. These measurements would be submitted to the Department of Public Health and provide analytical data to ensure that the RFR exposures from tower operations are protective of human health at the project site and in vicinity, both during and following construction of the project.

Because RFR levels in publicly accessible areas near the project site would decline incrementally under normal operations in the future, and because the FCC exposure limit is designed to be protective of all persons, including children, the proposed project would not adversely affect children at Clarendon Elementary School, located approximately one-eighth mile from the tower. In addition, because RFR levels decline rapidly with increased distance from the tower, RFR levels at the Clarendon Elementary School location are, and would continue to be, lower than the values reported above for locations much closer to Sutro Tower. The potential impact of the Sutro Tower project on the nearby elementary school would be less than significant.

In summary, because radio frequency radiation emitted from Sutro Tower under the proposed project would decline incrementally under long-term permanent conditions, compared to existing conditions, and because RFR levels would be well within the FCC maximum permissible exposure level for the public, the project would result in a less-than-significant impact with regard to RFR emissions.

Risk of Fire (p.70)

The proposed project would not result in the addition of new combustible materials nor in the elimination of the existing measures Sutro Tower, Inc., takes to monitor and minimize fire risk from trees on its own property. These measures include maintaining access trails across the property to enable Fire Department access, regularly trimming shrubs and brush, removing dead wood from trees, periodically thinning or trimming trees to reduce the likelihood of serious fire risks, and inspecting the access trails and the trees on a daily basis to monitor ongoing fire safety and on-site security. Project construction would include welding activities. Sutro Tower's safety plan includes provisions for fire prevention during welding, including having a trained crewmember assigned to continuously monitor the surrounding area for fire The fire monitor would have two-way radio contact with work crews on the tower to notify them of any fire danger, "in which case work will immediately cease and additional precautions taken." Additionally, workers on the tower will use welding blankets to contain sparks and slag, and will have a fire extinguisher present at all welding stations. A fire extinguisher would also be available to ground personnel. Therefore, it is not anticipated that the proposed project would result in significant effects with regard to fire safety.

C. Areas of Controversy and Issues to be Resolved

Some residents living near Sutro Tower, and others, are concerned about potential safety risks to the neighborhood from potential structural failure of the tower, particularly in an earthquake; potential effects of radio frequency radiation emitted by the antennas and other equipment on the tower and elsewhere at the facility; and about the visual effect of Sutro Tower, one of the most recognizable structures on the San Francisco skyline. These issues are addressed in Chapter III of this EIR.

D. Mitigation Measures (p. 73)

The Initial Study found that truck traffic and other equipment operating during the construction period of the proposed project could cause some temporary increases in particulate dust and other pollutants that would increase particulate concentrations near the project site. The project sponsor would implement the following mitigation measure to ensure that the proposed project's construction air quality impacts would be less than significant.

Construction Air Quality

> The project sponsor shall require the contractor(s) to spray the site with water during demolition, excavation, and construction activities; spray unpaved construction areas with water at least twice per day; cover stockpiles of soil, sand, and other material; cover trucks hauling debris, soils, sand, or other such material; and sweep surrounding streets during demolition, excavation, and construction 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 that the contractor(s) 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 a prohibition on idling motors when equipment is not in use or when trucks are waiting in queues, and implementation of specific maintenance programs to reduce emissions for equipment that would be in frequent use for much of the construction period.

E. Significant Unavoidable Effects (p. 74)

As explained in Chapter V, the proposed project would not result in any potentially significant effects that could not be avoided.

F. Alternatives to the Proposed Project (p. 76)

Project alternatives were analyzed based on information provided by Hammett & Edison, Inc., broadcast engineers for Sutro Tower. This firm also provides consulting services to American Tower Corp., the operator of the San Bruno Mountain broadcasting facilities, as well as to Sutro Tower Inc, the operator of the Sutro Tower broadcasting facilities, and most broadcasters operating at Sutro Tower.

Alternative A: No Project

Description

There would be no new construction under the No-Project Alternative, as this alternative would entail no immediate change to the Sutro Tower facilities. Under this alternative, the proposed additional digital antennas would not be brought to the site for installation on the tower and the ancillary antennas would not be removed. After the FCC's February 2009 deadline to consolidate to DTV, ten of Sutro Tower's 11 television stations would continue to operate from the existing DTV antennas that are installed below Level 6 on the tower. Because of its channel assignment, KGO cannot continue to use an existing DTV antenna and therefore would use its existing analog antenna above Level 6 for DTV operation after the transition. Three stations, KGO-TV, KCNS, and KBWB, might be able to use their existing auxiliary antennas for operation as auxiliary DTV antennas. However, no other station would have an auxiliary antenna under the no project alternative because the existing auxiliary antennas cannot function as DTV antennas. Therefore, the No-Project Alternative would entail severe limitations for at least eight of Sutro Tower's 11 television stations, which would not have any backup broadcast capability. Under the No-Project Alternative, once analog television broadcasting is terminated in 2009, the existing analog antennas above tower Level 6 would be shut down (except for KGO's, which, as noted, would be used for DTV broadcasting). These antennas could be removed at some point in the future.

Impacts

Under the No-Project Alternative, potential construction activity (if the existing analog antennas were removed) would take no more than approximately three months, as opposed to the project's 12- to 16-month construction schedule, and would also result in less truck traffic than the project: as with the project, construction-related traffic impacts would be less-than-significant. This alternative would also result in less visual change than the project and, as with the project, visual effects would be less than significant. Under the No-Project Alternative, structural upgrades proposed as part of the project would not be undertaken, because the seismic upgrades are designed to accommodate the placement of new digital television equipment on the tower and, without the new equipment, no such upgrade would be necessary. Therefore, effects would be considered less beneficial than those of the proposed project, although there could not be a significant impact under CEQA, because such a determination would require a change from existing conditions and no such change would occur under this alternative. Operation of the main DTV antennas would generate similar radiofrequency radiation (RFR) exposure to that of the proposed project; that is, an incremental decrease from existing conditions, and, as with the project, the effect would be less than significant because RFR exposure would be well below the FCC standard. Temporary noise impacts and air quality would be of lesser duration and intensity (if existing analog antennas were removed) than with the project. No permanent impacts would occur due to operation of either this alternative or the proposed project on the following: land use, population and housing, cultural resources, transportation, noise, air quality, wind and shadow, recreation, utilities and services, biology, hydrology, mineral and agricultural resources, or growth inducing effects.

Alternative B: San Bruno Mountain

Description

San Bruno Mountain is about five miles south of Sutro Tower, in northern San Mateo County. Unlike Sutro Tower, the existing broadcast tower site is not within a residential neighborhood; instead, the site is within San Bruno Mountain State and County Park, and nearest residences are approximately 0.5 miles (about 2,500 feet) to the west. The site has ten towers, ranging in height from 180 feet to 310 feet above grade (all shorter than Sutro Tower's 977 feet), at elevations of between about 1,200 and 1,300 feet. All 11 Sutro Tower stations could relocate to San Bruno Mountain. However, only three of the ten towers could accommodate additional antennas of the size required for the Sutro Tower DTV stations, with one multi-station main panel antenna on each tower, assuming that the towers can handle the weight of additional antennas or would require structural upgrade. A new tower would need to be constructed on San Bruno Mountain to accommodate one station's antenna, as well as to accommodate three auxiliary antennas that would be necessary for the 11 DTV stations to provide for backup signal transmission, as is planned on Sutro Tower with the proposed project (unless this alternative were to involve fewer than the 11 existing Sutro Tower TV stations and no auxiliary antennas). In addition to the new tower, the following additions to the San Bruno Mountain broadcast site would likely be required: four new transmitter buildings, additional power service, and backup electrical generators. Under this alternative, with the relocation of television broadcasting facilities from Sutro Tower to San Bruno Mountain, Sutro Tower would continue to be used for other telecommunication uses, including the future use of the radio frequency spectrum currently used for analog television broadcasting.

It is noted that the broadcast towers at San Bruno Mountain are operated by American Tower Corp., and not by the project sponsor, Sutro Tower, Inc. Therefore, the project sponsor could not implement this alternative. Moreover, because the San Bruno Mountain site is in San Mateo County, approval of this alternative would be under the purview of that county, and not the San Francisco Planning Commission or another San Francisco entity.

Impacts

The new transmission tower would have to be a minimum of 200 feet tall, comparable in height to existing towers at San Bruno Mountain. This addition would alter the visual setting, although not substantially, given that the new tower would visually "fit" within the context of the existing broadcast towers, and thus the impact would be less than significant. Because it is assumed that Sutro Tower would continue to be used for other telecommunications purposes, aesthetic conditions there would be similar to existing conditions. Under this alternative, necessary seismic and other structural upgrades that might be required would be made to three existing tower structures at San Bruno Mountain; these towers and the new tower would therefore meet current *Building Code* standards, although not necessarily those for essential facilities. However, because the towers are 2,500 feet distant from the nearest residence, there is minimal danger to persons from structural failure at this site. Therefore, effects of this alternative related to geology and seismicity would be comparable to those of the project, and would be less than significant.

Under this alternative, maximum additional radiofrequency radiation (RFR) level from the new antennas plus existing equipment would theoretically exceed the FCC public exposure limit, and thus operational changes would be required (one or more stations at San Bruno Mountain might relocate elsewhere and/or reduce operational power and/or alter its facilities to reduce RFR emissions). The precise nature of any such changes cannot be determined absent further investigation. However, it can be assumed that with appropriate operational procedures, effects due to RFR exposure would be less than significant.

Temporary construction impacts would be greater than those of the project because more construction would be required at the San Bruno Mountain site, and there is the potential that a number of special-status animal species that inhabit the mountain could be adversely affected. These include several butterflies (Mission Blue, San Bruno Elfin, San Francisco Silverspot, and Bay Checkerspot) and the San Francisco garter snake. Additionally, San Bruno Mountain is home to more than a dozen plant species that are listed as rare by the California Native Plant Society. Site-specific surveys for special-status species would be required once a specific location for a new tower, new transmission buildings, and the other new facilities were identified, to determine the precise nature of potential impacts to biological resources, as well as any potential effects related to stormwater runoff. (As noted, construction of a new tower could be avoided if one or more Sutro Tower TV stations were to remain at Sutro Tower.) Impacts of this alternative would be limited, and less than significant, in the areas of land use, population, public services and utilities, water, hazardous materials, energy, cultural resources, and growth inducing effects.

Alternative C: Mount Diablo

Description

Mount Diablo is located about 27 miles east of Sutro Tower. About 20,000 acres of the mountain have been established as Mount Diablo State Park, within which are two broadcast sites. The south site is located near the Juniper Campground, with the north site about 1.25 miles to the northeast. Areas outside of the tower compounds are publicly accessible. Each site has one tower suitable for broadcast service, although neither tower has sufficient room to accommodate the relocation of the Sutro Tower DTV stations. Installed on the south tower are antennas for two DTV stations and 13 FM translators/boosters; analog antennas for two television station and one FM booster station are installed on the north tower. Therefore, this alternative would require construction of at least one new tower on Mount Diablo. Because of FCC post-transition interference criteria, only eight of the 11 Sutro Tower stations would be able to locate antennas at Mount Diablo even if additional towers and infrastructure were added to the site: antennas for television stations KBCW, KCSM-TV, and KTVU could not relocate there due to prohibited interference; that is, these three stations could not broadcast from Mount Diablo because their signal would interfere either with each other's signals or with those of another station. Therefore, for this alternative to be feasible—that is, to enable the television broadcasters at Sutro Tower to convert to digital operation, including appropriate auxiliary broadcast facilities, this alternative would need to be incorporated with use of another site for the three stations that cannot relocate to Mount Diablo. This might involve continued operation of Sutro Tower to accommodate these three stations, in which case Sutro Tower would continue in operation as a broadcast facility.

It is noted that the broadcast facilities at Mount Diablo are operated by American Tower Corp. and Pappas Telecasting Companies, and not by the project sponsor, Sutro Tower, Inc. Therefore, the project sponsor could not implement this alternative. Moreover, because the Mount Diablo site is in Contra Costa County, approval of this alternative would be under the purview of that county, and not the City and County of San Francisco, except if some DTV stations continue to broadcast from Sutro Tower.

Impacts

Because this alternative would at least double the number of towers at one of the two facilities, the visible change would be notable, at least in close-in views. Inasmuch as Mount Diablo is a popular hiking destinations some observers would likely deem the impact of a new broadcast tower to be unsightly, and the impact could be significant, depending on the final height and design of the new tower. Visual changes would also occur at Sutro Tower, but the changes would be less substantial than with the proposed project and, as with the project, would be less than significant. It is assumed that the new tower(s) constructed at Mount Diablo would meet existing *Building Code* requirements, although not necessarily for an "essential facility," and effects related to geology and seismicity would be comparable to those of the proposed project, less than significant. As with the No-Project Alternative, Sutro Tower would not be structurally strengthened to meet the *Building Code* wind loading criteria for essential structures, and effects of this alternative would be considered less beneficial than those of the proposed project, at the Sutro Tower site, although the impact is not considered significant under CEQA, because Sutro Tower would meet current seismic *Building Code* standards and was upgraded to non-essential wind standards in 1995.

Under the Mount Diablo alternative, the maximum additional ambient RFR level anywhere at ground level would be approximately 40 percent of the FCC public exposure limit, for each of the two new towers. It is likely that operational measures could be used as part of a formal design for Mount Diablo to ensure that FCC exposure limits including existing equipment are not exceeded; however, the nature of any specific measures is too speculative to evaluate at this time. As with Alternative B, it can be assumed that with appropriate operational procedures, effects due to RFR exposure would be less than significant. Temporary construction impacts would be greater than with the project, and effects at Mount Diablo could potentially be significant, in terms of impacts to special-status species and possibly hydrologic effects. However, a site-specific design would have to be formulated to allow for more detailed evaluation of these potential effects. Impacts of this alternative would be limited, and less than significant, in the areas of land use, population, public services and utilities, water, hazardous materials, energy, cultural resources, and growth inducing effects.

CHAPTER II
Project Description

A. Site Location and Project Characteristics

Site Location

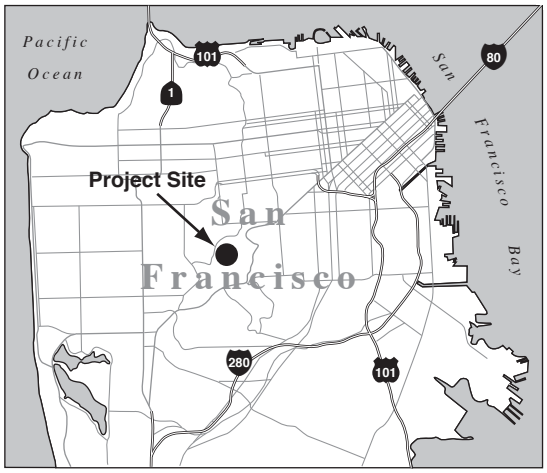
The approximately 5.6-acre project site (Assessors Block 2724, Lot 3) is located on a single parcel at 1 La Avanzada Street (formerly 250 Palo Alto Avenue) in San Francisco's Midtown Terrace neighborhood. The site is roughly bounded by Dellbrook Avenue (approximately 250 feet to the west), Clarendon Avenue, Panorama Drive (approximately 500 feet to the south), Farview Court, and Clairview Court (see **Figure 1**, p. 16). The entire Sutro Tower facility includes the tower, a transmitter building, a garage and storage building, a guard station, emergency generators, ancillary antennas and equipment associated with radio communications, and a surface parking lot with striping to accommodate 23 cars. The facility (although not the entire parcel) is completely enclosed within a security fence (see **Figure 2**, p. 17).

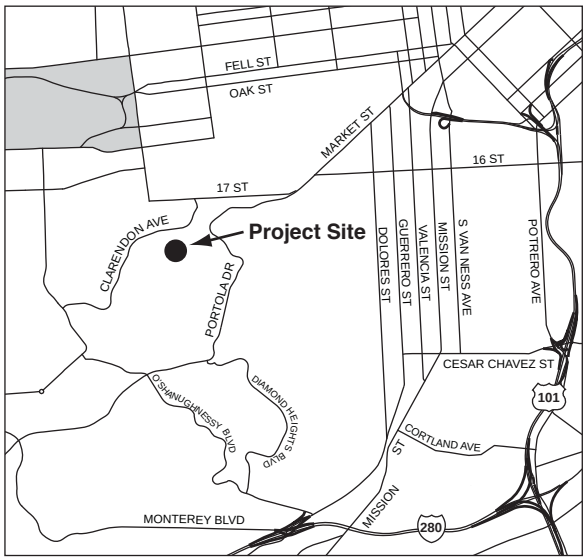
Located just southeast of Mount Sutro, the tower is located on one of the higher points in San Francisco (834 feet above sea level) and is generally visible from most places in the City. The project site is about one-half mile south of Kezar Stadium and Golden Gate Park, and one-quarter mile south of the University of California at San Francisco (UCSF). The project site is also about one-eighth mile east of Clarendon Alternative Elementary School. Surrounding neighborhoods include Forest Hill and the Sunset to the west, the Castro and Noe Valley to the east, Diamond Heights and Miraloma Park to the south, and the Haight Ashbury and Cole Valley to the north.

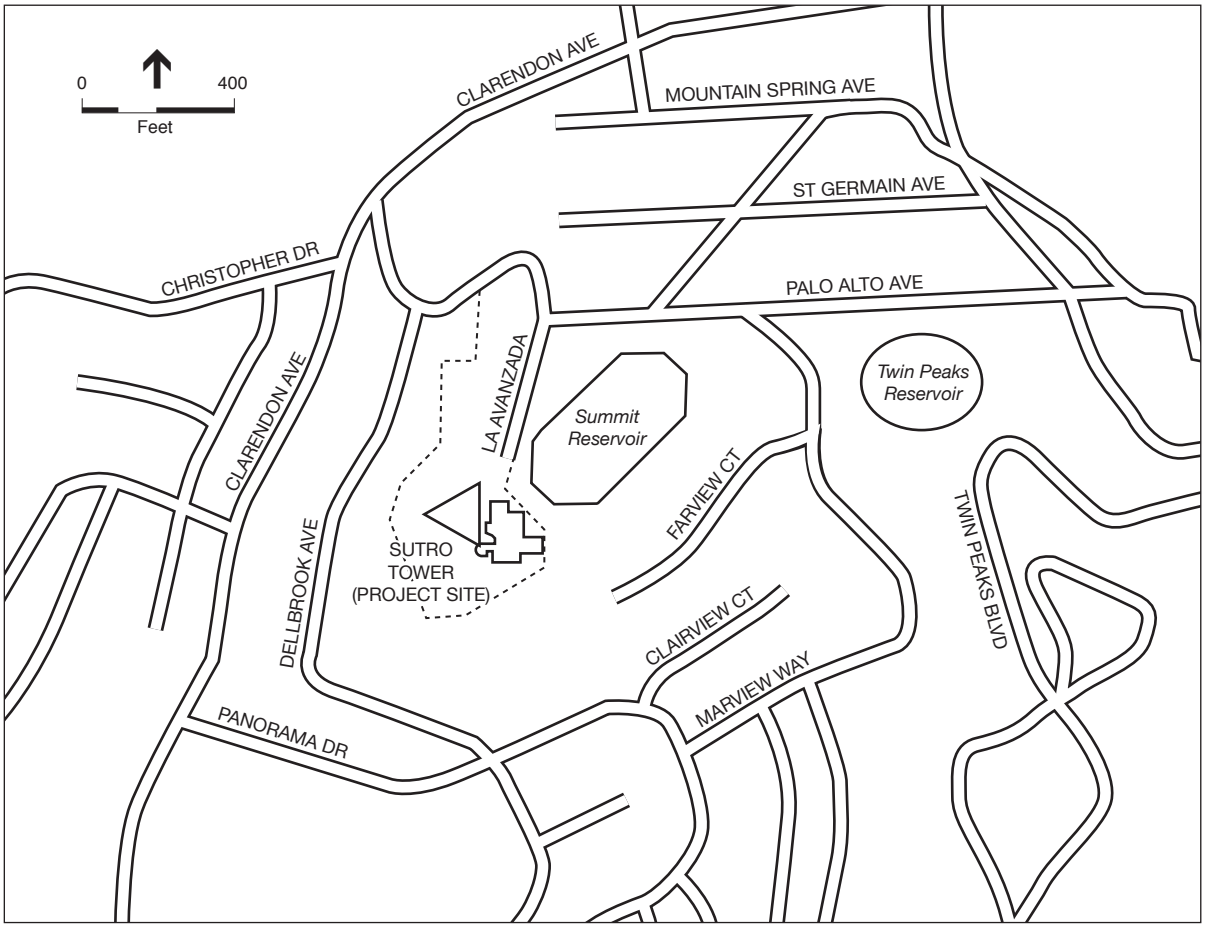
The project site is located in an RH-1(D) (Residential, House, One-Family, Detached) zoning district and within a 40-X height and bulk district (40-foot height limit; no bulk limit). RH districts are designed to accommodate and enhance areas characterized by one- to three-unit dwellings of limited width and height. Existing uses surrounding the project site are predominantly low-density residential uses.

Project Characteristics

The Sutro Tower telecommunications facility includes the following: an existing 977-foot-tall steel broadcasting tower/structure; a 31,000-square-foot transmission building; a garage/storage building; and a security guard station. The facility is owned and operated by Sutro Tower, Inc. (project sponsor). The project sponsor proposes to convert the television antennas on Sutro Tower from the current combination of analog and digital to an all-digital system. The project is being proposed to comply with the Federal



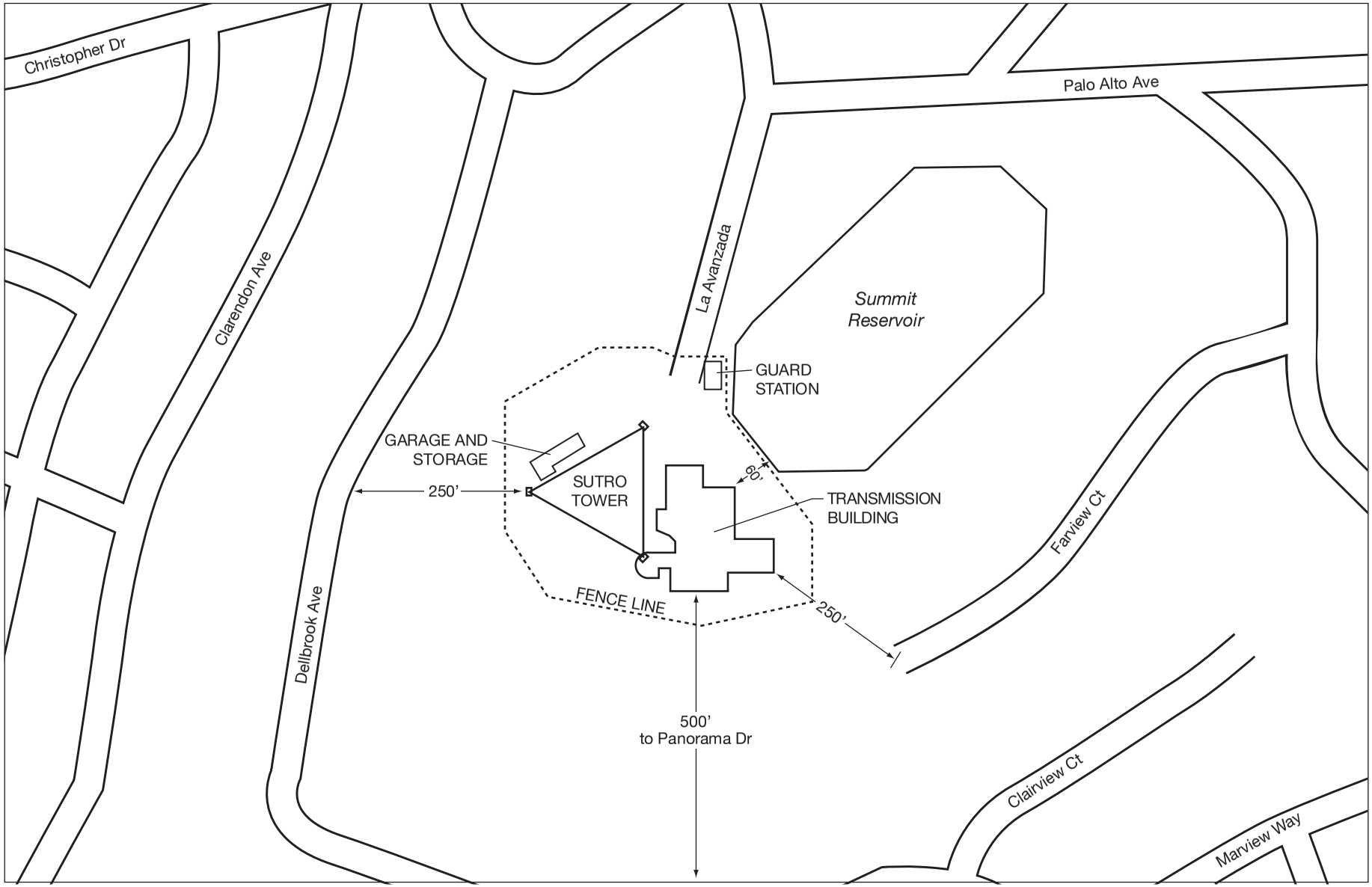




2007.0206E: Sutro Tower Digital Television - 206334

SOURCE: ESA

Figure 1
Project Location



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SOURCE: ESA

2007.0206E: Sutro Tower Digital Television - 206334

Figure 2
Site Plan

Communications Commission's (FCC) mandate to consolidate the United States television spectrum into a narrower spectrum space, which will free portions of the broadcast spectrum for other uses such as wireless data, voice or video services, cellular communications, and expanded broadband services, including those for use by public safety services (police and fire departments, etc.). The deadline for the conversion has been set by Congress at February 17, 2009, after which time analog transmission will not be permitted.[1]

The project sponsor proposes to replace the existing analog television antennas with digital television antennas. With implementation of the proposed project, the total number of television antennas operating at Sutro Tower would be reduced from 22 antennas (nine existing analog main antennas, nine existing analog auxiliary antennas, and four existing digital main antennas) to eight antennas (five digital main antennas and three digital auxiliary antennas). **Figures 3** and **4**, pp. 19 and 20, show the existing and proposed configuration of antennas on Sutro Tower, respectively. The number of radio station antennas would remain unchanged at nine antennas. The project also includes installation of 14 new panel antennas and a microwave dish antenna for two high-speed wireless data services. Approximately 184 other existing small antennas and ancillary equipment would remain, and the transmitter building at the base of the tower, the garage, and the guard station would also remain unchanged. Proposed project components include:

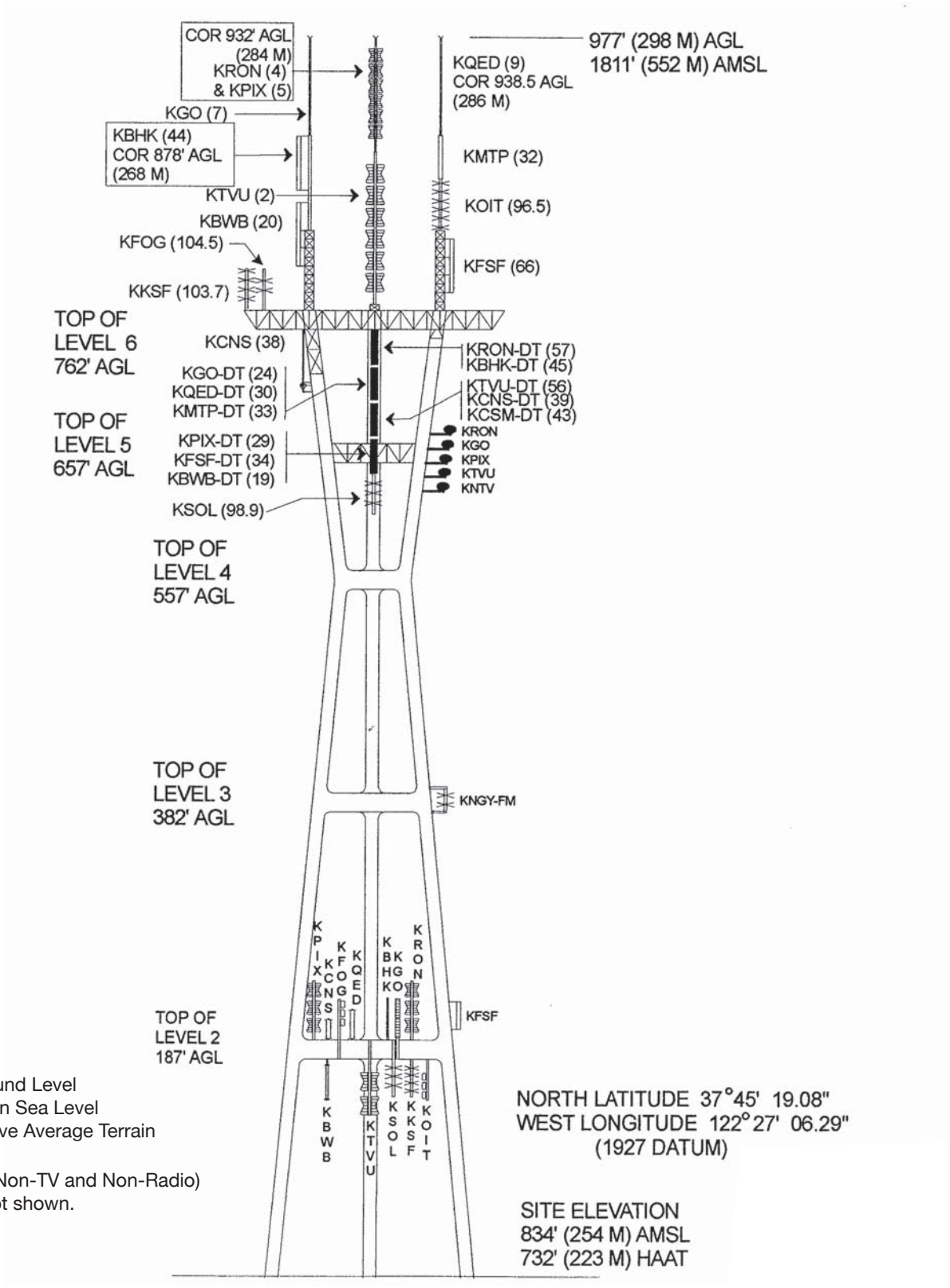
1. **Replacement of the nine existing analog main antennas at the top of Sutro Tower (762 feet to 977 feet above ground level (AGL)) with no more than five digital main antennas at the same location.** The new digital antennas are anticipated to be comparable to or smaller in size and total weight with the existing analog main antennas.

   As shown in **Figures 3** and **4**, pp. 19 and 20, three existing vertical mast assemblies extend upward 215 feet in height from Level 6 of the tower (762 feet AGL to 977 feet AGL). These vertical assemblies, consisting of a solid round steel pole atop an X-braced steel pedestal, constitute the topmost three points of the tower. Each of the masts is secured by non-metallic guy-wires (made of synthetic fibers) connected to the three horizontal X-braced trusses that make up Level 6 of the tower, and the pedestals are also secured to Level 6.

   As currently proposed, one of the three existing vertical masts (Mast B) would remain, although a portion of the solid round steel pole near the top would be replaced. Masts A and C would be largely replaced with new mast assemblies consisting of a round steel pole atop an X-braced pedestal.

   Two new digital antennas, each 30 to 40 feet in height, would be attached to Mast B. New digital antennas approximately 60 feet in height would be attached to each of the proposed new vertical mast assemblies (Masts A and C). A fifth digital antenna, 60 feet in height, would be attached to Mast A below the taller antenna. At each of the three mast assemblies, the pedestals would be at a height such

[1] The Digital Television Transition and Public Safety Act of 2005 requires that full-power television stations cease analog broadcasting after February 17, 2009.



LEGEND

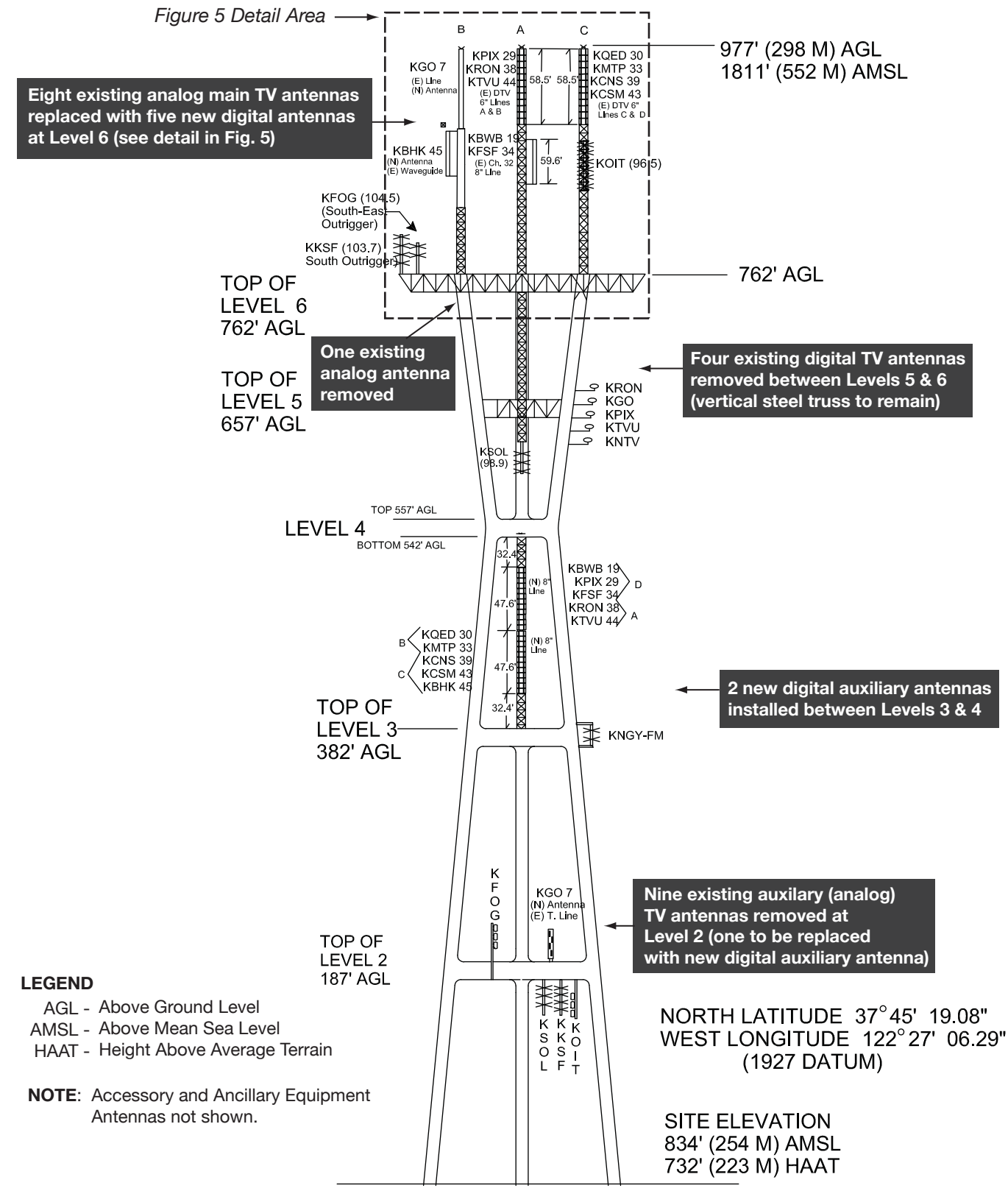
AGL - Above Ground Level
AMSL - Above Mean Sea Level
HAAT - Height Above Average Terrain

NOTE: Accessory (Non-TV and Non-Radio) Antennas not shown.

2007.0206E: Sutro Tower Digital Television - 206334

SOURCE: Sutro Tower, Inc.

Figure 3
Existing Antenna Configuration



2007.0206E: Sutro Tower Digital Television - 206334

SOURCE: Sutro Tower, Inc.

Figure 4
Proposed Antenna Configuration

that the uppermost point of all three mast assemblies would remain the same as under existing conditions: that is, the topmost points of all three mast assemblies, including new digital antennas, would remain at 977 feet AGL. New guy wires would attach each mast assembly to the horizontal trusses at Level 6. **Figure 5**, p. 22, depicts a detailed view of the proposed new digital television antenna configuration on the uppermost level of the tower. The five new digital antennas would serve 11 television stations that currently broadcast from Sutro Tower (KTVU, KRON, KPIX, KGO, KQED, KBHK, KBWB, KMTP, KCSM, KFSF, and KCNS).

Three existing radio station antennas are currently located above Sutro Tower Level 6. Two radio antennas are attached to two of the steel horizontal trusses at Level 6 where these beams extend beyond the vertical members of the tower ("outriggers"). The third radio antenna is attached to one of the vertical mast assemblies. All three radio antennas would remain at their current locations. No change would be made to these antennas.

Also remaining would be a radio station antenna that is attached to the bottom of the 125-foot-long vertical steel truss suspended from a horizontal beam between Level 5 and Level 6. No change would be made to this radio antenna. (This 125-foot vertical steel truss currently supports four digital antennas that would be removed as part of the project, as described below.)

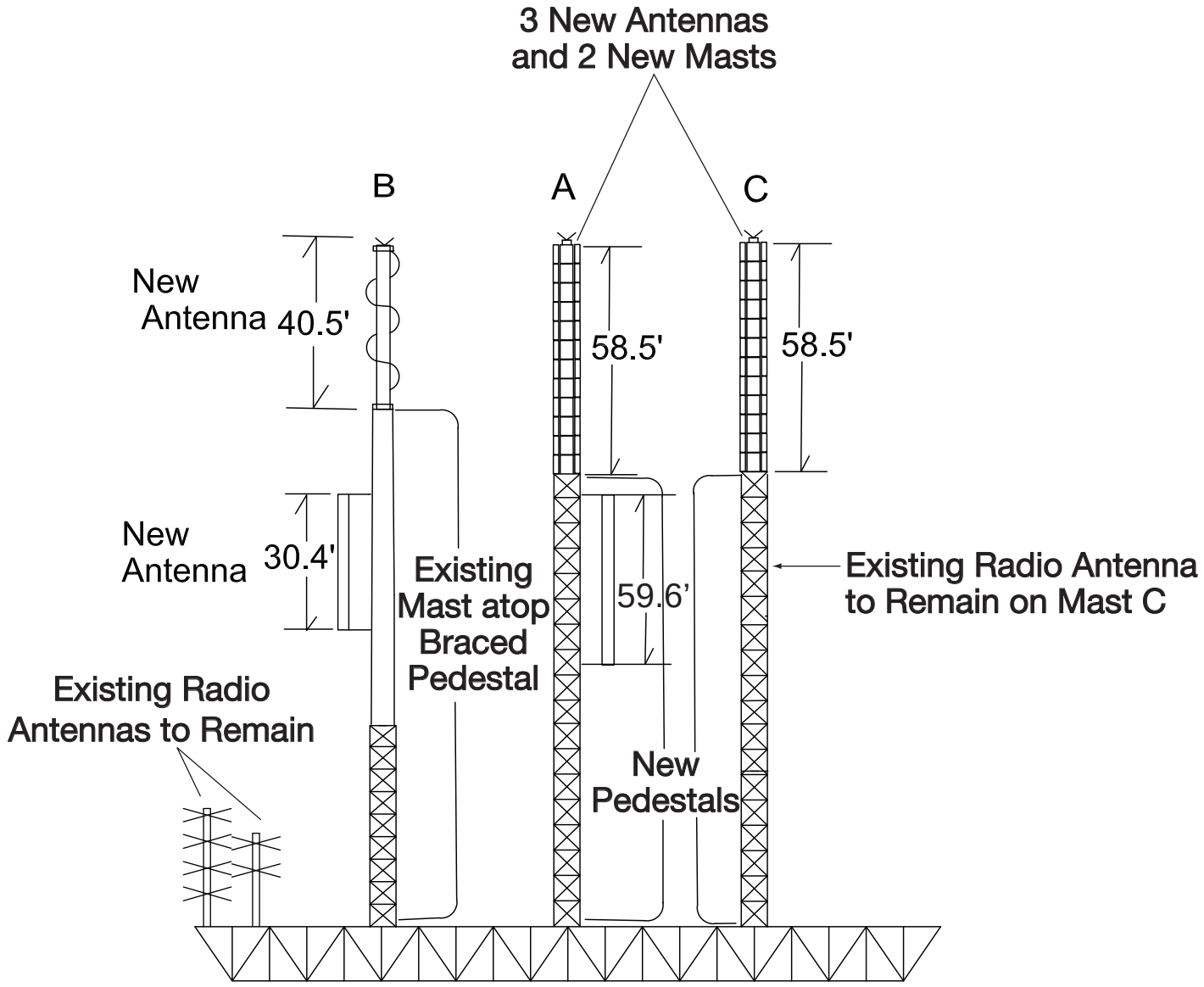
In addition, existing microwave dish antennas (each approximately five feet in diameter) that are suspended from the tower's north leg at Level 5 would also remain, with no changes made.

2. **Structural upgrades to the tower to enable the tower to meet *Building Code* wind resistance requirements for an "essential facility" and to accommodate the placement of new digital television equipment on the tower.** Each recommended structural change or upgrade is detailed in the structural analysis report by Simpson, Gumpertz & Heger, Inc., which serves as the basis for the following description.[2] In summary, these improvements would include:

    - Strengthening of one of three columns on each of the three tower legs above tower Level 3 by bolting new steel plates to the columns, and replacing "splice plates" between lengths of each of the columns with higher-strength plates, at two locations between Levels 1 and 2 and at one location above Level 3;

    - Reinforcement, at tower Levels 2, 3, 4, and 5, of the connections between the horizontal trusses and the three tower legs, by the addition of steel plates and welds, as well as the addition of new braces to convert locations with single diagonal braces to an "X-braced" system;

[2] Description of structural improvements adapted from Simpson Gumpertz & Heger, Inc., "Digital Television Conversion of Sutro Tower, Phase II Structural Analysis Report," March 10, 2008. This report is on file and available for review by appointment at the Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0206E.



2007.0206E: Sutro Tower Digital Television - 206334

SOURCE: Sutro Tower, Inc.

Figure 5

Detail of Proposed Upper Level Antenna Configuration

- Upgrading bolted connections to welded connections on the Level 6 horizontal "outriggers" (the portion of the horizontal trusses extending beyond the tower legs) that anchor guy wires supporting the vertical masts atop the tower, adding welded steel tabs where these same horizontal trusses connect to the tower legs, and adding welded L-shaped steel angles to the same trusses at certain locations between the tower legs; and

- Replacement of bolted connections with welded connections, along with the addition of stiffener plates to existing triangular gusset plates, on existing diagonal braces within the tower legs, at various locations between grade and tower Level 2, between Levels 2 and 3, and between Levels 5 and 6.

Sutro Tower last underwent strengthening for wind loads in connection with the earlier installation of DTV antennas, using *Building Code* criteria applicable to "normal occupancy," that is, non-essential structures. In 1997, the Department of Building Inspection determined that Sutro Tower was a critical component of the City's emergency communications system and designated the Tower as an "essential facility" subject to more restrictive seismic design criteria than ordinary structures. Under the *Building Code*, an essential facility must be able to survive earthquake shaking with an average recurrence interval of 1,000 years (e.g., a greater earthquake than must be withstood by non-essential facilities). In2003 – 04, Sutro Tower underwent structural upgrades consisting of reinforcement of a small percentage of the structure's braces, columns and connections, which enabled the tower to meet the *Building Code* seismic design standard for an essential facility. However, this upgrade did not account for structural resistance to wind loading for essential facilities, which is being proposed as part of the current project.[3]

Completion of the above structural improvements would enable Sutro Tower to meet all *Building Code* wind and seismic criteria for essential structures.

3. **Removal of four digital main television antennas between Levels 5 and 6 of Sutro Tower (between 557 feet and 762 feet AGL).** Currently, four digital main television antennas are attached to a 125-foot long vertical steel truss attached to the east face of the horizontal trusses that make up Levels 5 and 6. This truss was installed in 1998 as part of the first phase of Sutro Tower's conversion to digital television broadcasting. Although at that time it was envisioned that this truss would support ten digital television antennas, subsequent technological advances resulted in the shared use of a lesser number of antennas. The truss would be retained while the four existing digital antennas would be removed as part of the proposed project. An analog television antenna suspended from Level 6 would also be removed.

4. **Removal of nine analog auxiliary television antennas on Level 2 of Sutro Tower (187 feet AGL) and installation of two digital auxiliary antennas extending between Levels 3 and 4 (462 feet AGL at midpoint between these levels) and one digital auxiliary antenna at Level 2.** The new

[3] Simpson Gumpertz & Heger, Inc. (see footnote 2, p. 21).

digital auxiliary antennas are anticipated to be comparable to or smaller in size than the existing analog auxiliary antennas.

Currently, nine analog auxiliary antennas on Level 2 provide backup broadcasting capacity in the event of a malfunction of the main antenna or in the event of an emergency which disables a primary antenna, and during routine maintenance of the main antennas. One analog auxiliary antenna on Level 2 would be replaced with a new digital auxiliary antenna; the remaining analog auxiliary antennas would be removed from Level 2, and two new digital auxiliary antennas would be installed higher up on the tower between Levels 3 and 4, on a new steel mast to be attached to the horizontal steel members of those two levels of the tower.

When used, each digital auxiliary antenna would operate at approximately 50 percent of the power levels of the station's primary antenna.

Four existing radio station auxiliary antennas would remain at Level 2. In addition, one existing auxiliary radio station antenna that is hung from the side of Level 3 would also remain. No change would be made to these radio antennas.

5. **Alteration, replacement, or addition of small ancillary and accessory antennas and equipment associated with the operation of Sutro Tower broadcasters.** In addition to the television and radio broadcast antennas, Sutro Tower supports a number of smaller-scale antennas and ancillary equipment associated with radio frequency broadcasting. These smaller-scale antennas and equipment are accessory to the television and FM station tenants at Sutro Tower, or are the primary broadcasting equipment for telecommunications and public safety tenants such as the California Highway Patrol (CHP), Federal Bureau of Investigation (FBI), and United States Postal Inspector. This equipment is used for voice, data, dispatch and paging, microwave interconnect, newsgathering, and other broadcast-related uses.

   The smaller-scale antennas and accessory equipment are located on the tower itself, on the transmitter building rooftop, and in a few cases, on the secured grounds of Sutro Tower. Some equipment on the roof of the building is contained within enclosures for weather protection. Typical smaller antennas and accessory antennas include:

   - Weather cameras, weather monitoring stations, anemometers (wind speed gauges), thermometers and security cameras, usually smaller than two feet in any dimension;
   - Cylindrical "whip" antennas two to three inches in diameter and less than 15 feet in height, typically made out of fiberglass or similar materials;
   - Point-to-point microwave "dishes" (similar to a home satellite dish) between two and 10 feet diameter; and
   - Flat panel antennas between eight to 10 inches wide and one to two feet tall.

There are approximately 184 existing smaller-scale antennas (and ancillary equipment) at the Sutro Tower facility in addition to the television and radio antennas described above. These smaller-scale devices are periodically added, altered or replaced with new equipment of similar or enhanced function. In the past decade, the San Francisco Planning Commission and the Board of Supervisors have deemed alterations, replacement, or additions of equipment of this type to be categorically exempt from detailed environmental review as Class 1 exemptions (minor alteration to an existing facility).

At present, the project sponsor anticipates, as part of the proposed project, that a new 2-foot microwave dish and 14 new 36-inch by 30-inch by 2-inch panel antennas would be installed at Level 3 (385 feet AGL) for two new high-speed wireless data service tenants. Other smaller-scale antennas and equipment may be altered, replaced, or added to the tower and roof of the transmitter building in the future, subject to broadcasting requirements, the availability of appropriate technology, and the availability of space within the transmitter building for any necessary cabling and equipment. While it is not possible at this time to foresee the specific type, number or locations of such future smaller-scale antennas or accessory equipment, it is speculatively possible that current tenants or future low-power tenants such as wireless internet service providers, video providers, or mobile and portable signal providers could alter, replace, or install smaller-scale equipment at Sutro Tower in the future. The potential for alteration, replacement, or installation of new, smaller-scale equipment is included as part of the project description and is analyzed in this EIR. For purposes of analysis of the tower's structural capability, it was conservatively assumed that up to 6,000 pounds of equipment could be added in the future at each of Levels 2, 3, and 4, and 2,000 pounds at Level 5. Installation of future smaller-scale equipment will be subject to environmental review to determine the consistency of the proposed equipment with the analysis in this DEIR. If new or substantially greater impacts could result, further environmental review, as appropriate under CEQA, would be undertaken.

Most broadcasting equipment on the tower or roof of the building is connected through cabling or wiring to processing or transmission equipment in the building at the base of the tower. Currently, the building is almost at full capacity, with only small areas within the structure potentially available for additional equipment under current technological limitations and equipment configuration. While Sutro Tower's conditional use permit does not itself restrict the number or type of antennas, equipment or tenants at the facility, the transmission building at the base of the tower cannot be expanded without an amendment to the facility's conditional use authorization. Any expansion to the transmission building or any alteration, replacement, or installation of new equipment requiring an expansion to the transmission building would therefore constitute a separate project under CEQA and be subject to additional environmental review and public hearings before the Planning Commission and potentially the Board of Supervisors.

6. **Addition of auxiliary equipment, and electrical, elevator, and public safety improvements associated with the proposed project.** A new rooftop equipment enclosure on top of the transmitter

building would be required to house digital combining equipment for the new digital television antennas. This expansion is expected to increase the dimension of the existing approximately 600-square-foot rooftop enclosure by about 300 square feet (10 feet by 30 feet), to about 900 square feet. There would be no change in the existing 10.5-foot height of this equipment enclosure.

Additional electrical, elevator, and public safety improvements (including fire suppression, security, and emergency notice improvements) could also be included as part of the operation of Sutro Tower.

No changes would be made in the transmitter building itself, which would retain its existing footprint and height. Likewise, no changes would be made in the garage/storage area, or in the guard station.

The proposed project would require no demolition or ground disturbing activities on the project site.

Project Operations

No change in ongoing operations of Sutro Tower or employment at the site is anticipated as a result of the project. According to the project sponsor, there is an average of seven employees on-site on a typical day, with as many as 10 and as few as four, depending on daily activities. On the typical day, four employees are Sutro Tower employees who work only at the tower site, while the others are television or radio station employees who work at the tower on certain days and work at their studio sites on other days. No change in this level of employment is anticipated.

Schedule

Project construction is anticipated to commence in the latter half of 2008 and would take approximately 12 to 16 months to complete with an estimated cost of $1.75 million. The entire project would be completed as a continuous process. The project would not require excavation.

Construction would involve the presence of an average of about 10 construction workers daily during the project, with as many as 15 workers present during periods of peak activity.

B. Project Setting

Land use in the surrounding neighborhoods is primarily residential, with some institutional and open space uses in the vicinity. The project site is immediately surrounded by open space that spans much of the area between Twin Peaks and Mount Sutro. The closest residences to the project site are located along Dellbrook Avenue, Farview Court, and Palo Alto Avenue; the nearest dwelling is approximately 200 feet from the tower. Other nearby residences are located on St. Germain Avenue, Panorama Drive, Clairview Court, Forest Knolls Avenue, and Oak Park Drive. Open spaces in the project vicinity include the Midtown Terrace Playground, located less than one-fourth mile southwest from the project site, across Panorama Drive and Dellbrook Avenue; the City's designated Interior Greenbelt, along Clarendon Avenue and between Stanyan Street and the UCSF Medical Center; the Mount Sutro Open Space Reserve (owned by the University of California), located approximately one-fourth mile northwest of the project

site, across Clarendon Avenue; and Twin Peaks, about one-third mile southeast of the site. Sutro Tower is roughly equidistant between Golden Gate Park, to the northwest; Glen Canyon Park, to the southeast; and Mount Davidson Park, to the south: each is approximately one mile from the project site.

Institutional uses in the area include the UCSF Medical Center to the north, Clarendon Alternative Elementary School, located across Clarendon Avenue from Midtown Terrace Playground; San Francisco Fire Station No. 20, at Clarendon Avenue and Olympia Way (across Olympia Way from Midtown Terrace Playground); Laguna Honda Hospital and Youth Guidance Center farther south; and four city reservoirs (Summit, Twin Peaks, Sutro, and Laguna Honda Reservoirs). The nearest concentration of commercial uses is about two-thirds of a mile south of the project site, on Portola Drive.

Key dates in the history of Sutro Tower include:

1971 – 1973	Original construction of tower and transmitter building.
1997	Sutro Tower designed an "essential facility" by the City of San Francisco.
1997 – 1998	Environmental Impact Report for initial digital television installation.
1998 – 1999	Initial digital television installation.
1999 – 2003	Complete non-linear dynamic analysis of structural using state-of-the-art modeling and ground motions specific to the tower site.
2003 – 2004	Seismic structural upgrade to meet *Building Code* "essential facility" standards based on the results of the 1999-2003 analysis.
2008	Environmental Impact Report for mandated conversion of all television stations to digital transmission, structural upgrades necessary for the conversion and ancillary installations to support all digital transmission.

C. Approvals Required

Communication facilities such as Sutro Tower are conditionally permitted in an RH-1(D) district as "Public Facilities and Utilities" under *San Francisco Planning Code* Section 209.6. Because the proposed project does not include major remodeling of the tower, expansion of the transmitter building at the base of the tower, or a change in use, an amendment to the existing conditional use authorization would not be required for the proposed project. However, pursuant to City Planning Commission Resolution No. 11399, adopted July 14, 1988, the Planning Commission will hold a public hearing to review the proposed project under its Discretionary Review authority. The project may also require building and electrical permits to allow Sutro Tower and/or its tenants to make necessary improvements to their leased space to accommodate the described antenna and accessory equipment or to alter, replace, or add small-scale accessory and ancillary equipment in the future.

As the relocation or replacement of television antennas with comparable or smaller antennas and the addition or replacement of small-scale antennas and accessory equipment would not increase the height or bulk of the tower, the proposed project would fall within the requirements of the 40-X height and bulk district by not making any change in the height of a legally noncomplying structure.

Standard Conditions

Every Sutro Tower building permit since 2000 has been subject to the following "Standard Sutro Tower Conditions," imposed by the Planning Commission.[4]

The Standard Conditions include mandatory structural inspections, monitoring of radio frequency radiation (RFR), and communications with neighborhood organizations.

Mandatory Structural Inspections

The mandatory structural inspections include:

- *Annual Inspection:* Each year, an independent testing laboratory approved by the Department of Building Inspection conducts annual inspections of approximately one-third of the tower, such that the entire structure is evaluated over a three-year interval.
- *In-Depth Inspection:* Every five years, an independent testing laboratory conducts a tension check on the guy wires and cross brace cables and re-tensions them as necessary. As part of the in-depth inspection, Sutro Tower may have non-destructive field testing, load tests, and/or materials tests performed by an independent testing laboratory if so recommended by a licensed engineer.
- *Event Inspections:* In the case of a severe storm, earthquake, mudslide or other triggering event that exceeds the design load of the tower, Sutro Tower must have an independent testing laboratory conduct an event inspection and, if required, an additional in-depth inspection in areas of local damage to the tower.
- *Special Inspections:* An independent testing laboratory conducts special inspections as part of an annual inspection to monitor remedial action resulting from any inspection, and conducts any inspection recommended by the licensed engineer for any reason.

Radio Frequency Emissions

Sutro Tower is subject to detailed conditions concerning RFR as part of the Standard Conditions:

- *FCC Compliance:* Sutro Tower is required to operate in a manner that does not contribute to ambient levels in excess of the FCC standards for RFR emissions.
- *Site Measurements:* Sutro Tower is required to measure radio frequency levels at 200 publicly-accessible sites within 1,000 feet of the tower each three years, or within six months of activation of any DTV [digital television] antenna. The Department of Public Health must be notified by Sutro

[4] A complete copy of the standard conditions of approval for Sutro Tower is on file and available for review by appointment at the Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0206E.

Tower at least three days before measurements are taken. Sutro Tower must remedy any ambient or localized measurements that exceed FCC standards for radio frequency exposure. A report of these RFR exposure measurements must be submitted to the Planning Department and Department of Public Health within 45 days of measurement and those reports shall be made available to the public.

- *Private Property:* Upon written request from an individual property owner within 1,000 feet of the tower, Sutro Tower must measure radio frequency exposure levels at the accessible front yard and rear yard of the property and remedy any ambient or localized field found to exceed FCC standards.

Neighborhood Communication

As stipulated in the Standard Conditions, Sutro Tower, Inc. regularly communicates with and through the "Sutro Tower liaisons" designated by Twin Peaks Improvement Association, Midtown Terrace Homeowners Association, and Forest Knolls Neighborhood Association. Representatives of each of these organizations speak directly with and meet with Sutro Tower's general manager regarding both permit-related and operational issues.

Since 2000, the general manager of Sutro Tower has personally notified each Sutro Tower liaison within 10 days of filing any final permit application or report with any local agency.

The main posting location for any public hearing is at the entrance gate, which is the only access point to the facility. Pursuant to the directives of the Zoning Administrator in 1998, seven additional copies of this notice are also posted at the intersections of Oak Park and Clarendon, Panorama and Clarendon, Olympia and Clarendon, Marview and Panorama, Farview and Marview, Palo Alto and Glen View, and Twin Peaks and Clarendon to ensure extensive public awareness of all Sutro Tower hearings.

D. Project Sponsor's Objectives

The primary objective of Sutro Tower, Inc. as project sponsor is to replace the existing analog television facilities with digital television facilities to comply with the FCC's mandate to consolidate all United States television broadcast operations to DTV by February 17, 2009, after which time analog transmission will not be allowed.[5] The DTV transition will consolidate United States television into a narrower spectrum space which will free up parts of the broadcast spectrum that can then be used for other services, such as advanced wireless (cellular) and public safety services (police, fire departments, rescue squads, etc.). The project sponsor's objectives include:

1. Enable Sutro Tower, Inc. and its broadcast television station users to:

    a. Comply with the FCC's mandate to replace existing analog television antennas and associated transmission systems with digital television antennas consistent with the Commission's Final Table of Channel Designations for DTV broadcast;

[5] DTV is an advanced broadcasting technology that will enable stations to offer improved television services to the public. It can also offer multiple programming choices, called multicasting, interactive capabilities, and mobile information services.

b. Provide continuous, free, over-the-air broadcasting during normal and emergency conditions through the installation of permanent main and auxiliary DTV antenna facilities, and provide such television broadcasting throughout continued normal and emergency conditions after completion of the project;

c. Provide optimal broadcast television signal placement for San Francisco and surrounding Bay Area communities; and

d. Replicate existing television broadcast coverage and provide required community of license broadcast service from the television stations at Sutro Tower, consistent with FCC rules (47 CFR Sections 73.622-73.625).

2. Maintain minimum broadcast signal interference with and separations between other television and non-television broadcasters and licensed communications service providers, in accordance with FCC rules (47 CFR Sections 73.623);

3. Consistent with the FCC's signal non-interference requirements, utilize a joint stack antenna configuration or other technical antenna configuration involving a single source location for as many of the existing Sutro Tower television broadcast signals as possible for DTV service;

4. Maintain all stations at a single location with shared management, security, testing, and reporting to enable maximum station operational efficiency, and to avoid the necessity of consumers to continuously redirect their private antennas to receive adequate signals from multiple sites;

5. Maintain compliance with applicable health and safety laws and standards for television broadcasting, including the human exposure standards for radio frequency radiation (RFR);

6. Maintain flexibility to accommodate future technical improvements in broadcast communications technology and avoid technical constraints that would limit compliance with or implementation of future regulatory and technological developments;

7. Comply with *San Francisco Building Code* criteria for "essential structures" to accommodate the new configuration of antennas and broadcast equipment and potential smaller-scale accessory antennas and ancillary equipment in the future; and

8. Minimize the construction of new structures, buildings, roads, or other infrastructure.

E. Plans and Policies

San Francisco General Plan

The *San Francisco General Plan* provides general policies and objectives to guide land use decisions. Any conflicts between the proposed project and policies that relate to physical environmental issues are discussed in Section D, Evaluation of Environmental Effects, of the Initial Study (see Appendix A) and Chapter III of this EIR. The compatibility of the proposed project with *General Plan* policies that do not

relate to physical environmental issues will be considered by decision-makers as part of their decision whether to approve or disapprove the proposed project. Any potential conflicts identified as part of the process would not alter the physical environmental effects of the proposed project. *General Plan* policies applicable to the proposed project include the following:

Commerce and Industry Element

Objective 1: Manage economic growth and change to ensure enhancement of the total city living and working environment.

Policy 1.1: Encourage development which provides substantial net benefits and minimizes undesirable consequences. Discourage development which has substantial undesirable consequences that cannot be mitigated.

Policy 1.2: Assure that all commercial and industrial uses meet minimum, reasonable performance standards.

Policy 1.3: Locate commercial and industrial activities according to a generalized commercial and industrial land use plan.

Objective 2: Maintain and enhance a sound and diverse economic base and fiscal structure for the city.

Policy 2.1: Seek to retain existing commercial and industrial activity and to attract new such activity to the city.

Community Safety Element

Overall Goal: It is the goal of the City and County of San Francisco to the extent feasible, to avoid the loss of life and property as a result of natural and technological disasters, to reduce the social, cultural and economic dislocations of disasters, and to assist and encourage the rapid recovery from disasters.

Objective 2: Reduce structural and non-structural hazards to life safety, minimize property damage and resulting social, cultural and economic dislocations resulting from future disasters.

Policy 2.1: Assure that new construction meets current structural and life safety standards.

Policy 2.2: Review and amend at regular intervals all relevant public codes to incorporate the most current knowledge of structural engineering.

Policy 2.3: Consider site soils conditions when reviewing projects in areas subject to liquefaction or slope instability.

Policy 2.5: Assess the risks presented by other types of potentially hazardous structures and reduce the risks to the extent possible.

Policy 2.9: Consider information about geologic hazards whenever City decisions that will influence land use, building density, building configurations or infrastructure are made.

Objective 5: Support seismic research through appropriate actions by all public agencies, and apply new knowledge as it becomes available.

Policy 5.1: Participate actively in the State of California, Department of Conservation, Division of Mines and Geology's Seismic Hazard Mapping program.

Policy 5.2: Support and monitor research being conducted about the nature of seismic hazards in the Bay Area, including research on earthquake prediction and warning systems, on the risk of tsunamis, and on the performance of structures.

Environmental Protection Element

Policy 1.4: Assure that all new development meets strict environmental quality standards and recognizes human needs.

Objective 7: Assure that the land resources in San Francisco are used in ways that both respect and preserve the natural values of the land and serve the best interests of all the city's citizens.

Policy 7.2: Protect land from changes that would make it unsafe or unsightly.

Objective 14: Promote effective energy management practices to maintain the economic vitality of commerce and industry.

Policy 14.1: Increase the energy efficiency of existing commercial and industrial buildings through cost-effective energy management measures.

Urban Design Element

Objective 1: Emphasis of the characteristic pattern which gives to the city and its neighborhoods an image, a sense of purpose, and a means of orientation.

Policy 1.1: Recognize and protect major views in the city, with particular attention to those of open space and water.

Policy 1.3: Recognize that buildings, when seen together, produce a total effect that characterizes the city and its districts.

Policy 1.4: Protect and promote large-scale landscaping and open space that define districts and topography.

Objective 2: Conservation of resources which provide a sense of nature, continuity with the past, and freedom from overcrowding.

Policy 2.1: Preserve in their natural state the few remaining areas that have not been developed by man.

Objective 3: Moderation of major new development to complement the city pattern, the resources to be conserved, and the neighborhood environment.

Policy 3.2: Avoid extreme contrasts in color, shape and other characteristics which will cause new buildings to stand out in excess of their public importance.

Policy 3.3: Promote efforts to achieve high quality of design for buildings to be constructed at prominent locations.

Policy 3.5: Relate the height of buildings to important attributes of the city pattern and to the height and character of existing development.

Policy 3.6: Relate the bulk of buildings to the prevailing scale of development to avoid an overwhelming or dominating appearance in new construction.

Objective 4: Improvement of the neighborhood environment to increase personal safety, comfort, pride and opportunity.

Policy 4.14: Remove and obscure distracting and cluttering elements.

Policy 4.15: Protect the livability and character of residential properties from the intrusion of incompatible new buildings

In general, the proposed project, as a continuation of the use of an existing broadcasting tower and associated facilities, would be consistent with the above *General Plan* policies. Although there are a number of policies and objectives that could be seen to conflict with erection of a new transmission tower of the size and scale of Sutro Tower were the tower to be authorized and constructed today —particularly as to the Urban Design Element—the proposed project would result in little in the way of discernible change in views or visual quality (see discussion in Section III.A, Aesthetics and Visual Quality). Therefore, these objectives and policies, presented above for illustrative purposes, would not apply to the proposed Sutro Tower Digital Television Project, because the project would not visibly or intrusively alter the existing tower.

San Francisco Planning Code (Zoning)

The *San Francisco Planning Code* (*Planning Code*), which incorporates by reference the City's Zoning Maps, governs permitted uses, densities and the configuration of buildings in San Francisco. Permits to construct new structures (or to alter or demolish existing ones) may not be issued unless either the proposed action conforms to the *Planning Code*, or an exception is granted pursuant to provisions of the *Planning Code*, or a reclassification of the site occurs.

The project site is within a RH-1(D) (Residential, House, Single-Family Detached) zoning district. Areas designated as RH districts are generally characterized by dwellings in the form of houses, usually with one to three units with separate entrances, plentiful open space, and few non-residential uses. Buildings in these districts typically range from two to four stories and rarely exceed 40 feet in height. Communication facilities such as Sutro Tower are conditionally permitted in an RH-1(D) district as "Public Facilities and Utilities."[6] In 1966, a conditional use permit was approved authorizing the construction and operation of Sutro Tower as a "transmission tower and building" for "the purpose of originating, receiving, and transmitting frequency modulation, facsimile and television broadcasts, and other forms of radio

6 *San Francisco Planning Code* Section 209.6.

communications."[7] The permit specified that "the structural safety of the tower would be governed by applicable city codes." Sutro Tower's original construction complied with all relevant requirements of the *San Francisco Building Code*. When constructed in 1972, Sutro Tower was designed to withstand an earthquake of magnitude 8.3 on the Richter scale without significant structural damage. The tower has subsequently undergone a substantial structural upgrade (see Section III.B, Geology, Soils, and Seismicity).

The project site is within a 40-X height and bulk district. This district allows a maximum building height of 40 feet, and has no bulk limit. The existing 977-foot-tall tower is a legal noncomplying facility for the height and bulk district. As the proposed alteration, replacement, or addition of existing television antennas with comparable or smaller antennas and the alteration, replacement, or addition of smaller-scale antennas and accessory equipment would not increase the height or bulk of the tower, the proposed project would comply with the requirements of both the height and bulk limits. The transmission building is 35 feet tall and complies with the height and bulk limits.

The project is not located within any Special Use District or Preservation District Overlays. The proposed project would, therefore, not violate any regulations set forth by any overlay designation.

In 1997, the City determined that Sutro Tower was an "essential facility" pursuant to state law as part of the City's emergency communications resources.[8] Sutro Tower ensures free over-the-air information and news in the case of a man-made or natural disaster, and provides back-up facilities in case station studios are destroyed or damaged during an emergency situation. In addition to Sutro Tower's television and radio broadcasters, current public safety broadcasters operating emergency dispatch equipment at Sutro Tower include the Federal Bureau of Investigation, the California Highway Patrol, and the United States Postal Inspector.

As noted under Required Approvals, the Planning Commission in 1988 adopted a policy requiring all Sutro Tower building permits to come before the Commission for discretionary review.[9]

The foregoing notwithstanding, the proposed project would be consistent with the existing zoning of the project site, and no change in land use controls is required for project approval.

Priority Policies

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

7 Planning Commission Resolution No. 5967, March 10, 1966. This document is on file and available for review by appointment at the Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0206E.

8 An essential services building is "any building or a portion of which is used or designed to be used as a fire station, police station, emergency operation center, California Highway Patrol office, sheriff's office or emergency communications dispatch center (California Building Standards Administrative Code, Chapter 4, Article 1 4.207). Among other requirements, Sutro Tower must comply with very stringent construction standards as an essential facility.

9 Planning Commission Resolution No. 11399, July 14, 1988. This document is on file and available for review by appointment at the Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0206E.

policies, and the sections of the Environmental Evaluation (Initial Study) addressing the environmental issues associated with the policies, are: (1) preservation and enhancement of neighborhood-serving retail uses; (2) protection of neighborhood character (Question 1c, Land Use and Land Use Planning); (3) preservation and enhancement of affordable housing (Question 3b, Population and Housing, with regard to housing supply and displacement issues); (4) discouragement of commuter automobiles (Questions 5a, b, f, and g, Transportation and Circulation); (5) protection of industrial and service land uses from commercial office development and enhancement of resident employment and business ownership (Question 1c, Land Use and Land Use Planning); (6) maximization of earthquake preparedness (Questions 13a – 13d, Geology, Soils, and Seismicity); (7) landmark and historic building preservation (Question 4a, Cultural Resources); and (8) protection of open space (Questions 8a and b, Wind and Shadow, and Questions 9a and c, Recreation). (Please see Appendix A for the Initial Study, which discusses physical environmental effects associated with the Priority Policies, as noted.) Prior to issuing a permit for any project which requires an Initial Study under the California Environmental Quality Act (CEQA), and 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 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.

Other Plans and Policies

Environmental plans and policies, like the *Bay Area 2005 Ozone Strategy*, directly address physical environmental issues and/or contain standards or targets that must be met in order to preserve or improve specific components of the City's physical environment. The proposed project would not obviously or substantially conflict with any such adopted environmental plan or policy.

CHAPTER III
Environmental Setting and Impacts

A. Aesthetics and Visual Quality

This section discusses the existing visual character of the project site as well as views of the site from various public vantage points, and analyzes the potential for the proposed project to affect existing site character and views. In the context of the tower's existing physical elements, the proposed installation of new digital antennas and removal of existing analog antennas would be noticeable only upon close inspection. However, due to the visual prominence of Sutro Tower both in the surrounding neighborhoods and in long-range views of the City, the potential effects of the proposed project on visual quality and aesthetic character of the project site and its surroundings are analyzed in this section.

Consideration of the project's aesthetic impacts is limited to any significant effect(s) of the proposed digital television conversion project and minor equipment changes or alterations associated with continued use of Sutro Tower for radio frequency communications, as well as the potential future alteration, replacement, and/or installation of an unknown number of smaller-scale antennas and accessory equipment. Information for the discussion and subsequent analysis is drawn from site visits, project plans, and photomontages developed for the project, which illustrate both existing conditions and the future visual characteristics of the project in the existing setting. Computer-generated visual simulations illustrating conceptual "before" and "after" visual conditions at the project site as seen from three representative public vantage points are presented as part of the analysis. Digitized photographs and computer modeling techniques were utilized to prepare the visual simulations.

As stated in the Initial Study (Appendix A), it is not expected that the proposed project's change in antennas or their configuration would be generally noticeable. While individual elements of the tower would be altered, the overall scale, bulk, materials, and character of the facility would remain unchanged.

As determined in the Initial Study, the project would not result in significant impacts related to light and glare effects. Additionally, there are no officially designated California Scenic Highway segments in the project vicinity, nor are there other scenic vistas in the vicinity that would be affected by the project. As such, no further discussion of these topics is provided in this section.

Existing Visual Setting

Project Site

The 5.6-acre project site is located on a single parcel at 1 La Avanzada Street in San Francisco's Midtown Terrace neighborhood. The project site is developed with the existing Sutro Tower facility which

includes: the tower with extensive cross-bracing, cable-ties, trusses, and guy-wires, the existing 184 smaller-scale antennas and equipment, as well as a transmitter building, a garage and storage building, a guard station, emergency generators, and a surface parking lot with striping to accommodate 23 cars. The site is completely enclosed within a security fence (see **Figure 2**, p. 17).

The tower itself—a three-pronged, free-standing hourglass-shaped structure—is the San Francisco Bay Area's tallest structure, surpassing the 853-foot Transamerica Pyramid by more than 100 feet. Located about three miles southwest of the downtown skyline near Mount Sutro and Twin Peaks, the tower stands 977 feet above ground on one of the highest points in the City (834 feet above sea level), reaching an overall height of more than 1,800 feet above sea level. Sutro Tower's height of 977 feet combines about 762 feet of primary structure (the tower itself) topped by three 215-foot tall masts topped by antennas.

The tower is painted in relatively distinctive 90-foot white and international orange color bands, as required by the Federal Aviation Administration (FAA). In addition to making the tower more visible to aircraft, the color bands create a graphic quality to the design. The eye is drawn to the orange color bands, while white painted portions of the structure tend to blend in with the sky, especially when the weather is cloudy, foggy, or overcast. The simplicity of the hourglass shape is visually compromised by the busy feel of the trusses at the uppermost Level 6, which forms the primary antenna platform. Below the platform, the tower's hourglass form is visually stable.

The tower's legs (trusses clad with steel shingles) are 150 feet apart at the ground and slope inward at five degrees to the "waist" (the most slender portion) of the tower. At the waist (Level 4) of the tower the legs are about 60 feet apart; thereafter, the legs slope outward until reaching the antenna platform at Level 6. The supporting masts and antennas, placed 100 feet apart, align with the ends of the legs, and appear as prongs directed toward the sky. Five sets of horizontal trusses (located at 180 feet, 375 feet, 550 feet, 650 feet, and 755 feet above ground) connect the legs and form five structural bays; although visually the tower appears more as four proportional bays, one above the waist and three below (the trusses at Level 5 are less visible than the solid structural elements defining the lower levels and are painted white rather than orange; they create two structural bays of lesser height than those below the waist). Cables provide "X shape" lateral bracing at each structural bay and lateral support for each antenna mast (similar to how ship masts or tent poles are supported).

Pursuant to FAA Advisory Circular AC 70/7460-1K, Sutro Tower is equipped with FAA-approved lighting including 12 high-intensity white flashing obstruction beacons, nine medium intensity flashing red beacons, 18 steady-burning obstruction lights and three red/white antenna beacons. The FAA-required beacons are the only source of night light attributable to the facility. Low-level security lighting is currently provided at the site. However, no additional exterior lighting is proposed as part of the project.

The Seattle Space Needle design reportedly inspired the original concept design of Sutro Tower. The original concept of Sutro Tower had a more slender feel and was intended to be green or dark green in color. The final design was created by the architectural and engineering firm Albert C. Martin & Associates of Los Angeles. The final three-legged design offers greater structural and seismic stability

than the earlier design, while the international orange and white color pattern was ultimately mandated by the FAA.

Project Vicinity

With the exception of the UCSF Medical Center, nearby neighborhoods primarily consist of single-family residences, relatively small multi-family structures, public facilities such as Clarendon Alternative Elementary School, and neighborhood-serving commercial facilities. Most buildings in the project vicinity are under four stories and set in the relatively dense urban fabric with varied topography. Numerous well-maintained Victorian and Spanish Eclectic-style structures lend architectural character to nearby neighborhoods, although many unarticulated-box shaped buildings are also found in the neighborhood.

Views

Views of the existing tower are available from short- to long-range viewpoints. As the tallest structure in the Bay Area, the tower's basic hourglass shape and structural lines are visible in most cityscape or panoramic views of the City on clear days. As a large structure on a prominent hilltop, the tower is considered by some to be visually intrusive, and by others to be a visual icon on the skyline.

Existing views and visual simulations of the tower are shown from various viewpoints in **Figures 6**, **7**, and **8**, pp. 39, 40, and 41, (from the Twin Peaks overlook, Ninth Avenue near Pacheco Avenue, and Clarendon Avenue, respectively). The visual simulations are presented and discussed in the impact analysis that follows. It is important to note that although the visual simulations provide a reliable depiction of how the proposed project would look on the project site, the simulations are limited in the sense that they only provide several representative fixed viewpoints and cannot demonstrate all views of the project site with the proposed project. In addition, they cannot provide the more dynamic views that are created when one moves (i.e., driving, walking, cycling) along the perimeters of the project site. However, the simulations depict the tower massing, height, and the proposed antenna configuration and are sufficient in detail to make an assessment of the proposed project's potential visual impacts. They are not intended to present a full assessment of every aesthetic and/or engineering detail, nor does the analysis include simulations of tower as it would be seen at night, because nighttime views are primarily those of the tower's required safety lighting and not of the structure itself or its antennas.

As demonstrated in the existing views, the tower's height and location make it highly visible from public sidewalks and streets surrounding the project site and in surrounding neighborhoods. While the neighborhood streetscapes are visually rich and generally tend to draw the eye toward street level activity and building facades, the tower is noticeable from surrounding areas. From neighborhoods adjacent to Mount Sutro, the tower's existing cable-ties and cross bracing are noticed upon direct observation. At further distances these elements start to blend in with the sky or the tower's main structural elements. The tower starts to be perceived more as an object on the Mount Sutro land mass.

SOURCE: Sutro Tower, Inc.; Previsualists, Inc.

2007.0206E: Sutro Tower Digital Television - 206334

Figure 6
Photosimulation of View Looking West
from the Twin Peaks Overlook

2007.0206E: Sutro Tower Digital Television - 206334

SOURCE: Sutro Tower, Inc.; Previsualists, Inc.

Figure 7
Photosimulation of View Looking Norhteast from 9th Avenue near Pacheco Avenue

SOURCE: Sutro Tower, Inc.; Previsualists, Inc.

2007.0206E: Sutro Tower Digital Television - 206334

Figure 8
Photosimulation of View Looking South from Clarendon Avenue

Because the tower is situated adjacent to stands of mature Eucalyptus trees, the ancillary structures and 150 to 200 feet of the tower's base are partially screened from view from most off-site locations. The notable exception is that the transmitter building and some of its associated equipment is visible from the residential neighborhoods generally east-southeast of the tower (for example, along Farview Court and Marview Way). In particular, the presence of Summit Reservoir means there is little vegetation between these streets and the tower (see **Figure 9**).

Impacts

Significance Criteria

The project would have a significant effect on the environment if it would:

- Substantially degrade the existing visual character or quality of the site and its surroundings.

As noted above, the Initial Study determined that the project would not result in significant impacts related to light and glare effects. Additionally, there are not any officially designated California Scenic Highway segments in the project vicinity, nor are there other scenic vistas in the vicinity that would be affected by the project. As such, no further discussion of these topics is provided in this section.

As previously noted, Sutro Tower is an existing facility and the appearance of the tower and its antennas, as well as that of the ground-level buildings and other equipment, are part of the existing setting. Consideration of the project's aesthetic impacts is limited to effects of the proposed digital television conversion project and equipment changes or alterations associated with continuation of Sutro Tower for radio frequency communications, as well as the potential future replacement, alteration and/or installation of an unknown number of smaller-scale antennas and accessory equipment.

Impact Analysis

It is not expected that the change in antennas or their reconfiguration would be generally noticeable. As can be seen in the visual simulations in **Figures 6**, **7**, and **8**, pp. 39, 40, and 41, the replacement of existing auxiliary analog antennas at Level 2 with new auxiliary digital antennas that would be attached between Levels 3 and 4 (approximately 460 feet above ground level at the midpoint between these levels) would not result in a substantial visual change. As the closest residential property is 200 feet from the tower, the new antennas would be nearly 500 feet from the nearest residential observers. Furthermore, there would be a net decrease of 14 television antennas, mostly from Level 2 and also from between Levels 4 and 6 (although a vertical mast on which these latter antennas are mounted would remain). Existing antennas atop Level 6 would be replaced with new antennas and the mast assemblies supporting the antennas would be reconfigured. While the changes in antenna configuration at Level 2 and between Levels 3 and 4 would be the most noticeable of all the changes to the Sutro Tower facilities, in the context of the tower's details such as cross-bracing, cable-ties, trusses, and existing antennas, the proposed new set of antennas between Levels 3 and 4 and removal of existing auxiliary antennas at Level 2 would be noticeable only upon relatively close inspection, when in relatively close proximity to the tower. From

Base of Sutro Tower and Transmission Building seen from near the end of Farview Court

Base of Sutro Tower and Transmission Building seen from Marview Way near Farview Court

2007.0206E: Sutro Tower Digital Television - 206334

SOURCE: ESA, February 10, 2008

Figure 9
Views from Nearby Residential Neighborhood

longer-range views, the antenna reconfiguration would not be noticeable, as these elements start to blend in with the tower's main structural elements.

Likewise, the replacement of the existing main analog television antennas with digital antennas above the uppermost Level 6 of the tower (see detail of new antennas in Figure 5, p. 22) would not result in a substantial visual change. As demonstrated in the visual simulations in Figures 6, 7, and 8, pp. 39, 40, and 41, these proposed changes to the upper-level antenna configuration are difficult to detect from both nearby ground-level views and in mid- and long-range views of the tower, even upon close inspection.

Similarly, the potential future alteration, replacement, and/or installation of an unknown number of smaller-scale antennas and accessory equipment would also not result in a substantial visual change, assuming such smaller-scale equipment would be approximately the same size and scale as has been the case in the past, because such equipment has historically been small enough as to be nearly indistinguishable in both nearby ground-level views of Sutro Tower and in mid- and long-range views of the tower. (A number of such smaller antennas can be seen in the existing views of the tower in close inspection of Figures 6, 7, and 8.) Thus, this impact would be less than significant, both individually and cumulatively.

As noted above, because the tower is situated within stands of mature Eucalyptus trees, the ancillary structures and 150 to 200 feet of the tower's base are partially screened from view from many off-site locations. Therefore, changes to the ancillary structures on the ground, such as the addition of new rooftop equipment enclosures on top of the transmitter building, would not be visible from most public views, except for locations to the east-southeast, such as along Farview Court and Marview Way. The expansion of rooftop equipment facilities might be visible from some of these locations, but would not substantially change the appearance of the transmitter building and associated equipment, as the expansion would be small in the context of existing partial views of the transmitter building.

The new set of antennas atop the tower and any additional structural members added as part of the structural improvements would be composed of non-reflective metal (unpainted) or painted the same color as the existing antennas (white) and structures to blend in with the existing tower.

Although visual quality is subjective, in the context of the tower's existing physical elements such as the three-legged structure with its cross-bracing, cable ties, and trusses, and the existing antennas at various levels of the tower, the proposed installation of new digital antennas and removal of existing analog antennas would be noticeable only upon close inspection and therefore, it cannot be concluded that the proposed project would result in a substantial, demonstrable negative aesthetic effect or would substantially degrade the existing visual character of the site and its surroundings. Therefore, the proposed project would not result in significant impacts related to visual quality.

B. Geology, Soils, and Seismicity

Introduction

The Initial Study (see Appendix A) for the proposed project determined that there could be a significant geology, soils, and seismicity impact due to the potential for damage from earthquake-induced ground shaking. This section describes the geology, soils, and seismicity characteristics of the project area as they relate to the proposed project. This analysis relies upon geologic maps and reports available from the City of San Francisco, the Association of Bay Area Governments (ABAG), the California Geological Survey (CGS; formerly California Division of Mines and Geology), as well as the seismic and structural analysis of Sutro Tower based upon geotechnical engineering investigations completed for the proposed project as well as previous projects at Sutro Tower.

Before construction of Sutro Tower in 1972, a geotechnical analysis of the area and the structural design was performed to ensure that the tower would conform to the requirements of the 1969 *San Francisco Building Code*. Subsequent geotechnical analyses were conducted in 1997, 1999, and 2008, to evaluate the structure against design criteria specified for the updates to the *Building Code*, particularly those outlined for designated "essential facilities" which are subject to more restrictive seismic design criteria than ordinary structures. The geotechnical analysis conducted in 2008 provides specific guidance for design criteria to support the proposed modifications and to enable the structure to meet current *Building Code* standards for both seismic and wind criteria for essential facilities.

Setting

The project area is situated within the Coast Ranges geomorphic province of California. The Coast Ranges is the largest of the state's geomorphic provinces extending approximately 400 miles long from the Klamath Mountains (near northern Humboldt County) to the Santa Ynez River in Santa Barbara County. The province lies between the Pacific Ocean and the Great Valley (Sacramento and San Joaquin valleys) provinces and is characterized by a series of northwest trending mountain ridges and valleys, running generally parallel to the San Andreas Fault zone. The Coast Ranges were created through the convergence of the boundaries between the Farallon plate and the North American plate[10] approximately 65 to 175 million years ago, as well as transformation of the North American plate's crustal blocks through movement along the San Andreas Fault system beginning approximately 25 million years ago. The predominant geologic formation is known as the Franciscan Formation which is composed of many different types of rock including greywacke, shale, greenstone (altered volcanic rock), basalt, chert (ancient silica-rich ocean deposits), and sandstone that originated as ancient sea floor sediments.[11]

The City of San Francisco rests on a foundation of Franciscan rocks in a northwest-trending band that cuts diagonally across the city. The project site is located near the geographic center of the City in the

[10] A convergent plate boundary is a boundary between tectonic plates at which Earth's surface plates collide and area is lost either by shortening and crustal thickening or by subduction of one plate beneath the other.

[11] California Geological Survey (CGS), California Geomorphic Provinces, CGS Note 36, 2002.

vicinity of Twin Peaks and Mount Sutro, at an elevation of approximately 834 feet above sea level. The bedrock in the Twin Peaks area consists of pillow basalt and chert, and once formed the upper part of the Farallon plate when the Farallon plate was several thousand miles west of San Francisco.[12] According to the soils and foundations studies conducted by Dames & Moore prior to construction of the Sutro Tower, the hill is capped by a highly fractured and weathered chert formation which tilts steeply downward in a westerly direction.[13] During the 1966 study, chert underlain by decomposed basalt was encountered in one boring; chert and medium hard to hard fractured sandstone in a second, and highly fractured and decomposed sandstone was encountered in a third.[14] Based on their results, Dames & Moore concluded that the rock formations encountered in on-site test borings would provide adequate support for both downward and uplift loads. Dames & Moore also provided recommendations for foundation considerations based on dead load plus live load plus seismic load. As part of the current structural analysis for the tower, Simpson Gumpertz & Heger reviewed the loads imposed by the tower to confirm it was within the parameters set by Dames & Moore.

Soils

Surface soils exhibit various characteristics dependent on location, slope, parent rock, climate, and drainage. According to soil survey information obtained from the United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), surface soils at the site range from gravelly sandy loam to fine sandy loam with some clay ranging in depth from 8 to 40 inches in depth at which point lithic bedrock is encountered. The parent material to these varying types of sand is generally hard, fractured residuum weathered from sandstone.[15] Review of geologic borings logged by Dames & Moore in 1966 and 1969 correspond well with the NRCS surface soil survey information.[13,16] According to a soil type and shaking hazard map for the San Francisco Bay Area which illustrates a rough estimate of surface geology, the project site soil is characterized by soil type A or B. Soil types A and B are not expected to contribute greatly to shaking amplification in the event of an earthquake.[17]

Seismicity

Seismic hazards include those hazards that could reasonably be expected to occur at the project site during a major earthquake on any of the active faults in the region. Some hazards can be more severe than others, depending on the location, underlying materials, and level of ground shaking. The project site, like

12 Konigsmark, Ted, Geologic Trips, San Francisco and the Bay Area. GeoPress, Gualala California, 1998.

13 Dames & Moore, *Soils Investigation, Proposed Television Transmitter Tower, Mount Sutro, San Francisco, California, for the American Broadcasting Company*. January 21, 1966. This report is on file and available for review by appointment at the Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0206E.

14 *Ibid.*

15 United States Department of Agriculture (USDA), *San Mateo County, Eastern Part, and San Francisco County, California (CA689).* Soil Maps Version 1, November 3, 2004; Soil Data Version 4, December 14, 2006. http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx, accessed December 2007.

16 Dames & Moore, *Foundation Investigation, Proposed Transmitter Facilities, Mount Sutro, San Francisco, California, for the American Broadcasting Company*, July 24, 1969. This report is on file and available for review by appointment at the Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0206E.

17 United States Geological Survey (USGS) Earthquake Hazards Program, Soil Type and Shaking Hazard in the San Francisco Bay Area. Modified January 11, 2007. http://earthquake.usgs.gov/regional/nca/soiltype/index.php, accessed December 2007.

the entire Bay Area, lies within an area that contains many active and potentially active faults and is considered to be an area of high seismic activity.[18] The USGS Working Group on California Earthquake Probabilities evaluated the probability of one or more earthquakes of Richter magnitude 6.7 or higher occurring in the San Francisco Bay Area within the next 30 years.[19] The result of the evaluation indicated a 62 percent likelihood that such an earthquake event will occur in the Bay Area between 2003 and 2032.[20]

Ground movement during an earthquake can vary depending on the overall magnitude, distance to the fault, focus of earthquake energy, and type of geologic material. The composition of underlying soils, even those relatively distant from faults, can intensify ground shaking. For this reason, earthquake intensities are also measured in terms of their observed effects at a given locality. The Modified Mercalli (MM) intensity scale (**Table 1**, p. 48) is commonly used to measure earthquake damage due to ground shaking. The MM values for intensity range from I (earthquake not felt) to XII (damage nearly total), and intensities ranging from IV to X can cause moderate to significant structural damage.[21] The intensities of an earthquake will vary over the region of a fault and generally decrease with distance from the epicenter of the earthquake.

The *San Francisco General Plan* Community Safety Element contains maps that show areas of the city subject to geologic hazards (Maps 2 and 3 of the Community Safety Element).[22] The project site is located in an area subject to "moderate" to "strong" ground shaking (Modified Mercalli Intensity VI to

18 An "active" fault is defined by the State of California as a fault that has had surface displacement within Holocene time (approximately the last 11,000 years). A "potentially active" fault is defined as a fault that has shown evidence of surface displacement during the Quaternary (last 1.6 million years), unless direct geologic evidence demonstrates inactivity for all of the Holocene or longer. This definition does not, of course, mean that faults lacking evidence of surface displacement are necessarily inactive. "Sufficiently active" is also used to describe a fault if there is some evidence that Holocene displacement occurred on one or more of its segments or branches (Hart, E. W., Fault-Rupture Hazard Zones in California: Alquist-Priolo Special Studies Zones Act of 1972 with Index to Special Studies Zones Maps, California Division of Mines and Geology, Special Publication 42, 1990, revised and updated 1997).

19 United States Geological Survey (USGS) Working Group on California Earthquake Probabilities (WG02), Open File Report 03-214, *Earthquake Probabilities in the San Francisco Bay Region: 2002-2031*, http://pubs.usgs.gov/of/2003/of03-214/, 2003. Richter magnitude is a measure of the size of an earthquake as recorded by a seismograph. Richter magnitudes vary logarithmically, with each whole number step representing a ten-fold increase in the amplitude of the recorded seismic waves. Earthquake magnitudes are also measured by their Moment Magnitude (Mw) which is related to the physical characteristics of a fault including the rigidity of the rock, the size of fault rupture, and movement or displacement across a fault.

20 United States Geological Survey (USGS) Working Group on California Earthquake Probabilities (WG02), Fact Sheet 039-03, *Summary of Earthquake Probabilities in the San Francisco Bay Region: 2003-2032*, http://quake.usgs.gov/research/seismology/wg02/, 2003.

21 The damage level represents the estimated overall damage that will occur for various MM intensity levels. Damage, however, is not uniform, as the age, material, type, method of construction, size, and shape of a building all affect its performance.

22 Continued research has resulted in revisions to ABAG's earthquake hazard maps. Based on the 1995 ABAG report, an earthquake on these faults could result in "moderate" and "nonstructural" damage, respectively, in the project vicinity. However, ABAG notes. "The damage, however, will not be uniform. Some buildings will experience substantially more damage than this overall level, and others will experience substantially less damage." For this reason, ABAG currently produces Shaking Hazard Maps that depict intensity of ground shaking, rather than estimated damage. Information regarding revised data for Maps 2 and 3 of the Community Safety Element are available on ABAG website (viewed December 4, 2007) at: http://www.abag.ca.gov/bayarea/eqmaps/mapsba.htbml.

TABLE 1
MODIFIED MERCALLI INTENSITY SCALE

Intensity Value	Intensity Description	Average Peak Acceleration (% g[a])
I	Not felt except by a very few persons under especially favorable circumstances.	< 0. 17 g
II	Felt only by a few persons at rest, especially on upper floors on buildings. Delicately suspended objects may swing.	0.17-1.4 g
III	Felt noticeably indoors, especially on upper floors of buildings, but many people do not recognize it as an earthquake. Standing motor cars may rock slightly, vibration similar to a passing truck. Duration estimated.	0.17-1.4 g
IV	During the day felt indoors by many, outdoors by few. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.	1.4–3.9g
V	Felt by nearly everyone, many awakened. Some dishes and windows broken; a few instances of cracked plaster; unstable objects overturned. Disturbances of trees, poles may be noticed. Pendulum clocks may stop.	3.5 – 9.2 g
VI	Felt by all, many frightened and run outdoors. Some heavy furniture moved; and fallen plaster or damaged chimneys. Damage slight.	9.2 – 18 g
VII	Everybody runs outdoors. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving motor cars.	18 – 34 g
VIII	Damage slight in specially designed structures; considerable in ordinary substantial buildings, with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. Sand and mud ejected in small amounts. Changes in well water. Persons driving motor cars disturbed.	34 – 65 g
IX	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb; great in substantial buildings, with partial collapse. Buildings shifted off foundations. Ground cracked conspicuously. Underground pipes broken.	65 – 124 g
X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations; ground badly cracked. Rails bent. Landslides considerable from riverbanks and steep slopes. Shifted sand and mud. Water splashed (slopped) over banks.	> 124 g
XI	Few, if any, (masonry) structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly.	> 1.24 g
XII	Damage total. Practically all works of construction are damaged greatly or destroyed. Waves seen on ground surface. Lines of sight and level are distorted. Objects are thrown upward into the air.	> 1.24 g

[a] g (gravity) = 980 centimeters per second squared. 1.0 g of acceleration is a rate of increase in speed equivalent to a car traveling 328 feet from rest in 4.5 seconds.

SOURCE: Association of Bay Area Governments (ABAG), *On Shaky Ground; Modified Mercalli Intensity Scale,* 2003. http://www.abag.ca.gov/bayarea/eqmaps/doc/mmi.html; accessed December 2007; California Geological Survey (CGS), *Background Information on the ShakeMaps*, http://quake.usgs.gov/research/strongmotion/effects/shake/about.html, April 21, 2003.

VII) from earthquakes along the Peninsula and North Golden Gate segments of the San Andreas Fault, and "light" to "moderate" ground shaking (Modified Mercalli Intensity V to VI) from the Northern and Southern segments of the Hayward Fault.[23]

The project site is not in an Alquist-Priolo Earthquake Fault Zone, and no known active fault exists on the project site or elsewhere in San Francisco. The potential for surface fault rupture at the site is thus extremely low. The closest active faults are the San Andreas Fault, approximately 5.5 miles southwest of the project site, and the main portion of the Hayward Fault, about 13 miles northeast of the project site. Like the entire Bay Area, the project site is subject to ground shaking in the event of an earthquake on the regional faults.

Regional Faults

The San Andreas, Hayward, and Calaveras faults pose the greatest threat of substantial damage in the Bay Area according to the USGS Working Group.[24] These three faults exhibit strike-slip orientation and have experienced movement within the last 150 years.[25] Other principal faults capable of producing significant ground shaking in the Bay Area are listed on **Table 2**, p. 50, and include the San Gregorio fault, the Rodgers Creek fault, the Concord–Green Valley fault, and the Marsh Creek–Greenville fault. These faults are considered active and there are many other potentially active and inactive faults located throughout the Bay Area. Considerable seismic events can occur on faults with a long period of inactivity, although it is generally considered less likely. Occasionally, faults classified as inactive can exhibit secondary movement during a major event on another active fault.

San Andreas Fault

The San Andreas Fault Zone is a major structural feature that forms at the boundary between the North American and Pacific tectonic plates, extending from the Salton Sea in Southern California near the border with Mexico to north of Point Arena, where the fault trace extends out into the Pacific Ocean. The main trace of the San Andreas fault runs through the Bay Area and trends northwest through the Santa Cruz Mountains along the eastern side of the San Francisco Peninsula. As the principal strike-slip boundary between the Pacific plate to the west and the North American plate to the east, the San Andreas is often a highly visible topographic feature, such as between Pacifica and San Mateo, where Crystal Springs Reservoir and San Andreas Lake clearly mark the rupture zone. Near San Francisco, the San Andreas fault trace is located immediately off-shore near Daly City and continues northwest through the Pacific Ocean approximately 6 miles due west of the Golden Gate Bridge.

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[23] Association of Bay Area Governments (ABAG), *ABAG Shaking Intensity Maps and Information, San Andreas and Hayward Fault Shaking Scenarios* . http://gis.abag.ca.gov/website/Shaking-Maps/viewer.htm; accessed December 2007.

[24] See footnote 20, p. 47.

[25] A strike-slip fault is a fault in which movement is horizontal, parallel to the strike of the fault plane (Press, 1998).

TABLE 2
FAULTS IN THE PROJECT SITE VICINITY

Fault	Distance and Direction from Project	Recency of Movement	Fault Classification[a]	Historical Seismicity[b]	Maximum Moment Magnitude Earthquake (Mw)[c]
San Andreas	5.5 miles southwest	Historic (1906, 1989 ruptures)	Active	M 7.1, 1989 M 8.25, 1906 M 7.0, 1838 Many <M 6	7.9
Hayward	13 miles northeast	Historic (1868 rupture)	Active	M 6.8, 1868 Many <M 4.5	7.1
Calaveras	24.5 miles east	Historic (1861, 1911, 1984)	Active	M 5.6–M 6.4, 1861 M 6.2, 1911, 1984	6.8
San Gregorio	10 miles west	Historic	Active	Historic active creep	Unknown
Rodgers Creek	28 miles north	Historic	Active	M 6.7, 1898 M 5.6, 5.7, 1969	7.0
Concord-Green Valley	27 miles northeast	Historic (1955)	Active	Historic active creep	6.7
Marsh Creek–Greenville	36 miles east	Historic (1980 rupture)	Active	M 5.6, 1980	6.9

[a] An "active" fault is defined by the State of California as a fault that has had surface displacement within Holocene time (approximately the last 11,000 years). A "potentially active" fault is defined as a fault that has shown evidence of surface displacement during the Quaternary (last 1.6 million years), unless direct geologic evidence demonstrates inactivity for all of the Holocene or longer. This definition does not, of course, mean that faults lacking evidence of surface displacement are necessarily inactive. "Sufficiently active" is also used to describe a fault if there is some evidence that Holocene displacement occurred on one or more of its segments or branches (Hart, 1997).

[b] Richter magnitude (M) and year for recent and/or large events. The Richter magnitude scale reflects the maximum amplitude of a particular type of seismic wave.

[c] Moment Magnitude (Mw) is related to the physical size of a fault rupture and movement across a fault. Moment magnitude provides a physically meaningful measure of the size of a faulting event (CGS, 2002b). The Maximum Moment Magnitude Earthquake, derived from the joint CGS/USGS Probabilistic Seismic Hazard Assessment for the State of California, 1996. (Peterson, 1996).

SOURCES:

(1) Hart, E. W., Fault-Rupture Hazard Zones in California: Alquist-Priolo Special Studies Zones Act of 1972 with Index to Special Studies Zones Maps, California Division of Mines and Geology, Special Publication 42, 1990, revised and updated 1997;
(2) Jennings, C. W., *Fault Activity Map of California and Adjacent Areas*, California Division of Mines and Geology Data Map No. 6, 1:750,000, 1994;
(3) Peterson, M.D., Bryant, W.A., Cramer, C.H., *Probabilistic Seismic Hazard Assessment for the State of California*, California Division of Mines and Geology Open-File Report issued jointly with U.S. Geological Survey, CDMG 96-08 and USGS 96-706, 1996;
(4) United States Geological Survey (USGS) Working Group on California Earthquake Probabilities (WG02), Open File Report 03-214, 2003, *Earthquake Probabilities in the San Francisco Bay Region: 2002-2031,* http://pubs.usgs.gov/of/2003/of03-214/.

Hayward Fault

The Hayward Fault Zone is the southern extension of a fracture zone that includes the Rodgers Creek fault (north of San Pablo Bay), the Healdsburg fault (Sonoma County), and the Maacama fault (Mendocino County). The Hayward fault trends to the northwest within the East Bay, extending from San Pablo Bay in Richmond, 60 miles south to east San José. The Hayward fault in San José converges with the Calaveras fault, a similar type fault that extends north to Suisun Bay. The Hayward fault is designated by the Alquist-Priolo Earthquake Fault Zoning Act as an active fault.

A characteristic feature of the Hayward fault is its well-expressed and relatively consistent fault creep. Although large earthquakes on the Hayward fault have been rare since 1868, slow fault creep has continued to occur and has caused measurable offset. Fault creep on the East Bay segment of the Hayward fault is estimated at 9 millimeters per year (mm/yr).[26] However, a large earthquake could occur on the Hayward fault with an estimated moment magnitude (Mw) of about Mw 7.1 (see **Table 2**). The USGS Working Group on California Earthquake Probabilities includes the Hayward–Rodgers Creek Fault Systems in the list of those faults that have the highest probability of generating earthquakes of magnitude (M) 6.7 or greater in the Bay Area.[27]

Calaveras Fault

The Calaveras fault is a major right-lateral strike-slip fault that has been active during the last 11,000 years. The Calaveras fault is located in the eastern San Francisco Bay region and generally trends along the eastern side of the East Bay Hills, west of San Ramon Valley, and extends into the western Diablo Range, and eventually joins the San Andreas Fault Zone south of Hollister. The northern extent of the fault zone is somewhat conjectural and could be linked with the Concord fault.

The Calaveras fault has been the source of numerous moderate magnitude earthquakes and the probability of a large earthquake (greater than M6.7) is much lower than on the San Andreas or Hayward faults.[28] However, this fault is considered capable of generating earthquakes with upper bound magnitudes ranging from Mw magnitude 6.6 to magnitude 6.8.

San Gregorio

San Gregorio fault zone is mainly located offshore, west of San Francisco Bay and Monterey Bay, with a few onshore locations. The most recent earthquake along the San Gregorio fault zone occurred after 1270 AD to 1400 AD.[29] The San Gregorio fault is located off-shore and approximately 10 miles west of the project site.

Rodgers Creek

The Rodgers Creek fault is an important branch of the larger San Andreas Fault system and is generally thought to be connected to the Hayward fault to the south by means of right steps.[30] The Rodgers Creek fault is located in Sonoma County and is zoned under the Alquist-Priolo Earthquake Fault Zoning Act from Windsor Creek on the north almost to San Pablo Bay.[31,32] The fault is considered active and studies

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26 Peterson, M.D., Bryant, W.A., Cramer, C.H., *Probabilistic Seismic Hazard Assessment for the State of California*, California Division of Mines and Geology Open-File Report issued jointly with U.S. Geological Survey, CDMG 96-08 and USGS 96-706, 1996.

27 See footnote 20, p. 47.

28 See footnote 19, p. 47.

29 Bryant, W. A., and Cluett, S. E., compilers, Fault number 60a, San Gregorio fault zone, San Gregorio section, in Quaternary fault and fold database of the United States, 1999: U.S. Geological Survey website, http://earthquakes.usgs.gov/regional/qfaults, accessed December 2007.

30 Hart, E. W., compiler, Fault number 32, Rodgers Creek fault, in Quaternary fault and fold database of the United States, 1998: U.S. Geological Survey website, http://earthquakes.usgs.gov/regional/qfaults, accessed December 2007.

31 California Division of Mines and Geology, Revised official maps of earthquake fault zones, Healdsburg, Mark West Springs, Santa Rosa, Cotati, Glen Ellen, Petaluma River, and Sears Point quadrangles (scale 1:24,000), 1983.

have verified Holocene-active fault traces.[33,34] The Rodgers Creek fault is approximately 28 miles north from the project site.

Concord-Green Valley

The Concord and Green Valley faults are part of the larger San Andreas Fault system. The Concord fault extends from the northwestern slope of Mt. Diablo north to Suisun Bay, where the Green Valley fault is generally thought to be connected to the Concord fault and continues north to Wooden Valley in Napa County. Several site-specific studies on these faults have been conducted in compliance with the Alquist-Priolo Earthquake Fault Zoning Act, and they report the most recent displacement on these faults between 2,600 and 2,700 years ago in the late Holocene. The Concord fault is located approximately 27 miles northeast of the project site.

Marsh Creek-Greenville Fault

The Marsh Creek-Greenville fault, extends along the base of the Altamont Hills, which form the eastern margin of the Livermore Valley. The fault is recognized as a major structural feature and has demonstrated activity in the last 11,000 years. The Marsh Creek-Greenville fault is located approximately 36 miles east of the project site.

Seismic Hazards

Ground Shaking

Strong ground shaking from a major earthquake could affect the project site during the next 30 years. An earthquake on any one of the active faults (listed in **Table 2**, p. 50) could potentially produce a range of ground shaking intensities at the project site. Ground shaking may affect areas hundreds of miles distant from the earthquake's epicenter. Historic earthquakes have caused strong ground shaking and damage in the San Francisco Bay Area, the most recent being the Loma Prieta earthquake (moment magnitude 6.9) in October 1989. The epicenter was approximately 41 miles southeast of the project site, and the earthquake caused strong ground shaking for about 20 seconds and resulted in varying degrees of structural damage as far as 50 miles away. This event produced moderate (Modified Mercalli VI) to strong (Modified Mercalli VII) shaking intensities in the project area.[35] The 1906 San Francisco earthquake, with an estimated moment magnitude of 7.9, produced very strong (Modified Mercalli VIII) shaking intensities in the project area.[36]

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32 California Division of Mines and Geology, Revised official maps of earthquake fault zones, mark West Springs quadrangle (scale 1:24,000), 1993.

33 Hart, E. W., 1982. Rodgers Creek Fault, Sonoma County: California Division of Mines and Geology Fault Evaluation Report 141, microfiche copy in California Department of Conservation, Division of Mines and Geology Open-File Report 90-10.

34 Hart, E. W. 1992. Recently active traces of the Rodgers Creek fault, Sonoma County, California: California Department of Conservation, Division of Mines and Geology Open-File Report 92-7.

35 Association of Bay Area Governments (ABAG), *Earthquake Hazards Maps for 1989 Loma Prieta Earthquake and 1906 San Francisco Earthquake*, 2003. http://www.abag.ca.gov/cgi-bin/pickmapx.pl.; accessed December 2007.

36 *Ibid.*

The common way to describe ground motion during an earthquake is the duration of the shaking. However, a common measure of ground motion is also the peak ground acceleration (PGA). The PGA for a given component of motion is the largest value of horizontal acceleration obtained from a seismograph. PGA is expressed as the percentage of the equivalent acceleration of gravity (g), which is approximately 980 centimeters per second squared. (In terms of automobile acceleration, one "g" of acceleration is a rate of increase in speed equivalent to a car accelerating from a standstill to 60 mph in less than 3 seconds.) For comparison purposes, the maximum peak acceleration value recorded during the Loma Prieta earthquake was in the vicinity of the epicenter, near Santa Cruz, at 0.64 g. The lowest values recorded were 0.06 g in the bedrock on Yerba Buena Island. However, an earthquake on the San Andreas fault would likely produce more severe ground shaking than was observed during the Loma Prieta earthquake if the epicenter were closer in vicinity to the project site. Probabilistic seismic hazard maps indicate that peak ground acceleration in the project region could reach or exceed 0.6g.[37,38] The potential hazards related to ground shaking are discussed further in the Impact Analysis sub-section.

Surface Fault Rupture

Seismically induced ground rupture is defined as the physical displacement of surface deposits in response to an earthquake's seismic waves. The magnitude, sense, and nature of fault rupture can vary for different faults or even along different strands of the same fault. Ground rupture is considered more likely along active faults, which are referenced in **Table 2**, p. 50.

The project site is not within an Alquist-Priolo Fault Rupture Hazard Zone, as designated through the Alquist-Priolo Earthquake Fault Zoning Act, and no mapped active faults are known to pass through the immediate project region. Therefore, the risk of ground rupture at the site is very low and potential impacts relative to fault rupture are considered less than significant and are not analyzed in detail in the Impact Analysis sub-section.

Liquefaction

Liquefaction is a transformation of soil from a solid to a liquefied state during which saturated soil temporarily loses strength resulting from the buildup of excess pore water pressure, especially during earthquake-induced cyclic loading. Soils susceptible to liquefaction includes saturated loose to medium dense sands and gravels, low-plasticity silts, and some low-plasticity clay deposits. Liquefaction and associated failures could damage foundations, disrupt utility service, and can damage roadways.

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37 California Geological Survey (CGS), *Background Information on the ShakeMaps*, http://quake.usgs.gov/research/strongmotion/effects/shake/about.html, April 21, 2003.

38 A probabilistic seismic hazard map shows the predicted level of hazard from earthquakes that seismologists and geologist believe could occur. The map's analysis takes into consideration uncertainties in the size and location of earthquakes and the resulting ground motions that can affect a particular site. The maps are typically expressed in terms of probability of exceeding a certain ground motion. These maps depict a 10% probability of being exceeded in 50 years. There is a 90% chance that these ground motions will NOT be exceeded. This probability level allows engineers to design buildings for larger ground motions than seismologists think will occur during a 50-year interval, making buildings safer than if they were only designed for the ground motions that are expected to occur in the 50 years. Seismic shaking maps are prepared using consensus information on historical earthquakes and faults. These levels of ground shaking are used primarily for formulating building codes and for designing buildings. (See footnote 37; California Geological Survey, Probabilistic Seismic Hazards Assessment Maps, 2003, http://www.consrv.ca.gov/cgs/rghm/psha/index.htm, accessed December 2007.)

Hazard maps produced by the ABAG depict liquefaction and lateral spreading hazards for the entire Bay Area in the event of a significant seismic event.[39,40] According to these maps, the project site is not within a seismic hazard zone for liquefaction and has a very low liquefaction hazard level as shown on the official State of California Seismic Hazards Zone Map for San Francisco prepared under the Seismic Hazards Mapping Act of 1990.[41] Therefore, potential effects related to liquefaction would be less than significant, and are not analyzed in detail in the Impact Analysis sub-section.

Landslides

Slope failures, commonly referred to as landslides, include many phenomena that involve the downslope displacement and movement of material, either triggered by static (i.e., gravity) or dynamic (i.e., earthquake) forces. A slope failure is a mass of rock, soil, and debris displaced downslope by sliding, flowing, or falling. Exposed rock slopes undergo rockfalls, rockslides, or rock avalanches, while soil slopes experience shallow soil slides, rapid debris flows, and deep-seated rotational slides. Landslides may occur on slopes of 15 percent or less; however, the probability is greater on steeper slopes that exhibit old landslide features such as scarps, slanted vegetation, and transverse ridges. Landslide-susceptible areas are characterized by steep slopes and downslope creep of surface materials. Debris flows consist of a loose mass of rocks and other granular material that, if saturated and present on a steep slope, can move downslope. The rate of rock and soil movement can vary from a slow creep over many years to a sudden mass movement. Landslides occur throughout the state of California, but the density of incidents increases in zones of active faulting.

Slope stability can depend on a number of complex variables. The geology, structure, and amount of groundwater in the slope affect slope failure potential, as do external processes such as climate, topography, slope geometry, and human activity. The factors that contribute to slope movements include those that decrease the resistance in the slope materials and those that increase the stresses on the slope. Slope failure under static forces occurs when those forces initiating failure overcome the forces resisting slope movement. For example, a soil slope may be considered stable until it becomes saturated with water (e.g., during heavy rains or due to a broken pipe or sewer line). Under saturated conditions, the water pressure in the individual pores within the soil increases, reducing the strength of the soil. In addition, cutting into the slope and removing the lower portion, or slope toe, can reduce or eliminate the slope support, thereby increasing stress on the slope.

The site is not within a seismic hazard zone for seismically-induced landslides, as shown on the official State of California Seismic Hazards Zone Map for San Francisco. The project site is relatively flat. However, within the vicinity and down slope of the project area there are designated Landslide Zones

39 Association of Bay Area Governments (ABAG), *Earthquake Hazards Maps for 1989 Loma Prieta Earthquake and 1906 San Francisco Earthquake*, 2003. http://www.abag.ca.gov/cgi-bin/pickmapx.pl.; accessed December 2007.

40 Lateral spreading is a ground failure associated with liquefaction and generally results from predominantly horizontal displacement of materials toward relatively unsupported free slope faces.

41 The Seismic Hazards Mapping Act was developed to protect the public from the effects of strong ground shaking, liquefaction, landslides, or other ground failure, and from other hazards caused by earthquakes. This act requires the State Geologist to delineate various seismic hazard zones and requires cities, counties, and other local permitting agencies to regulate certain development projects within these zones.

where previous occurrence of landslide movement, or local topographic, geological, geotechnical, and subsurface water conditions indicate a potential for permanent ground displacements. The project site is also shown to be within an area subject to potential landslide hazard according to Map 5 of the *General Plan* Community Safety Element. The potential hazards related to landslides are discussed further in the Impact Analysis sub-section.

Inundation

Inundation hazards include the potential for tsunamis, reservoir failure, and flooding. The project site is not in an area subject to tsunami run-up, or reservoir inundation hazards (*General Plan* Community Safety Element, Maps 6 and 7). No portion of San Francisco is currently within a designated 100-year flood zone. However, the City is considering joining the National Flood Insurance Program. Accordingly, the Federal Emergency Management Agency (FEMA) in September 2007 released a preliminary Flood Insurance Rate Map (FIRM) for the City, which would designate some piers along San Francisco Bay, as well as portions of Mission Bay, Bayview Hunters Point, Hunters Point Shipyard, Candlestick Point, and Treasure Island in coastal flood hazard zones. The preliminary map is for review and comment only. It is anticipated that a final FIRM will be published in September 2008. If the City joins the flood insurance program, property owners and tenants will be eligible to purchase flood insurance, and flood insurance would be required for structures with federally backed mortgages that are located in "Special Flood Hazard Areas." The project site is not shown in or near a flood hazard area on the draft flood insurance map. The Sutro Tower site is located in proximity to several reservoirs. Sutro Tower currently complies with all *Building Code* structural standards for essential facilities, and with wind loading standards for non-essential facilities. Upon completion of the proposed project, the structural integrity of the tower would be enhanced and the tower would comply with the higher wind loading standards for essential facilities. Thus, there is no reasonable likelihood that Sutro Tower could experience structural failure that could result in reservoir failure and subsequent inundation. On the basis of this information, potential effects related to inundation would be less than significant and are not analyzed further in the Impact Analysis subsection.

Geologic Hazards

Considering the geologic context of the project area and nature of the project, other typical geologic hazards could include expansive soil materials and soil erosion. These hazards are discussed briefly here.

Expansive Soils

Expansive soils possess a "shrink-swell" behavior. Shrink-swell is the cyclic change in volume (expansion and contraction) that occurs in fine-grained clay sediments from the process of wetting and drying. Structural damage to buildings can occur over a long period of time, usually as a result of inadequate soil and foundation engineering or the placement of structures directly on expansive soils. Soils in the area have been characterized as having a moderate to low potential for shrink-swell behavior. The surface soils at the site are relatively thin ranging in depth between 8 and 40 inches below ground surface and are mostly comprised of sandy material. The proposed project does not include any subsurface work or changes to the foundation which would cause the structure to become exposed to any

expansive properties that might exist in the thin layer of surface soil reported in the area by the NRCS. Thus, there is a low potential for expansive soils to affect the project and potential impacts related to expansive soils would, therefore, be less than significant, and are not analyzed in detail in the Impact Analysis sub-section.

Soil Erosion

Erosion is the wearing away of soil and rock by processes such as mechanical or chemical weathering, mass wasting, the action of waves, wind and underground water. Excessive soil erosion can eventually lead to damage of building foundations and roadways. Because the project site includes no exposed soils, nor would the project include any excavation, there is no potential for soil erosion, and potential impacts related to erosion would, therefore, be less than significant and are not analyzed in detail in the Impact Analysis sub-section.

Regulatory Setting

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act of 1990 addresses non-surface fault rupture earthquake hazards, including liquefaction and seismically induced landslides, and its purpose is to protect public safety from the effects of strong ground shaking, liquefaction, landslides, and other ground failure, and other hazards caused by earthquakes. The Act requires the State Geologist to delineate various seismic hazard zones and requires cities, counties, and other local permitting agencies to regulate certain development projects within these zones. Before a development permit is granted for a site within a seismic hazard zone, a geotechnical investigation of the site must be conducted and appropriate mitigation measures incorporated into the project design. Seismic Hazard maps have been completed for San Francisco. As mentioned in the Seismic Hazards sub-section, the project site is not within a seismic hazard zone for liquefaction or seismically-induced landslides, as shown on the official State of California Seismic Hazards Zone Map for San Francisco prepared under the Seismic Hazards Mapping Act of 1990. The project site is in an extensive area subject to landslide according to Map 5 of the *General Plan* Community Safety Element, but more specific landslide mapping conducted by the CGS indicate that the tower location is at the margin of a much smaller area susceptible to earthquake induced landslides.

Impact Analysis

Methodology

The potential impacts associated with the project site geology and seismicity were evaluated through the review of prior geotechnical investigations conducted for the project site, regional and state data related to geologic, seismic, and soils conditions, and relevant federal and state regulations. This analysis relies in substantial part on a structural analysis performed by the engineering firm Simpson Gumpertz & Heger,

the findings of which are summarized herein.[42] The structural analysis was subject to independent peer review by Helmut Krawinkler and Andrew Whittaker, experts identified by the San Francisco Department of Building Inspection (DBI) as qualified to review Sutro Tower data. The review concluded that "the design process is sound in concept and the results in the Phase II Analysis Report appear to be reasonable based on the presented wind and seismic loading criteria."[43] The analysis was also reviewed by DBI, which concurred with the reviewers' conclusions that the structural analysis report is adequate.[44]

Significance Criteria

The Initial Study (see Appendix A) determined that the project would not result in a significant effect with regard to erosion, expansive soils, or septic or other alternative wastewater systems, nor would the project change substantially the topography or any unique geologic or physical features of the site. Therefore, these issues are not discussed further. As discussed above, the project site is not within a seismic hazard zone for liquefaction and has a very low liquefaction hazard level, nor is the site subject to a substantial risk of ground rupture, nor is the site situated in an area with a high potential for expansive soils to affect the project, nor is the site subject to risk of inundation, nor is the site subject to substantial soil erosion. Therefore, for the reasons described in the Setting, potential impacts related to these issues would be less than significant, and these potential impacts are not analyzed in further detail.

For this analysis, implementation of the proposed project would result in significant impacts if it would expose people or structures to potential substantial adverse effects, including risk of loss, injury or death involving strong seismic ground shaking or landslides, or if the project would be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on or off-site landslide, lateral spreading, subsidence, liquefaction or collapse.

Project Impacts

Seismic Ground Shaking

The proposed project site is located in a seismically active region. According to the USGS Working Group, the project site will likely experience one or more earthquakes of Richter magnitude 6.7 or greater within the next 30 years. The original structural design for Sutro Tower was produced by A.C. Martin Associates of Los Angeles, with detailing and fabrication performed by Kline Towers; construction of the tower occurred in 1972. A supplemental seismic evaluation analysis was conducted in 1997 following direction from San Francisco's Department of Building Inspection with the purpose of evaluating the

[42] Simpson Gumpertz & Heger, "Digital Television Conversion of Sutro Tower, Phase II Structural Analysis Report." March 10, 2008. This report is on file and available for review by appointment at the Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0206E.

[43] Helmut Krawinkler, Ph.D., P.E., Structural Engineering Consultant, and Andrew Whittaker, letter to Eugene Zastrow, General Manager, Sutro Tower, March 11, 2008. This document is on file and available for review by appointment at the Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0206E. Dr. Krawinkler is professor of engineering at Stanford University. Dr. Whittaker is professor of engineering at the University of Buffalo.

[44] Hanson Tom, Principal Engineer, Department of Building Inspection, e-mail correspondence, March 18, 2008. This document is on file and available for review by appointment at the Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0206E.

structure under the 1995 revision of the *San Francisco Building Code*. Later in 1997, the Planning Department determined that Sutro Tower was a critical component of the City's emergency communications system and designated it as an "essential facility" subject to more restrictive seismic design criteria than ordinary structures. In order to meet the *Building Code* standards for an essential facility, a revised seismic and structural analysis was conducted by EQE International in 1999. This analysis resulted in the 2004 – 2005 upgrades to the tower's structural design consisting of local reinforcement of a small percentage of the structure's braces, columns, and connections.[45,46]

The currently proposed DTV project would bring Sutro Tower up to the current Federal Communications Commission standards for digital broadcasting by incorporating new broadcasting equipment into the current structure, and removing older broadcasting equipment. Accordingly, changes to the structure's design are evaluated against the current *San Francisco Building Code* for essential facilities. Using the base model originally developed by EQE International for the analysis and design of seismic upgrades during the period 1999-2000, an additional seismic and structural analysis was conducted by Simpson Gumpertz & Heger in 2008.

The model used by EQE International in 1999 to conduct its seismic analysis and retrofit work on the tower, was developed in collaboration with Dr. Paul Sommerville of URS Consultants, an expert in ground motion estimation, according to Simpson Gumpertz & Heger. Dr. Sommerville characterized the probable intensity of earthquakes having an average recurrence interval of 1,000 years and developed ground motion acceleration histories representative of 1,000-year earthquake ground motions for use in EQE's structural analysis. The model used for the 2008 seismic and structural analysis accounted for the existing structure, including the modifications made as part of a wind upgrade undertaken in connection with the earlier installation of DTV antennas, the modifications included as part of the seismic upgrade completed in 2005, and the weight of the currently proposed DTV equipment. Additionally, a conservative allowance was made for some 6,000 pounds of equipment that could be added in the future at each of Levels 2, 3, and 4 of Sutro Tower, and 2,000 pounds at Level 5.[47]

Based on the 2008 analysis, the following upgrades are recommended to accommodate the changes in weight on the existing structure and would be implemented as part of the proposed project:[48]

- Strengthening of one of three columns on each of the three tower legs above tower Level 3 by bolting new steel plates to the columns, and replacing "splice plates" between lengths of each of the columns with higher-strength plates, at two locations between Levels 1 and 2 and at one location above Level 3 (to meet *Building Code* wind loading requirements for essential structures);

45 Simpson Gumpertz & Heger, (see footnote 42, p. 57); p. 6.
46 The report by EQE International, "Seismic/Structural Analysis of Sutro Tower," June 1999 (including URS Greiner Woodward Clyde, "Ground Motions at the Sutro Tower," June 11, 1999), is on file and available for review by appointment at the Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0206E.
47 Simpson Gumpertz & Heger, *op. cit.*; p. 19. This potential new equipment is described in the project description on p. 25.
48 Simpson Gumpertz & Heger, *op. cit.*; p. 45

- Reinforcement, at tower Levels 2, 3, 4, and 5, of the connections between the horizontal trusses and the three tower legs, by the addition of steel plates and welds, as well as the addition of new braces to convert locations with single diagonal braces to an "X-braced" system (to meet *Building Code* wind loading requirements for essential structures);

- Upgrading bolted connections to welded connections on the Level 6 horizontal "outriggers" (the portion of the horizontal trusses extending beyond the tower legs) that anchor guy wires supporting the vertical masts atop the tower, adding welded steel tabs where these same horizontal trusses connect to the tower legs, and adding welded L-shaped steel angles to the same trusses at certain locations between the tower legs (to accommodate seismic loading from the new configuration of tower-top antennas); and

- Replacement of bolted connections with welded connections, along with the addition of stiffener plates to existing triangular gusset plates, on existing diagonal braces within the tower legs, at various locations between grade and tower Level 2, between Levels 2 and 3, and between Levels 5 and 6 (to accommodate seismic loading from ground-shaking due to an earthquake with an average recurrence interval of 1,000 years, as required for essential structures, resulting from the new configuration of tower-top antennas).

Completion of the above structural improvements would enable Sutro Tower to meet all *Building Code* wind and seismic criteria for essential structures.

If the proposed project was, theoretically, implemented using the existing tower structure without any structural upgrades, that hypothetical scenario would increase the overall seismic demand on the structure during the modeled ground shaking scenarios. However, the recommended structural upgrades, which are proposed as part of the project, would compensate for the alterations in seismic demand. Therefore, the project would have a low potential for adverse effects related to seismic ground shaking. Seismic-related ground failure is not anticipated due to the fact that the original seismic analysis of the structure conducted by Dames & Moore concluded that the rock formations encountered during the test borings would provide adequate support for both downward and uplift loads.[49] Furthermore, the 1969 foundation investigation conducted by Dames & Moore provided recommendations for foundation considerations based on dead load plus live load plus seismic load.[50] The modeling conducted for the 2008 analysis included review of the adequacy of the existing foundations and verified that they are adequate for the modeled parameters. Additionally, the final upgrades to the structural design would be evaluated by the DBI, which would ensure that all current *San Francisco Building Code* provision are met. Therefore, the proposed project would result in a less-than-significant impact with regard to strong seismic ground shaking. Likewise, the project would not result in substantial adverse effects related to catastrophic failure from ground shaking.

[49] Dames & Moore (see footnote 13, p. 46).
[50] Dames & Moore (See footnote 16, p. 46).

Slope Failure

As noted in the Setting section, according to the Seismic Hazard Zones map for the City of San Francisco, the project site is located at the margin of an area mapped as susceptible to earthquake-induced landslide or slope failure. In accordance with the Seismic Hazard Mapping Act, CGS has designated Landslide Zones where previous occurrence of landslide movement, or local topographic, geological, geotechnical, and subsurface water conditions indicate a potential for permanent ground displacements. The project site is also shown to be within an area subject to potential landslide hazard according to Map 5 of the *General Plan* Community Safety Element.

As also discussed in the Setting, landslide-susceptible areas are generally characterized by steep slopes and downslope creep of surface materials. Sutro Tower is located at an approximate base elevation of 834 feet above sea level on a relatively level site between Mount Sutro and Twin Peaks. The topography in the vicinity of the project site is characterized by a generally level area that is oblong in shape and oriented in a northeast/southwest trending direction, and that includes the concrete-topped Summit Reservoir and Sutro Tower and its transmission building and parking lot. The feature can be described as relatively large and flat with a length of approximately 960 feet and elevation change of less than 25 feet. Due to the relatively flat topography in the vicinity of the project area, the slope on which the tower was constructed is considered relatively stable. Southwest of the tower, the topography slopes relatively steeply down to Dellbrook Avenue and Clarendon Avenue below, and the slope above Dellbrook Avenue is mapped as being within an area susceptible to seismically inducted landsliding.

Slope stability can depend on a number of complex variables. The geology, structure, and amount of groundwater in the slope affect slope failure potential, as do external processes (i.e., climate, topography, slope geometry, and human activity). The factors that contribute to slope movements include those that decrease the resistance in the slope materials and those that increase the stresses on the slope. The total weight of the existing Sutro Tower structure, including all cladding and equipment, is approximately 4 million pounds.[51] The estimated weight of the tower's concrete foundation is some 6,900 tons (13.8 million pounds). The estimated increase in weight to the current structure due to the proposed project (including the conservatively assumed addition of 20,000 pounds future unspecified equipment) would be approximately 0.3 percent of the total weight of the structure and would not result in a substantial increase in stress to the slope. (Absent this additional 20,000 pounds of potential future equipment assumed in the seismic analysis, the currently proposed and known changes in television antennas would result in a *decrease* in weight of the equipment on the tower of some 7,600 pounds.) Because the tower is anchored to its foundation, which sits atop bedrock, and because the increase in total mass to the structure would be relatively small, the proposed project is not expected to alter the current slope stability. Therefore, this impact is considered less than significant.

The proposed project would not result in significant effects with regard to seismically induced ground shaking or landslides. Accordingly, and because other geologic risks discussed above (liquefaction, ground rupture, expansive soils) were found to result in less-than-significant impacts, it can be concluded

[51] Simpson, Gumpertz & Heger, *op. cit.*; p. 33.

that the project site is not on a geologic unit or soil that is unstable, nor would the site become unstable as a result of the project and, therefore, the project would not result in landslides, lateral spreading, subsidence, liquefaction or collapse.

The *San Francisco Building Code* contains requirements for new and replacement construction. The final building plans, including the proposed structural upgrades, would be reviewed by the San Francisco Department of Building Inspection (DBI). In reviewing building plans, the DBI refers to a variety of information sources to determine existing hazards and assess requirements for mitigation. Sources reviewed include maps of Special Geologic Study Areas and known landslide areas in San Francisco as well as the building inspectors' working knowledge of areas of special geologic concern.

Potential geologic hazards would be mitigated during the permit review process through these measures. For any development proposal in an area of liquefaction potential, the DBI will, in its review of the building permit application, require the project sponsor to prepare a geotechnical report that assesses the nature and severity of the hazard(s) on the site and recommends project design and construction features that would reduce the hazards(s). To ensure compliance with all *San Francisco Building Code* provisions regarding structural safety, when DBI reviews the geotechnical report (if required) and building plans for a proposed project, it will determine the adequacy of necessary engineering and design features to reduce the potential damage to structures from ground shaking and liquefaction. Therefore, potential damage to structures from geologic hazards on the project site would be ameliorated through the DBI requirement for a geotechnical report and review of the building permit application. Any changes incorporated into the foundation design required to meet the *San Francisco Building Code* standards that are identified as a result of the DBI permit review process would constitute minor modifications of the project and would not require additional environmental analysis.

Summary

Based upon the above analysis, the proposed project would not expose people, including nearby residents, or structures, including nearby reservoirs or Clarendon Elementary School, to substantial adverse effects including risk of injury or death due to seismic ground shaking or landslides. Moreover, the project would not be located on an unstable geologic unit or soil, nor would the underlying geologic unit or soil become unstable as a result of the project. Finally, the project would not result in landsliding, lateral spreading, subsidence, liquefaction or collapse. Therefore, effects related to geology, soils, and seismicity would be less than significant.

C. Radio Frequency Radiation

Introduction

This section presents the existing setting and potential impacts related to radio frequency radiation (RFR) exposure and interference conditions from Sutro Tower associated with the implementation of the proposed project. Although radio frequency interference with consumer devices is not an environmental impact, this section also addresses such interference associated with the operation of Sutro Tower for informational purposes.

Setting

Radio Frequency Radiation

Radio frequency used in radio and television broadcasts involves electromagnetic waves or radio waves. There are two forms of electromagnetic waves: ionizing and non-ionizing. The shortest wavelengths, or highest frequencies, are ionizing electromagnetic radiation: ionizing radiation (such as X-rays) has higher energy than non-ionizing radiation. The energy level of these ionizing radiation waves is enough to expel an electron (or ionize it) from a molecule, which can alter the function of biological molecules and cause irreversible and cumulative damage. There is no ionizing radiation present at Sutro Tower or planned as part of the project.

Radio frequency radiation emitted by the antennas at Sutro Tower involves non-ionizing electromagnetic waves. Radio waves have a characteristic frequency, which is the rate at which the driving voltage alternates from positive to negative and back again. Frequency is expressed in hertz (Hz); a “kilohertz” (kHz) is one thousand hertz; a “megahertz” (MHz) is one million hertz; and a “gigahertz” (GHz) is one billion hertz. Radio frequencies are considered to be in a range from about 300 kHz to 300 GHz. Sutro Tower currently emits radio frequency waves with a frequency range between 54-788 MHz.

The energy content of such non-ionizing radio frequency waves is much smaller than that of ionizing radiation, and therefore relatively high exposures are necessary to cause biological damage. Exposure levels to RFR are generally referred to as “power densities” (the rate at which energy is available over a region of space) and are expressed in terms of milliwatts per square centimeter. In general, power density levels from a RF source decrease according to the inverse square principle: at twice the distance from the source, a point will receive one-fourth of the level of radiation exposure.

RFR must be distinguished from another type of non-ionizing radiation commonly referred to as extremely low frequency radiation. Extremely low frequencies, usually 60 Hz, are commonly used in the transmission of electric power from generating stations to substations, and to consumers of electricity. While controversy surrounds reports of adverse health effects from exposure to electric and magnetic fields associated with electric power lines and operating appliances within the home. Sutro Tower television and radio antennas do not emit these extremely low frequencies.

The discussion in this section relies on the following sources of information:[52]

- Hammett & Edison, Inc., Consulting Engineers, Project Summary Report, Sutro Tower, Inc., San Francisco, California, dated April 3, 2008. This report analyzes the proposed digital television broadcast services on Sutro Tower.

- Hammett & Edison, Inc., Consulting Engineers, Assessment of RF Exposure Conditions, Sutro Tower, Inc., San Francisco, California, dated April 3, 2008. This report evaluates the RF exposure conditions at Sutro Tower during the transition to digital television.

- Hammett & Edison, Inc., Consulting Engineers, Response to SFDPH Questions regarding Project Summary and RF Exposure Condition reports for the Sutro Tower Post-Transition Digital Television Project, Letter dated December 14, 2007.

RFR Exposure Regulations

In October 1997, in Docket 93-62, the Federal Communications Commission (FCC) adopted human exposure limits for field strength and power density recommended in Report No. 86, "Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields," published in 1986 by the National Council on Radiation Protection and Measurements. More recent standards developed by the Institute of Electrical and Electronics Engineers (IEEE) and approved as American National Standard ANSI/IEEE C95.1-2006, "Safety Levels with Respect to Human Exposure to Radio Frequency and Electromagnetic Fields, 3 KHz to 300 GHz" include similar exposure limits. According to information provided by the San Francisco Department of Public Health in connection with a separate matter, in October 2005 IEEE reviewed public exposure limits and did not substantially alter its recommendations. In addition, a federal interagency working group (with representative of the FCC, Environmental Protection Agency, Occupational Safety and Health Administration, Food and Drug Administration, and the National Institute for Occupational Safety and Health) meets regularly to review studies on RFR hazards and determine if changes to exposure standards need to be made. To date, this working group has not recommended changes to the federal exposure standards.

The FCC standards are set forth as maximum permissible exposure (MPE) limits, reported as a "power density" in milliwatts per square centimeter (mW/cm^2). The MPE may also be measured in terms of "field strength," measured in volts per meter. The MPE level varies by frequency (in megahertz) of the RFR emitted, and separate MPE limits are established for worker exposure and public exposure to RFR, with the public exposure limit generally being five times more restrictive. According to the Department of Public Health, The FCC MPE limits "are based on established biological effects of RF energy published in the scientific literature that are considered to be potentially harmful to humans. The public MPE is set

[52] Each of these reports is on file and available for review by appointment at the Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0206E.

by dividing those power density levels with a safety factor of 50."[53] This conservative MPE limit is established to be protective of all persons, including children, seniors, and people with health problems.

The Department of Public Health has determined that the FCC MPE standard is "health protective" and that "if the general public is exposed to RFR levels below the established FCC MPE limits, no health hazard will occur."[54]

Under existing conditions, the actual measured maximum existing ambient RFR exposure levels at ground level, for any publicly accessible location around Sutro Tower, is 8.5 percent of the FCC public exposure limit for all broadcast facilities under normal main antenna operation. This includes the operation of all antennas on the tower, including the smaller-scale antennas and accessory equipment located at the Sutro Tower site.[55] As described in the project description, many television and radio stations also have auxiliary antennas at Sutro Tower. These are permanent standby facilities used during routine maintenance or failure of the main antennas. Ground-level RFR levels during operation of auxiliary antennas are greater than for the main antennas, because auxiliary antennas are installed at lower levels on the tower and are typically physically shorter than main antennas, often for spacing, weight, or power considerations. This results in broad elevation plane patterns and greater contributions at ground level. Although it is not unusual for individual stations to transmit from their auxiliary antennas for short periods of time, transmissions from the auxiliary antennas by all stations simultaneously is atypical. Moreover, auxiliary antennas are used for limited periods of time, under non-standard operating conditions.

For the existing auxiliary TV antennas, the combined operation of all eight antennas could theoretically result in exposure levels equal to 99 percent of the FCC public exposure limit. Under existing conditions, the combined operation of these auxiliary antennas, along with all other existing FM and ancillary antennas could theoretically exceed the FCC public exposure limit. To ensure that no combination of auxiliary antennas is energized at the same time such that cumulative RFR exposure levels at ground level would exceed the FCC public exposure limit, the General Manager of Sutro Tower, Inc., and all tenant stations are required under conditions of their leases to comply with a "Table of Contributions," a set of engineering formulae and procedures developed by Sutro Tower's radio frequency engineers to ensure that actual operation of auxiliary antennas complies with FCC public exposure limits. This Table of Contributions describes the maximum power limit for each auxiliary antenna, describes each antenna's radio frequency contribution to cumulative conditions at different power levels, and indicates how each particular station must reduce auxiliary antenna operation or auxiliary power levels to ensure that the cumulative RFR exposure level does not exceed FCC public exposure standards. Operation of auxiliary

[53] Richard J. Lee, Community Toxics Program Manager, San Francisco Department of Public Health, letter to Jeremy Battis, San Francisco Planning Department, July 2. 2007. (This letter was prepared in response to an appeal of a CEQA Categorical Exemption for a proposed citywide "wi-fi" proposal.) This letter is on file and available for review by appointment at the Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0206E.

[54] *Ibid.*

[55] Hammett & Edison, Inc., Consulting Engineers, Assessment of RF Exposure Conditions, Sutro Tower, Inc., San Francisco, California, dated April 3, 2008; p. 3. This report is on file and available for review by appointment at the Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0206E.

antennas pursuant to the Table of Contributions is administered by Sutro Tower's general manager and compliance with those directives is mandated as part of every tenant lease at Sutro Tower in order that Sutro Tower does not violate the FCC's public exposure limits for RFR. This established operational procedure requires that certain broadcasters operate at reduced power from auxiliary antennas, depending on the operating status of other broadcasters to ensure compliance with FCC RFR exposure standards.

Impact Analysis

Significance Criteria

The Initial Study (see Appendix A) determined that the proposed project would not result in a significant impact with regard to routine transport, use, or disposal of hazardous materials; as a result of being located on a site included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 (the site is not so located); in relation to location of an airport or airstrip; in regard to an adopted emergency response plan or emergency evacuation plan; or as a result of fire hazard.

For this analysis, the proposed Sutro Tower DTV project would have a significant effect on the environment if it would:

- create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment; or
- emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.

This analysis evaluates the project against the two above criteria with respect to levels of radio frequency radiation that would be emitted from Sutro Tower as a result of the proposed project. Inasmuch as the Department of Public Health considers the FCC's maximum permissible exposure level for the public to be protective of public health, the analysis evaluates whether the project would result in an exceedance of the FCC standard.

RFR Exposure

The proposed project, transitioning from analog to digital television (DTV) broadcasting, involves the following: removal of various analog television broadcasting main antennas and auxiliary antennas (permanent standby antennas for use during main antenna maintenance and for emergency use) and replacement with DTV antennas; installation of antennas for wireless communications facilities; alteration, replacement, or addition of small ancillary and accessory antennas; and installation of various equipment associated with the operation of Sutro Tower as a broadcasting facility. Under the project, the total number of television antennas at the tower would be reduced from 22 to 8. During the construction phase of the project, expected to take approximately 12 to 16 months, the existing analog antennas would be removed and new DTV antennas will be installed. For a portion of the construction period, new auxiliary antennas would be utilized when workers need access to areas near the main DTV antennas higher on the tower. When construction is completed, broadcasting would switch to the new DTV main

antennas and the auxiliary antennas would only be utilized during routine maintenance on the main antennas or in the event of an emergency where one or more of the main antennas experience failure.

RFR emissions from existing antennas at the Sutro Tower site, the conditions during construction (or transition), and the final conditions following completion of the project were evaluated by Hammett & Edison, broadcast engineers for Sutro Tower. Existing RFR conditions were based on field measurements of RFR exposure levels; conditions during construction and following completion of the project were calculated according to Federal Communications Commission (FCC) methodology for evaluating RFR exposure. These calculated RFR emissions levels for future conditions (construction and post-construction scenarios) include several "worst-case" assumptions and, therefore, are expected to overstate actual power density levels. For example, RFR measurements made following installation of the Sutro Tower transitional DTV antenna in 1999 were all below calculated values reported in the EIR for that project, with measurements averaging about half of the calculated values.[56]

For project conditions, the anticipated RFR exposure levels under with-project conditions were calculated for standard operation on the main antennas, operation of the main and auxiliary antennas during construction, and the unlikely, theoretical operation of all FM and/or TV auxiliary antennas at the same time. Results are compared to the FCC's maximum permissible exposure limits for field strength and power density. These regulations provide separate limits for occupational and public exposure conditions; as noted in the setting, the public exposure conditions (used in this analysis) are generally five times more restrictive. These limits are intended to provide a prudent margin of safety for all persons, regardless of age, gender, size or health.

As noted in the setting, under existing conditions, the measured maximum existing RFR exposure levels at ground level for the Sutro Tower project area for all broadcast facilities under normal main antenna operation is 8.5 percent of the FCC public exposure limit, for any publicly accessible location. Under the combined operation of existing auxiliary TV and FM antennas, plus ancillary antennas, RFR levels could theoretically exceed the FCC public exposure limit but in practice is limited by use of a Table of Contributions, as described in the Setting, on p. 64.

Implementation of the proposed project would reduce RFR exposure levels from existing conditions, except during portions of the construction period when auxiliary antennas would be used. During construction, the maximum RFR exposure levels would be 3.9 percent of the public exposure limit at any publicly accessible location during operation on the main digital antennas (2.9 percent of the limit for DTV main antennas plus 1.0 percent of the limit for FM antennas and smaller ancillary and accessory antennas and equipment) (see **Table 3**). Because the main antennas could not be used when worker access to the main DTV antenna areas is required during construction, new auxiliary DTV antennas would be used instead. As shown in Table 3, RFR exposure levels would be 15.3 percent of the FCC limit at any

[56] Hammett & Edison, Inc. (see footnote 55, p. 64); p. 4.

TABLE 3
EXISTING, TRANSITIONAL, AND POST-CONSTRUCTION RFR EXPOSURE LEVELS [a]
(percent of maximum public exposure limit)

	Existing		Transition (Construction)		Final	
	Main	**Auxiliary**	**Main**	**Auxiliary**	**Main**	**Auxiliary**
TV	–	99.0[b]	2.9	14.3[b]	8.0	14.3[b]
FM/Ancillary	–	103.4[c]	1.0	103.4[c]	1.0	103.4[c]
Total	8.5[d]	<100[e]	3.9	<100[e]	8.4[f]	<100[e]

[a] Except for the existing main antennas, all values in this table are calculated levels of RFR exposure. As stated in the text (p. 66), calculated RFR levels include "worst-case" assumptions and thus have been found, through comparison to field measurements, to overstate actual power density levels by approximately a factor of two, on average (Source: Hammett & Edison, Inc. [see footnote 55, p. 64], p. 4).

[b] Theoretical maximum if all TV auxiliary antennas were energized simultaneously.

[c] Theoretical maximum if all FM auxiliary antennas were energized simultaneously.

[d] Determined by measurement.

[e] Pursuant to Table of Contributions to ensure that operation of auxiliary antennas does not exceed FCC limits.

[f] The maximum RFR exposure for the Main and FM/Ancillary antennas would occur at different locations; therefore cumulative levels do not equal the sum of individual levels. That is, at the location where the Main antenna RFR exposure is 8.0 percent of the Public Exposure Limit, RFR exposure from the FM/Ancillary antennas would be less than the maximum from those antennas. Likewise, at a location where the FM/Ancillary antenna RFR exposure is at is maximum of 1.0 percent of the Public Exposure Limit, the Main antenna RFR exposure is less than the maximum from those antennas. Because a person could not, therefore, be simultaneously exposed both maximum exposure levels at one time in one location, the overall maximum RFR exposure would be less than sum of the individual maximum levels.

SOURCE: Hammett & Edison, 2007.

publicly accessible location when all auxiliary antennas are operating (14.3 percent of the limit for DTV auxiliary antennas plus 1.0 percent of the limit for FM antennas and smaller ancillary and accessory antennas and equipment). This would be higher than current measured RFR exposure levels of 8.5 percent. This higher level of exposure would occur only during daytime hours when worker access to areas near the existing main DTV antennas is required, because at these times, the newly installed auxiliary DTV antennas between Levels 3 and 4 would be operating to avoid exposing workers to RFR levels in excess of permitted limits, from the existing DTV antennas below Level 6. At all other times during construction, when the new main DTV antennas are operating, the RFR levels would be 3.9 percent of the public exposure limit. To protect worker health and safety, operational measures are in place to ensure that access to on-tower areas that exceed the occupational exposure limit is restricted. Further restrictions are in place limiting access to the tower above ground level and to the transmitter building rooftop when any auxiliary antenna is energized. If necessary, the FM stations would temporarily reduce power when work is required close to an antenna. These operational measures would ensure worker safety during the construction period and maintain RFR levels in publicly accessible areas well below the public exposure limit.

With completion of the project and during future normal operation of main DTV antennas, the calculated maximum RFR level following completion of the proposed project would be 8.4 percent of the public exposure limit at any publicly accessible location, reduced incrementally from the existing measured level

of 8.5 percent, due to the reconfiguration of television antennas (see Table 3).[57] The new auxiliary DTV antennas would generate lower RFR levels than the existing auxiliary analog antennas (14.3 percent of the public exposure level, compared to 99 percent at present; see Table 3), without reliance on the Table of Contributions. However, the cumulative maximum RFR exposure level from the theoretical operation of all auxiliary TV, FM and ancillary antennas would be unchanged from existing conditions for both the construction phase and operation following completion of the proposed project. In each instance, operation under the Table of Contributions would be required to maintain the RFR exposure level within the FCC limit.

The mandatory RFR measurement program (found within the Standard Sutro Tower Conditions adopted in 2000) stipulates that "Sutro Tower Inc. shall measure RFR public exposure levels at 200 publicly accessible sites within 1,000 feet of the tower. Measurements shall be made within six months of the activation of any 'DTV' broadcasting antenna, or within six months of any increase in power from any main DTV antenna, whichever is earliest." Therefore, in connection with the currently proposed project, Sutro Tower Inc. will measure RFR public exposure levels at 200 publicly accessible sites within 1,000 feet of the tower after installation of the new shared DTV auxiliary antennas and again after installation of the new DTV main antennas.[58] These measurements would be submitted to the Department of Public Health and provide analytical data to ensure that the RFR exposures from tower operations are protective of human health at the project site and in vicinity, both during and following construction of the project. In addition, "Upon written request to [Sutro Tower Inc. (STI)] from an individual property owner within 1,000 feet of the tower, STI shall measure RFR exposure levels at the accessible front yard and rear yard of the property." Such measurements would also be submitted to the Department of Public Health.

School Proximity

Because RFR levels in publicly accessible areas near the project site would decline incrementally under normal operations in the future, and because, as noted, the FCC maximum permissible exposure limit is designed to be protective of all persons, including children, the proposed project would not adversely affect children at Clarendon Elementary School, located approximately one-eighth mile from the tower. As stated above, calculated RFR levels at locations of greatest exposure are well within FCC limits. Moreover, field measurements indicate that such calculations tend to overstate actual power density levels. In addition, because RFR levels decline rapidly with increased distance from the tower, RFR levels at the Clarendon Elementary School location are, and would continue to be, lower than the values reported above for locations much closer to Sutro Tower. The potential impact of the Sutro Tower project on the nearby elementary school would be less than significant.

[57] As indicated in Table 3, the locations of the maximum RFR exposure levels for DTV and FM/ancillary antennas are different. As a result, the maximum 8.4 percent of the public exposure limit is less than the combination of the separate maximums (8.0 percent and 1.0 percent, respectively) for the DTV and FM/ancillary antennas. That is, the 8 percent of public exposure limit from DTV antenna RFR would occur at a different location than the 1 percent of public exposure limit from FM/ancillary antenna RFR.

[58] Hammett & Edison, Inc. (see footnote 55, p. 64); p. 6.

Radio Frequency Interference with Consumer Electronics

While not a hazards-related issue, radio frequency interference with consumer devices is discussed in this section as it is sometimes mentioned as a nuisance in the neighborhood of Sutro Tower.[59] Neighbors have at times complained of "ghosting," audio buzzing, or other signal interference with household or consumer appliances. The Sutro Tower General Manager estimates there have been fewer than ten questions or complaints per year of reported RF interference during the past five years. Regulations related to radio frequency interference to the reception of TV and radio broadcasts from a large variety of consumer electronic devices are covered exclusively by federal law, described in the Code of Federal Regulations (CFR), Chapter 47, Part 15.

Because the RFR exposure levels after the transition are calculated to be less than those existing, interference to consumer devices from Sutro Tower operations is likely to be reduced by the project. Although field strength levels are calculated to be higher during the construction phase of the project, it is expected that the increase would not be great enough to result in an increase in interference to consumer devices. Moreover, these higher levels of RFR would occur only during daytime periods when construction worker access to the tower is required. The project would comply with all FCC interference regulations pertaining to interference with consumer devices. It is noted that regulation related to radio frequency interference from TV and radio signals to consumer electronic devices is covered exclusively by federal law, described in the Code of Federal Regulations (CFR), Chapter 47, Part 15.

Summary

In summary, because radio frequency radiation emitted from Sutro Tower under the proposed project would decline incrementally under long-term permanent conditions, compared to existing conditions, and because RFR levels would be well within the FCC maximum permissible exposure level for the public, the project would result in a less-than-significant impact with regard to RFR emissions.

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[59] A memo regarding Sutro Tower and radio frequency interference from Sutro Tower representative Debra Stein, GCA Strategies, to Richard Lee, Department of Public Health, dated December 6, 2007, is appended to Hammett & Edison, Inc., Consulting Engineers, Project Summary Report, dated April 3, 2008. This document is on file and available for review by appointment at the Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0206E.

D. Risk of Fire

Setting

Comments received in response to the Notice of Preparation of this EIR raised questions concerning the potential for increased fire risk as a result of the proposed project. That concern is addressed in this section.

Sutro Tower is adjacent to a stand of eucalyptus trees that surrounds the tower site, except on the northeast, where the presence of Summit Reservoir creates a break in the forested nature of the site. The existing trees are part of an extensive forestation project undertaken by Adolph Sutro, who made his fortune in the Nevada silver mines and later built the Cliff House, Sutro Baths, and was elected mayor of San Francisco. Sutro planted an immense forest on his landholdings west of Twin Peaks during the latter two decades of the 19th century. The fast-growing eucalyptus originally planted to provide shelter for other trees eventually crowded out most everything else. Sutro's Forest, as it came to be known, once covered hundreds of acres, including the neighborhoods of Forest Knolls, Midtown Terrace, Forest Hill, St. Francis Wood, Sherwood Forest, Monterey Heights, Westwood Highlands, Westwood Park, Balboa Terrace, and Mount Davidson Manor.[60]

Today, much of the remaining forest is on land owned by the University of California, San Francisco, covering Mount Sutro itself, located northwest of Sutro Tower, across Clarendon Avenue. Some of the forest is also on City land behind Laguna Honda Hospital. Other areas of eucalyptus forest are owned by Sutro Tower Inc.—the project sponsor—and by the Recreation and Park Department, the San Francisco Real Estate Department, and by several individual property owners in neighborhoods subsequently built among Sutro's trees.

Fire protection for the project site and vicinity is provided primarily by the three closest fire stations: Station 20, at 285 Olympia Way at Clarendon Avenue (approximately one-half mile south of the project site); Station 12 at 1145 Stanyan Street at Grattan Street (approximately one mile north); and Station 24, at 100 Hoffman Avenue at Alvarado Street (approximately 1.5 miles east). Each of these three stations houses an engine (pumper); Station 12 also houses a (ladder) truck and a medic unit (ambulance). A high pressure fire hydrant is located on Clarendon Avenue. Additional low pressure hydrants are located throughout the neighborhood.

Impacts

Significance Criteria

The proposed project would have a significant effect with respect to fire safety if it would expose people or structures to a significant risk of loss, injury or death involving fires or would result in substantial adverse physical impacts associated with the provision of, or the need for, new or physically altered

[60] Richard Brandi, "Farms, Fire and Forest: Adolph Sutro and Development 'West of Twin Peaks," 2003. Article posted on Western Neighborhoods Project website (http://www.outsidelands.org/forest-fires.php); reviewed April 6, 2008.

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 fire protection services.

Impacts Analysis

The proposed project would not result in the addition of new combustible materials nor in the elimination of the existing measures Sutro Tower, Inc., takes to monitor and minimize fire risk from trees on its own property. These measures include:[61]

- Maintaining several access trails across the property to enable Fire Department access in the case of an emergency;
- Regularly trimming shrubs and brush to keep access trails open;
- Removing dead wood from trees;
- Periodically thinning or cutting back trees within the fence line to reduce the likelihood of serious fire risks without significantly reducing the visual buffer around Sutro Tower; and
- Inspecting the access trails and the trees within the property on a daily basis to monitor ongoing fire safety and on-site security.

Project construction would include welding activities. Sutro Tower's safety plan includes provisions for fire prevention during welding, including having a trained crewmember assigned to continuously monitor the surrounding area for fire. The fire monitor would have two-way radio contact with work crews on the tower to notify them of any fire danger, "in which case work will immediately cease and additional precautions taken." Additionally, workers on the tower will use welding blankets to contain sparks and slag, and will have a fire extinguisher present at all welding stations. A fire extinguisher would also be available to ground personnel.[62]

In light of the above, the proposed project would not result in significant effects with regard to fire safety.

[61] Information provided by Gene Zastrow, Vice President and General Manager of Sutro Tower, through Debra Stein, GCA Strategies, e-mail correspondence, March 24, 2008. This document is available for review by appointment at the Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0206E.

[62] Sutro Tower DTV Conversion Project, Worker and Public Safety Plan, Draft September 20, 2007. This document is available for review by appointment at the Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0206E.

E. Growth Inducement

As stated in the Initial Study (Appendix A), the proposed construction activities would be temporary, and therefore would not result in any growth-inducing impacts, significantly increase in local population or housing, or indirectly induce growth by creating new opportunities for local industry or commerce. Because no change in employment at or occupancy of the tower facilities is anticipated once the new facilities are operational, compared to existing conditions, operation of the proposed project would not induce any additional growth in the project vicinity.

CHAPTER IV
Mitigation Measures

There are several items required by law that would serve to mitigate potential significant impacts; they are summarized here for informational purposes. These measures include: limitation of construction-related noise levels, pursuant to the San Francisco Noise Ordinance (Article 29 of the San Francisco Police Code, 1972); compliance with Section 3407 of the *San Francisco Building Code*, Work Practices for Exterior Lead-Based Paint; and observance of State and federal OSHA safety requirements related to handling and disposal of other hazardous materials, such as asbestos.

Mitigation Measures included in the Initial Study are indicated by an asterisk (*).

Mitigation Measures

Air Quality

The Initial Study found that truck traffic and other equipment operating during the construction period of the proposed project could cause some temporary increases in particulate dust and other pollutants that would increase particulate concentrations near the project site. The project sponsor would implement the following mitigation measure to ensure that the proposed project's construction air quality impacts would be less than significant.

Mitigation Measure 1 – Construction Air Quality

* The project sponsor shall require the contractor(s) to spray the site with water during demolition, excavation, and construction activities; spray unpaved construction areas with water at least twice per day; cover stockpiles of soil, sand, and other material; cover trucks hauling debris, soils, sand, or other such material; and sweep surrounding streets during demolition, excavation, and construction 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 that the contractor(s) 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 a prohibition on idling motors when equipment is not in use or when trucks are waiting in queues, and implementation of specific maintenance programs to reduce emissions for equipment that would be in frequent use for much of the construction period.

CHAPTER V
Significant Environmental Effects That Cannot Be Avoided if the Proposed Project is Implemented

In accordance with Section 21067 of the California Environmental Quality Act (CEQA), and with Sections 15040, 15081 and 15082 of the State CEQA Guidelines, the purpose of this chapter is to identify impacts that could not be eliminated or reduced to an insignificant level by mitigation measures included as part of the proposed project, or by other mitigation measures that could be implemented, as described in Chapter IV, Mitigation Measures.

The findings of significant impacts are subject to final determination by the City Planning Commission as part of its certification process for the EIR. This chapter in the Final EIR will be revised, if necessary, to reflect the City Planning Commission's findings.

The proposed project would not result in any potentially significant effects that could not be avoided if the project is implemented.

CHAPTER VI
Alternatives to the Proposed Project

This chapter identifies alternatives to the proposed project and discusses environmental impacts associated with each alternative. Project decision-makers could adopt any of the following alternatives, if feasible, instead of approving the proposed project. Three feasible alternatives to the proposed Sutro Tower project have been identified and are described below. All but the No-Project Alternative complies with the proposed project's fundamental objective to: comply with the FCC's mandate to consolidate all United States television broadcast operations to digital television (DTV) by February 17, 2009, after which time analog transmission will not be allowed. One alternative would be the no-project alternative, which would continue to operations at Sutro Tower from the existing DTV antennas that were installed for the initial DTV transition. Two additional alternatives would be to locate the broadcasting facilities for the television stations now on Sutro Tower at one or more alternative sites. In accordance with FCC Rules, Section 73.685(b), in the greater Bay Area there exist two possible candidates for relocation of the Sutro Tower stations: San Bruno Mountain in San Mateo County and Mount Diablo in Contra Costa County.[63] Also discussed is an alternative that was rejected for further consideration: discontinuation of television broadcasting from Sutro Tower.

This section is based on the alternative analysis study conducted by Hammett & Edison, Inc., a broadcast engineering consulting firm retained by the project applicant (Sutro Tower, Inc.) to provide radio frequency analysis.[64] Hammett and Edison, Inc., likewise provides consulting services to American Tower Corp., the operator of the San Bruno Mountain broadcasting facilities, as well as to Sutro Tower Inc, the operator of the Sutro Tower broadcasting facilities and most radio frequency broadcasters operating at Sutro Tower.

The alternatives presented in this chapter represent a range of potential locations where broadcast facilities could be located. They include a range of alternatives to the proposed project, and extend from doing nothing (Alternative A, "No Project") to moving all 11 television stations to an alternative location (Alternative B, "San Bruno Mountain"). Alternative C evaluates the relocation of some stations to Mt. Diablo and the retention of some antennas at Sutro Tower. These alternatives represent a range of

63 FCC Rules, Section 73.685(b) states that "Location of the antenna at a point of high elevation is necessary to reduce to a minimum the shadow effect on propagation due to hills and buildings which may reduce materially the intensity of the station's signals. In general, the transmitting antenna of a station should be located at the most central point at the highest elevation available… The location should be so chosen that line-of-sight can be obtained from the antenna over the principal community to be served…" In the San Francisco Bay Area, three of the highest sites are currently used for television broadcasting: Sutro Tower, San Bruno Mountain, and Mount Diablo.

64 Hammett & Edison, "Alternatives Analysis," April 11, 2008. This report is on file and available for review by appointment at the Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0206E.

alternatives to allow informed decision-making and provide sufficient information from which to extrapolate the impacts of hypothetical alternatives with antenna distribution falling somewhere between those described in the identified alternatives.

A. Alternative A: No Project

Description

There would be no new construction or demolition under the No-Project Alternative, as this alternative would entail no immediate change to the Sutro Tower facilities. Under this alternative, the proposed additional digital antennas would not be brought to the site for installation on the tower and the ancillary antennas would not be removed. After the FCC's deadline to consolidate to DTV (February 17, 2009), ten of Sutro Tower's 11 television stations would continue to operate from the existing DTV antennas that are installed below Level 6 on the tower. These antennas were installed approximately ten years ago for use during the digital television transition period. Under the proposed project, the existing digital antennas would be removed after the new auxiliary antennas has been built. Because of its channel assignment, KGO cannot continue to use an existing DTV antenna and therefore would use its existing analog antenna above Level 6 for DTV operation after the DTV transition.

Three stations, KGO-TV, KCNS, and KBWB, might be able to use their existing auxiliary antennas for operation as auxiliary DTV antennas. However, no other station would have an auxiliary antenna under the no project alternative because the existing auxiliary antennas cannot function as DTV antennas. Therefore, the No-Project Alternative would entail severe limitations for at least eight of Sutro Tower's 11 television stations, which would not have any backup broadcast capability. That is, it would not be possible for these stations to provide broadcast signals during normal maintenance or under emergency conditions if their main antennas should fail.

Under the No-Project Alternative, once analog television broadcasting is terminated in 2009, the existing analog antennas above tower Level 6 would be shut down (except for KGO's, which, as noted, would be used for DTV broadcasting). These no-longer-operational antennas could be removed at some point in the future.

Impacts

If the No-Project Alternative was implemented, most of the less-than-significant impacts discussed in Chapter III would not occur. As noted, it is possible that the no-longer-operational analog antennas above tower Level 6 could be removed at some point after February 2009. As described in the Initial Study (p. 23 of Appendix A), project construction activities would result in five to 15 workers commuting to the site each day for approximately 12 to 16 months for installation of new digital television antennas and removal of existing analog television antennas, along with related structural, electrical, elevator, and public safety improvements. Under the No-Project Alternative, the maximum number of construction workers would be approximately the same, but work to remove the existing analog antennas would take

no more than approximately three months. Antennas and other equipment removed from the tower would be hauled off-site by trucks smaller than 18-wheel semi-trailer trucks (as would be the case with the proposed project). Fewer than 10 truckloads (20 one-way truck trips) would be required over the three-month period for removal of the existing antennas. La Avanzada Street would be used to access the site to haul the antenna sections and other materials, with trucks likely arriving via Market Street, 17th Street, and Clarendon Avenue. Construction of the proposed project would not require any lane closures and, as with the proposed project, construction-generated traffic would be temporary and would not result in any long-term degradation in operating conditions or level of service on any of the roadways in the vicinity of the proposed project, and no significant effect would ensue.

Visual Resources

Sutro Tower would continue to be visible in the neighborhood and in the greater San Francisco Bay Area. The tower would not be altered, except potentially for removal of existing analog antennas and thus, visual quality impacts under this alternative would be less substantial than those of the proposed project and, as with the project, would be less than significant.

Geology and Seismicity

Under the No-Project Alternative, structural upgrades proposed as part of the project to meet *Building Code* wind and seismic criteria for essential structures would not be undertaken. Because this alternative would not include installation of new digital antennas between tower Levels 3 and 4, as is proposed with the project, the seismic upgrades that are identified by the project structural engineer as a necessary component of the proposed project would not, in fact, be required. This is because the seismic upgrades are designed to accommodate the placement of new digital television equipment on the tower and, without the new equipment, no such upgrade would be necessary. Thus, under the No-Project Alternative, Sutro Tower would not be structurally strengthened to meet the *Building Code* wind loading criteria for essential structures. As noted in the Project Description, Sutro Tower last underwent strengthening for wind loads in 1995 (prior to designation as an essential facility), using *Building Code* criteria applicable to "normal occupancy," that is, non-essential structures. Without a wind upgrade to essential facility standards, effects of the No-Project alternative would be considered less beneficial than those of the proposed project, although there could not be a significant impact under CEQA, because such a determination would require a change from existing conditions and no such change would occur under this alternative.

Radio Frequency Radiation

As described in Section III.C, Hazards and Hazardous Materials, with implementation of the proposed project, maximum radio frequency radiation exposure levels at ground level would be reduced incrementally, from 8.5 percent of the Federal Communications Commission (FCC) public exposure limit to 8.4 percent of that limit. Operation of all auxiliary television antennas under the proposed project would substantially reduce RF exposure, from the current 99 percent of the FCC public exposure limit with all existing analog auxiliary antennas to 14.3 percent of the FCC limit with all DTV auxiliary

antennas. Under this No-Project Alternative, operation of the main DTV antennas would generate similar RF exposure impacts to that of the proposed project; that is, an incremental decrease from existing conditions, and, as with the project, the effect would be less than significant because RF exposure would be well below the FCC standard. The No-Project Alternative could potentially generate less RF exposure under auxiliary DTV antenna operation because this alternative would have fewer auxiliary antennas.

Other Potential Impacts

On-site impacts would temporarily be less at Sutro Tower if the additional digital television antennas were not added to the tower. Temporary installation noise impacts would not occur on the Sutro Tower site, nor would installation impacts to traffic and air quality, or risk of fire during construction (or would be of lesser duration and intensity if existing analog antennas were removed). Temporary construction employment for installing and removing the antennas would also not occur (or would be of lesser duration if existing analog antennas were removed). Effects related to energy use would be similar to those of the proposed project, and would be less than significant.

No permanent impacts would occur due to operation of either this alternative or the proposed project on the following: land use, population and housing, cultural resources, transportation, noise, air quality, wind and shadow, recreation, utilities and services, biology, hydrology, mineral and agricultural resources, or growth inducing effects.

Television Coverage (non-CEQA effect)

If the No-Project Alternative was implemented, some of the impacts associated with the project could occur while others would be avoided. As indicated in the alternative analysis by Hammett & Edison, Inc., due to the power handling limitation of the existing DTV antenna, eight of the television stations would have reduced coverage as a result of the No-Project Alternative, with six stations seeing coverage reductions of about 10 percent or more compared to the proposed project. Specifically, KBCW, KBWB, KCNS, and KPIX-TV would not operate at maximum power due to the limitations of the antenna, and KMTP and KQED would be limited by interference from increasing power. KGO would see a small increase since that station would operate on its existing NTSC antenna under this scenario (Hammett & Edison, 2007).

Because there would be limited coverage with this alternative, it is unknown whether the television stations would choose to continue to operate from Sutro Tower. Although unlikely, the possibility exists that the stations would discontinue service from Sutro Tower. In this situation, Sutro Tower could continue to be utilized for other permitted communications uses. Sutro Tower is authorized to engage in all forms of radio frequency communications; it is not restricted only to the broadcast of digital television signals. Even if the television stations chose to discontinue service under this alternative, Sutro Tower could continue to be used for other telecommunication uses, including the future use of the radio frequency spectrum currently used for analog television broadcasting.

The No Project Alternative would not be environmentally superior to the proposed project with respect to Geology and Seismicity or Radiofrequency Radiation, and would be incrementally environmentally superior with respect to Visual Resources and Risk of Fire, as well as other temporary construction impacts. The No Project Alternative would not meet the project sponsor's objectives to maintain continuous, free, over-the-air broadcasting during all reasonably foreseeable conditions, because this alternative would not include installation of auxiliary digital antennas. Moreover, this alternative would not meet the sponsor's objective to comply with all *Building Code* criteria for "essential structures" because this alternative would not include structural upgrading to meet wind loading standards for essential structures.

B. Alternative B: San Bruno Mountain

Description

The San Bruno Mountain broadcast site is located about five miles south of Sutro Tower. The site is located within San Bruno Mountain State and County Park, in northern San Mateo County. Unlike Sutro Tower, the San Bruno Mountain site is not within a residential neighborhood; instead, the nearest residences are approximately 0.5 miles (about 2,500 feet) to the west, in a Daly City neighborhood off of East Market Street near Hillside Boulevard. Areas outside of the tower compounds are publicly accessible (within the park) and there is parking for visitors at the south end of the site.

According to the alternative analysis by Hammett & Edison, Inc., the site currently contains ten towers, ranging in height from 180 feet to 310 feet above grade (all much shorter than Sutro Tower's 977-foot height[65]) on which four analog television, three digital television, and nine frequency modulation (FM radio) stations are located. In addition, all nine FM stations have auxiliary antennas, with two television stations also having standby facilities.

Hammett and Edison's analysis states that based upon the final channel designations and the proposed FCC post-transition interference criteria, all 11 Sutro Tower stations would be able to relocate to San Bruno Mountain. With the current occupancy of the San Bruno Towers, Hammett and Edison states that only three of the ten towers—Towers 3, 6, and 9—could accommodate additional antennas of the size required for the Sutro Tower DTV stations. One multi-station main panel antenna could be installed on each tower, provided that the towers can handle the weight of additional antennas structurally. (Hammett and Edison did not evaluate the structural capacity of the existing San Bruno Mountain towers, and noted that one or more towers might require structural upgrade to accommodate new DTV antennas.) It is assumed for this analysis that the new antennas would be mounted atop the existing towers, at the maximum height allowed by the FAA, and that the power handling would be sufficient to accommodate four Ultra high frequency (UHF) DTV stations on one panel and three UHF DTV stations on the other two. KGO, as a high-band Very high frequency (VHF) station, would have to operate from a separate antenna, and Hammett and Edison states that a new, eleventh tower would need to be constructed on

[65] The San Bruno Mountain towers sit at base elevations of between about 1,200 feet and 1,300 feet above sea level, which is some 400 to 500 feet above the base of Sutro Tower.

San Bruno Mountain to accommodate this antenna, as well as to accommodate three auxiliary antennas that would be necessary for the 11 DTV stations to provide for backup signal transmission (as is planned on Sutro Tower with the proposed project). The KGO main antenna would be installed at the top of the new tower, with the two auxiliary DTV panel antennas, for 10 of the11 stations, installed below. Space would need to be found on this or another tower for the KGO auxiliary antenna.

Alternatively, the KGO broadcasting facilities could remain at Sutro Tower, as could the auxiliary DTV antennas, although this would necessitate operation of two separate broadcasting sites for most TV stations now at Sutro Tower.

Hammett & Edison found that with the exception of the possible use of three existing towers, the infrastructure for the addition of seven antennas at San Bruno Mountain is not in place. In addition to the new tower, it is expected that the following additions to the San Bruno Mountain broadcast site would be required: four new transmitter buildings (one each at Towers 3, 6, 9, and at the new tower), with a minimum size of 7,500 sq. ft. required for the first three buildings and 15,000 sq. ft. required for the building at the new tower; an additional power service of at least 500 kilowatts; and generators capable of providing sufficient emergency power to supply 11 DTV stations during outages. As noted, structural upgrades could be required for Towers 3, 6, and 9, as well.

Under this alternative, with the relocation of television broadcasting facilities from Sutro Tower to San Bruno Mountain, Sutro Tower could continue to be used for other telecommunication uses, including the future use of the radio frequency spectrum currently used for analog television broadcasting.

It is noted that the broadcast towers at San Bruno Mountain are operated by American Tower Corp., and not by the project sponsor, Sutro Tower, Inc. Therefore, the project sponsor could not implement this alternative. Moreover, because the San Bruno Mountain site is in San Mateo County, approval of this alternative would be under the purview of that county, and not the San Francisco Planning Commission or another San Francisco entity.

Impacts

Visual Resources

Under this alternative, a new 11th transmission tower would be constructed at San Bruno Mountain. According to Hammett & Edison, this tower would have to be a minimum of 200 feet tall, which is within the range of heights of the existing towers at San Bruno Mountain. The addition of a new tower to the 10 existing towers would alter the visual setting, although it appears unlikely that the change in either close-in or long-range views would rise to the level of a significant impact, given that the new tower would visually “fit” within the context of the existing collection of broadcast towers. The new tower would probably be most obvious in views from nearby locations, such as from within San Bruno Mountain State and County Park. However, given the context of the existing towers, it is judged that even from these nearby viewpoints, the impact would be less than significant.

Under this alternative, because the 11 television stations located on Sutro Tower would be moved to San Bruno Mountain with this alternative, it is assumed that Sutro Tower would continue to be used for other telecommunications purposes and aesthetic conditions, therefore, would be similar to existing conditions. Thus, effects on visual quality would be less than significant, as under the project, with the likelihood that there would be less visual change than that with the proposed project.

Visual effects would be less substantial if the new tower was not constructed and some facilities remain at Sutro Tower, and would be less than significant.

Geology and Seismicity

Under this alternative, it is assumed that necessary seismic and other structural upgrades that might be required to be made to the existing tower structures at San Bruno Mountain. It is unknown if the towers at San Bruno Mountain are designed as "essential facilities"; therefore, for purposes of a conservative analysis, it is assumed that this alternative would result in structural upgrades to three San Bruno Mountain towers and construction of a new tower, all four of which would meet current *Building Code* standards, but not necessarily those standards for essential facilities. However, inasmuch as the towers at San Bruno Mountain are located within a public park but are more than 2,500 feet distant from the nearest residence, there is minimal danger to persons from structural failure at this site. Therefore, and because it is assumed that at least some of the existing towers would be strengthened (or would be found to already meet current *Building Code* standards), effects of this alternative related to geology and seismicity would be comparable to those of the proposed project, and would be less than significant.

Radio Frequency Exposure

According to Hammett & Edison, the maximum ambient RFR exposure levels for the post-transition Sutro Tower proposed project, including all other broadcast facilities at the site, would be 8.4 percent of the FCC public exposure limit (reduced from 8.5 percent under existing conditions). The maximum ambient RF levels due to the operation of the proposed DTV auxiliary antennas, by themselves, would be 14.3 percent of the public exposure limit.

By comparison, under existing conditions, the maximum ambient RFR levels at San Bruno Mountain in any publicly accessible area measured 71 percent of the FCC public exposure limit based upon the most recent RFR exposure statements filed with the FM license renewals. Existing (and future) RFR levels from the San Bruno Mountain towers are much higher than those of Sutro Tower because the San Bruno Mountain towers are far shorter than is Sutro Tower. Unlike Sutro Tower, however, there are no residences in close proximity to the San Bruno Mountain broadcast facilities, and thus the estimated ambient RFR level at the nearest residence is less than 1 percent of the FCC public exposure limit. For the assumed main antenna facilities for the 11 Sutro Tower television stations, if installed at San Bruno Mountain, the maximum additional ambient RFR level anywhere at ground level would be approximately 59 percent of the FCC public exposure limit by themselves. Thus, the addition of the 11 Sutro Tower DTV stations could result in a worst-case cumulative exposure level at the site of 130 percent (71% + 59%) of the FCC public exposure limit. Because this level of RF radiation could not be permitted by the

FCC, operational changes would be required to allow this alternative to proceed. For example, one or more existing TV or radio stations at San Bruno Mountain might have to cease operations there and relocate elsewhere and/or one or more existing broadcasters might have to reduce operational power and/or alter its facilities to reduce RF emissions. The precise nature of any such changes cannot be determined absent further investigation.

For the assumed auxiliary antenna facilities at San Bruno Mountain, the maximum ambient RFR exposure levels are calculated to be 116 percent of the public exposure limit during the operation of all three DTV panel antennas simultaneously, although this type of operation would not generally be necessary because with the main DTV antennas on separate towers, it is not anticipated that all three auxiliary antennas would typically need to be operated simultaneously. Even if only one of the DTV auxiliary panels were operating, however, the maximum ambient RFR levels from the auxiliary antennas could exceed 50 percent of the public exposure limit, potentially resulting in cumulative exposure limits at the site of 121 percent or more of the public limit. As a result, it would be necessary to implement operational procedures, as part of a formal design for San Bruno Mountain antennas, to ensure that exposure limits under main or auxiliary antenna operation are not exceeded. As with the above, the nature of any specific measures cannot be fully evaluated at this time. However, it can be assumed that with appropriate operational procedures, effects due to RFR exposure would be less than significant. It is noted that Sutro Tower currently follows similar procedures during operation of auxiliary antennas (use of the Table of Contributions) to ensure that FCC exposure levels are not exceeded.

RFR levels at San Bruno Mountain would be lesser if some broadcast facilities remain at Sutro Tower, but a Table of Contributions or similar operating procedure would still be required, and RFR effects would be less than significant.

Other Potential Impacts

If the San Bruno Mountain alternative was implemented, temporary construction-related impacts would be greater than with the project at the San Bruno Mountain site, where a new broadcast tower, four new transmitter buildings, and other ancillary facilities would be constructed. The construction period at San Bruno Mountain would likely be approximately 12 to 18 months. New noise and air quality impacts would occur at San Bruno Mountain that would not occur with the proposed project. This alternative would not result in any fire risk due to construction at Sutro Tower; the San Bruno Mountain site is not wooded, and thus this less-than-significant impact would be reduced compared to the project.

Although construction at San Bruno Mountain would occur in proximity to 10 existing transmission towers, there is the potential that a number of special-status animal species that inhabit the mountain could be adversely affected. These include several butterflies (Mission Blue, San Bruno Elfin, San Francisco Silverspot, and Bay Checkerspot) and the San Francisco garter snake. Additionally, San Bruno Mountain is home to more than a dozen plant species that are listed as rare by the California Native Plant Society. Site-specific surveys for special-status species would be required once a specific location for a new tower, new transmission buildings, and the other new facilities were identified, to determine the

precise nature of potential impacts to biological resources, as well as any potential effects related to stormwater runoff.

Construction effects at San Bruno Mountain would be relatively less substantial if no new tower were built and some broadcast facilities remain at Sutro Tower, although construction impacts would be relatively greater at Sutro Tower.

Impacts of this alternative would be limited, and less than significant, in the areas of land use, population, public services and utilities, water, hazardous materials, energy, cultural resources, and growth inducing effects.

Television Coverage (non-CEQA effect)

Ten of the 11 TV stations now at Sutro Tower would have population coverage reductions of one to 19 percent, according to Hammett & Edison. **Table 4** provides a summary of the population coverage comparison of the San Bruno Mountain alternative with the proposed project. As a result, fewer Bay Area homes would be able to receive DTV signals (which will be the only broadcast signals available after February 2009) than would be the case with implementation of the proposed project.

TABLE 4
POST-TRANSITION POPULATION COVERAGE:
SAN BRUNO MOUNTAIN ALTERNATIVE
(2000 Census)

Station	Sutro Proposal	San Bruno Alternative	Percent Change
KGO-TV	7,661,659	6,159,679	**-19.6%**
KBWB	7,680,664	7,545,747	**-0.8%**
KPIX-TV	7,852,320	7,205,912	**-8.2%**
KQED	7,755,253	6,823,051	**-12.0%**
KMTP-TV	6,953,848	6,412,181	**-7.8%**
KFSF-TV	6,481,173	6,756,392	**-4.2%**
KRON-TV	7,672,525	7,023,979	**-8.5%**
KCNS	7,257,932	6,895,117	**-5.0%**
KCSM-TV	7,005,080	6,553,872	**-6.4%**
KTVU	7,755,253	6,893,380	**-11.1%**
KBCW	7,256,486	6,941,252	**-4.3%**

SOURCE: Hammett & Edison, Inc., June 2007.

The San Bruno Mountain Alternative would not be environmentally superior to the proposed project with respect to Visual Resources or Geology and Seismicity, or with respect to temporary construction impacts

at San Bruno Mountain. This alternative arguably would be environmentally superior to the project with regard to Radiofrequency Radiation, because the locations of maximum RFR exposure would not be within a residential neighborhood. This alternative would also be incrementally environmentally superior with regard to fire risk. The San Bruno Mountain Alternative would not meet any of the project sponsor's objectives, described on p. 29, because this alternative could not be implemented by the project sponsor, Sutro Tower Inc. Implementation of this alternative, by another entity other than the project sponsor, is speculative.

C. Alternative C: Mount Diablo

Description

Mount Diablo is located about 27 miles east of Sutro Tower. About 20,000 acres of the mountain have been established as Mount Diablo State Park, with Mount Diablo listed as a State Historic Site and a registered National Landmark. Situated within the State Park are two broadcast sites. The south site is located near the Juniper Campground, with the north site about 1.25 miles to the northeast. Areas outside of the tower compounds are publicly accessible. Each site has one tower suitable for broadcast service, although neither tower has sufficient room to accommodate the relocation of the Sutro Tower DTV stations. Installed on the south tower are antennas for two DTV stations and 13 FM translators/boosters; analog antennas for two television station and one FM booster station are installed on the north tower. Therefore, this alternative would require construction of at least one new tower on Mount Diablo.

According to Hammett & Edison, based upon the final channel designations and the proposed FCC post-transition interference criteria, eight of the 11 Sutro Tower stations would be able to locate antennas at Mount Diablo even if additional towers and infrastructure were added to the site. Based upon FCC regulations, antennas for television stations KBCW, KCSM-TV, and KTVU could not relocate there due to prohibited interference; that is, these three stations could not broadcast from Mount Diablo under their proposed operational configuration because their signal would interfere either with each other's signals or with those of another licensed television station, KHSL-TV, Channel D43, in Chico.

As a result of the problems with signal interference, for this alternative to be feasible—that is, to enable the television broadcasters at Sutro Tower to convert to digital operation, including appropriate auxiliary broadcast facilities, this alternative would need to be incorporated with use of another site for the three stations that cannot relocate to Mount Diablo. This is assumed to involve continued operation of Sutro Tower to accommodate these three stations, and Sutro Tower would continue in operation as a broadcast facility for this purpose and for all other forms of radio frequency broadcasting. This alternative could also involve the use of San Bruno Mountain to accommodate antennas for these three stations, although this is considered less likely because with continued operation of Sutro Tower, these three stations would have no reason to move to San Bruno Mountain. At any rate, a separate San Bruno Mountain alternative is described and analyzed as Alternative B.

It is noted that the broadcast facilities at Mount Diablo are operated by American Tower Corp. and Pappas Telecasting Companies, and not by the project sponsor, Sutro Tower, Inc. Therefore, the project sponsor could not implement this alternative. Moreover, because the Mount Diablo site is in Contra Costa County, approval of this alternative would be under the purview of that county, and not the San Francisco Planning Commission or another San Francisco entity, except to the extent that some the DTV stations might continue to broadcast from Sutro Tower.

Impacts

Visual Resources

This alternative would involve the construction of two new towers at least 250 feet in height on Mount Diablo, the construction of at least two transmitter buildings, each approximately 15,000 square feet in size, and the addition of new antennas and other related equipment to at least one of the two existing broadcast compounds on Mount Diablo. Because this alternative would immediately double—at a minimum—the number of towers at one of the two broadcast facilities on Mount Diablo, the visible change would be notable, at least in close-in views. Inasmuch as Mount Diablo is one of the Bay Area's more popular hiking destinations, it is likely that some observers would deem the impact of a new broadcast tower to be unsightly, and the impact could be significant, depending on the final height and design of the new tower.

Under this alternative, Sutro Tower would continue to operate as a site for the three DTV stations that cannot be accommodated on Mount Diablo. Under this scenario, visual changes would occur at Sutro Tower, but the changes would be less substantial than with the proposed project and, as with the project, would be less than significant.

Geology and Seismicity

Under this alternative, it is assumed that the new tower(s) constructed at Mount Diablo would meet existing *Building Code* requirements, although not necessarily for an "essential facility." With *Building Code* compliance, effects of this alternative related to geology and seismicity at the Mount Diablo site would be comparable to those of the proposed project.

If the three DTV station antennas that cannot be moved to Mount Diablo were to be accommodated at Sutro Tower, it is assumed that required structural upgrades for seismic resistance, if any, would be made as needed. However, as with the No-Project Alternative, Sutro Tower would not be structurally strengthened to meet the *Building Code* wind loading criteria for essential structures. The reason behind this assumption is that it is considered unlikely that the project sponsor would undertake the wind upgrade without the upgrade of broadcasting equipment proposed as part of the project. Without such an upgrade, effects of this Mount Diablo alternative would be considered less beneficial than those of the proposed project, at the Sutro Tower site, although the impact is not considered significant under CEQA, because Sutro Tower would meet current seismic *Building Code* standards and was upgraded to non-essential wind standards in 1995.

Radio Frequency Exposure

According to Hammett & Edison, under the Mount Diablo alternative, the maximum additional ambient RFR level anywhere at ground level would be approximately 40 percent of the FCC public exposure limit, for each of the two new towers. No recent data is available of the current ground level exposure at the Mount Diablo south site. It is likely that operational measures could be used as part of a formal design for Mount Diablo to ensure that FCC exposure limits are not exceeded; however, the nature of any specific measures is too speculative to evaluate at this time. As with Alternative B, it can be assumed that with appropriate operational procedures, effects due to RFR exposure would be less than significant.

Other Potential Impacts

If the Mount Diablo alternative was implemented, temporary construction-related impacts would be greater than with the project. Construction of at least one new tower and installation of antennas and other broadcast equipment would occur at Mount Diablo, while other new DTV equipment would be installed either at Sutro Tower or at the San Bruno Mountain site to accommodate the three TV stations that cannot relocate antennas to Mount Diablo. If construction were to occur at Sutro Tower, effects would be less substantial than with the proposed project, while if construction were to occur at San Bruno Mountain, effects would be less substantial than with Alternative B; in either case, effects would be less than significant. Effects at Mount Diablo, however, could potentially be significant, in terms of impacts to special-status species and possibly hydrologic effects. However, a site-specific design would have to be formulated to allow for more detailed evaluation of these potential effects. Although this alternative would reduce potential risk of fire during construction at Sutro Tower, it would increase such fire risk at Mount Diablo, which is a relatively isolated location with limited fire suppression facilities and services close by.

Impacts of this alternative would be limited, and less than significant, in the areas of land use, population, public services and utilities, water, hazardous materials, energy, cultural resources, and growth inducing effects.

Television Coverage (non-CEQA effect)

As noted in the description of this impact, this alternative could accommodate only eight of the 11 DTV stations at Sutro Tower because of considerations regarding signal interference.

The Mount Diablo Alternative would not be environmentally superior to the proposed project with respect to Visual Resources or Geology and Seismicity, or with respect to temporary construction impacts at San Bruno Mountain. With respect to fire risk, this alternative would not be environmentally superior, compared to the proposed project. Like the San Bruno Mountain, this alternative arguably would be environmentally superior to the project with regard to Radiofrequency Radiation, because the locations of maximum RFR exposure would not be within a residential neighborhood. The Mount Diablo Alternative would not meet any of the project sponsor's objectives, described on p. 29, because this alternative could not be fully implemented by the project sponsor, Sutro Tower Inc. Implementation of this alternative, by

another entity other than the project sponsor, is speculative. Moreover, even if another entity were to implement this alternative, the Mount Diablo Alternative would not be capable of achieving the sponsor's objective to maintain all Sutro Tower television stations at a single location.

D. Alternatives Rejected from Further Consideration

Discontinue Service

This alternative would have Sutro Tower cease operation and discontinue over-the-air broadcast service from the existing television stations that operate from the tower. According to Hammett & Edison, Inc., the 11 television stations that operate from Sutro Tower represent approximately 60 percent of the full-service television broadcast stations serving the greater San Francisco Bay Area. Over half of the remaining stations predominantly serve only the San Jose and South Bay Area.

This alternative was rejected from further consideration because if this alternative was implemented, more than half of Bay Area residents would lose over-the-air broadcast television signals. Therefore, this alternative would fail to meet the project's fundamental objective of converting Sutro Tower to digital television operation by February 2009 to meet the Federal Communications Commission (FCC) deadline. FCC licensees, such as the television station tenants of Sutro Tower, are subject to the requirement that they provide free over-the-air service in order to maintain their licenses. Stations may "go dark" or suspend service for up to one year in emergency circumstances, but an FCC license is forfeited in the event that a station is continuously dark for over one year. With this alternative, the 11 television stations at Sutro Tower would forfeit their FCC licenses. These stations would also lose rights of carriage on local cable television systems because, if a station cannot provide the required broadcast signal to the cable "headend," that station would also be dropped from cable systems providing programming to Bay Area subscribers.

It is assumed that Sutro Tower would continue to be used for other telecommunications purposes.

CHAPTER VII
DEIR Distribution List

List of Those to Receive Mailed Copies of Draft EIR

Copies of the Draft EIR and the Draft EIR hearing notice were mailed or delivered to the following public agencies, organizations, and individuals. In addition, Notices of Availability of the Draft EIR were mailed to parties who are neighbors of the project site.

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State Office of Intergovern. Mgmt.
State Clearinghouse
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Sacramento, CA 95812-3044

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1390 Market St., Suite 210
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Christina Olague, President
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William L. Lee
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698 Second Street, Room 109
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LIBRARIES

Government Information Services (3 C.)
Main Library - Civic Center
100 Larkin Street
San Francisco, CA 94102

Stanford University Libraries
Jonsson Library of Gov't. Documents
State & Local Documents Division
Stanford, CA 94305

Government Publications Department
San Francisco State University
1630 Holloway Avenue
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Notice of Availability also sent to project site neighbors.

CHAPTER VIII
Glossary

Analog Television: Analog (or analogue) television encodes television picture and sound information and transmits it as an analog signal, that is to say: one in which the message conveyed by the broadcast signal is a function of deliberate variations in the amplitude and/or frequency of the signal. An analog signal is any time continuous signal where some time varying feature of the signal is a representation of some other time varying quantity. It differs from a digital signal in that small fluctuations in the signal are meaningful. Analog is usually thought of in an electrical context; however, mechanical, pneumatic, hydraulic, and other systems may also convey analog signals.

Digital Television (DTV): Refers to all digital television formats and standards established by the Advanced Television Systems Committee (ATSC). DTV is the sending and receiving of moving images and sound by means of discrete (digital) signals, in contrast to the analog signals used by analog TV. Two basic DTV standards are HDTV (high-definition television) and SDTV (standard-definition television).

Electromagnetic Field (EMF): The form of energy which surrounds an electric charge; especially the energy surrounding a device such as an antenna.

Essential Facility: Any building or a portion of any building which is used or designed to be used as a fire station, police station, emergency operation center, California Highway Patrol Office or emergency communications dispatch center.

Federal Communications Commission (FCC): The FCC is an independent United States government agency, directly accountable to Congress. The FCC was established by the Communications Act of 1934 and is charged with regulating interstate and international communications by radio, television, wire, satellite and cable. The FCC's jurisdiction covers the 50 states, the District of Columbia, and U.S. possessions.

Frequency Modulation (FM): FM conveys information over a carrier wave by varying its frequency (contrast this with amplitude modulation, in which the amplitude of the carrier is varied while its frequency remains constant). FM is commonly used at VHF radio frequencies for high-fidelity broadcasts of music and speech. Normal (analog) TV sound is also broadcast using FM.

Hertz (Hz): Unit for measuring frequency of an alternating electric current or any repetitive activity. One hertz equals one cycle per second. **(**Giga hertz (1 billion hertz), kHz Kilohertz (1,000 hertz)).

Maximum Permissible Exposure (MPE): The FCC standards for human radio frequency radiation (RFR) exposure limits, reported as a “power density” in milliwatts per square centimeter (mW/cm^2). The MPE may also be measured in terms of “field strength,” measured in volts per meter. The MPE level varies by frequency (in megahertz) of the RFR emitted, and separate MPE limits are established for worker exposure and public exposure to RFR, with the public exposure limit generally being five times more restrictive than that of worker exposure limits.

Radio Frequency Interference (RFI): Also known as electrical magnetic interference (EMI). RFI is a (usually undesirable) disturbance that affects an electrical circuit due to electromagnetic radiation emitted from an external source. The disturbance may interrupt, obstruct, or otherwise degrade or limit the effective performance of the circuit. The source may be any object, artificial or natural, that carries rapidly changing electrical currents, such as an electrical circuit, the sun or the Northern Lights.

Radio Frequency Radiation (RFR): Energy emitted from a source is generally referred to as radiation. Examples include heat waves, radio waves, infrared light, visible light, ultraviolet light, X rays and Gamma rays. These differ only in frequency and wavelength. Longer-wavelength, lower-frequency waves (heat and radio) have less energy than shorter-wavelength, higher-frequency waves (X and gamma rays). In the electromagnetic spectrum, gamma rays given off by radioactive materials, cosmic rays and X-rays are called ionizing radiation. Electricity, microwaves and radiofrequency fields are found at the relatively long wavelength and low frequency end of the electromagnetic spectrum and produce non-ionizing radiation.

Radio frequency radiation emitted by the antennas at Sutro Tower involves non-ionizing electromagnetic waves. Radio waves have a characteristic frequency, which is the rate at which the driving voltage alternates from positive to negative and back again. Frequency is expressed in hertz (Hz); a “kilohertz” (kHz) is one thousand hertz; a “megahertz” (MHz) is one million hertz; and a “gigahertz” (GHz) is one billion hertz. Radio frequencies are considered to be in a range from about 300 kHz to 300 GHz.

CHAPTER IX
Appendices

APPENDIX A
Initial Study

NOTICE OF PREPARATION OF AN ENVIRONMENTAL IMPACT REPORT

Date of this Notice:	January 5, 2008
Lead Agency:	San Francisco Planning Department 1650 Mission Street, 4th Floor, San Francisco, CA 94103
Agency Contact Person:	Viktoriya Wise **Telephone:** (415) 575-9049
Project Title:	2007.0206E: Sutro Tower Digital Television Project
Project Sponsor:	Sutro Tower Inc.
Contact Person:	Debra Stein **Telephone:** (415) 391-4100
Project Address:	1 La Avanzada Street
Assessor's Block and Lot:	Assessor's Block 2724, Lot 3
City and County:	San Francisco

Project Description: The project site is a single, approximately 5.6-acre parcel (Assessors Block 2724, Lot 3) at 1 La Avanzada Street (formerly 250 Palo Alto Avenue), in the Midtown Terrace area of the Twin Peaks neighborhood. The proposed project would involve conversion of the television antennas on Sutro Tower from the current combination of analog and digital to an all-digital system, in compliance with a Federal Communications Commission mandate effective in 2009. Additional smaller-scale antennas (such as microwave dishes and panel antennas) would also be added. In addition, the project could include the replacement or addition of small ancillary and accessory antennas and equipment. The proposed project also includes structural, electrical, elevator, and public safety improvements to the tower. The project would result in an overall net reduction of approximately 14 television antennas, from 22 to 8 antennas. There would be no expansion of the tower itself or the ancillary buildings at the base of the tower.

The project site is located in an RH-1(D) zoning district and a 40-X height and bulk district (40-foot height limit; no bulk limit). The project requires issuance of one or more building permits from the Department of Building Inspection that, pursuant to Planning Commission Resolution 11399, shall come before the Commission for discretionary review prior to issuance. Action on the Building Permit Application(s) shall be preceded by public notice as required under *Planning Code* Section 306.9.

THIS PROJECT MAY HAVE A SIGNIFICANT EFFECT ON THE ENVIRONMENT. AN ENVIRONMENTAL IMPACT REPORT IS REQUIRED. This determination is based upon the criteria of the Guidelines of the State Secretary for Resources, Sections 15063 (Initial Study), 15064 (Determining Significant Effect), 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 **February 4, 2008**. Written comments should be sent to Bill Wycko, Acting Environmental Review Officer, an Francisco Planning Department, 1650 Mission Street, Suite 400, 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.

January 3, 2008
Date

Bill Wycko
Acting Environmental Review Officer

INITIAL STUDY
2007.0206E: Sutro Tower Digital Television Project

A. Project Description

Project Location

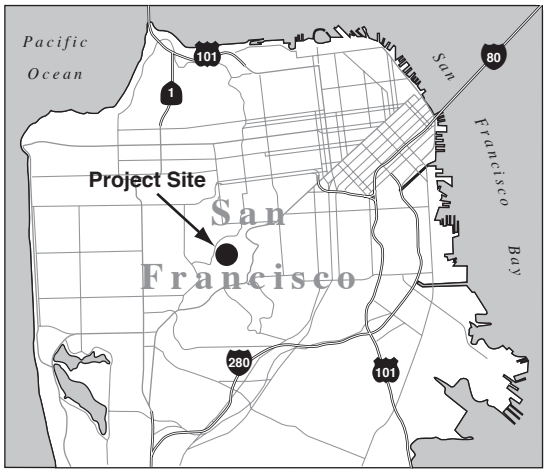
The approximately 5.6-acre project site (Assessors Block 2724, Lot 3) is located on a single parcel at 1 La Avanzada Street (formerly 250 Palo Alto Avenue) in San Francisco's Midtown Terrace neighborhood. The site is roughly bounded by Dellbrook Avenue (approximately 250 feet to the west), Clarendon Avenue, Panorama Drive (approximately 500 feet to the south), Farview Court, and Clairview Court (see Figure 1). The entire Sutro Tower facility includes the tower, a transmitter building, a garage and storage building, a guard station, emergency generators, ancillary antennas and equipment associated with radio communications, and a surface parking lot with striping to accommodate 23 cars. The site is completely enclosed within a security fence (see Figure 2, p. 3).

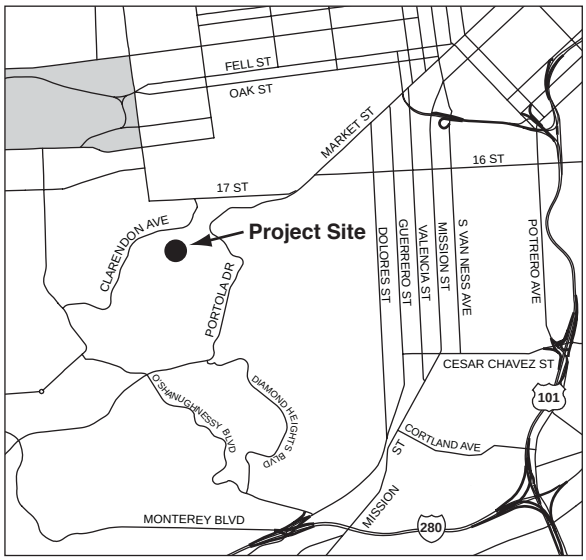
Located just southeast of Mount Sutro, the tower is located on one of the higher points in San Francisco (834 feet above sea level) and is generally visible from most places in the City. The project site is about one-half mile south of Kezar Stadium and Golden Gate Park, and one-quarter mile south of the University of California at San Francisco (UCSF). The project site is also about one-quarter mile from Clarendon Alternative Elementary School. Surrounding neighborhoods include Forest Hill and the Sunset to the west, the Castro and Noe Valley to the east, Diamond Heights and Miraloma Park to the south, and Haight Ashbury and Cole Valley to the north.

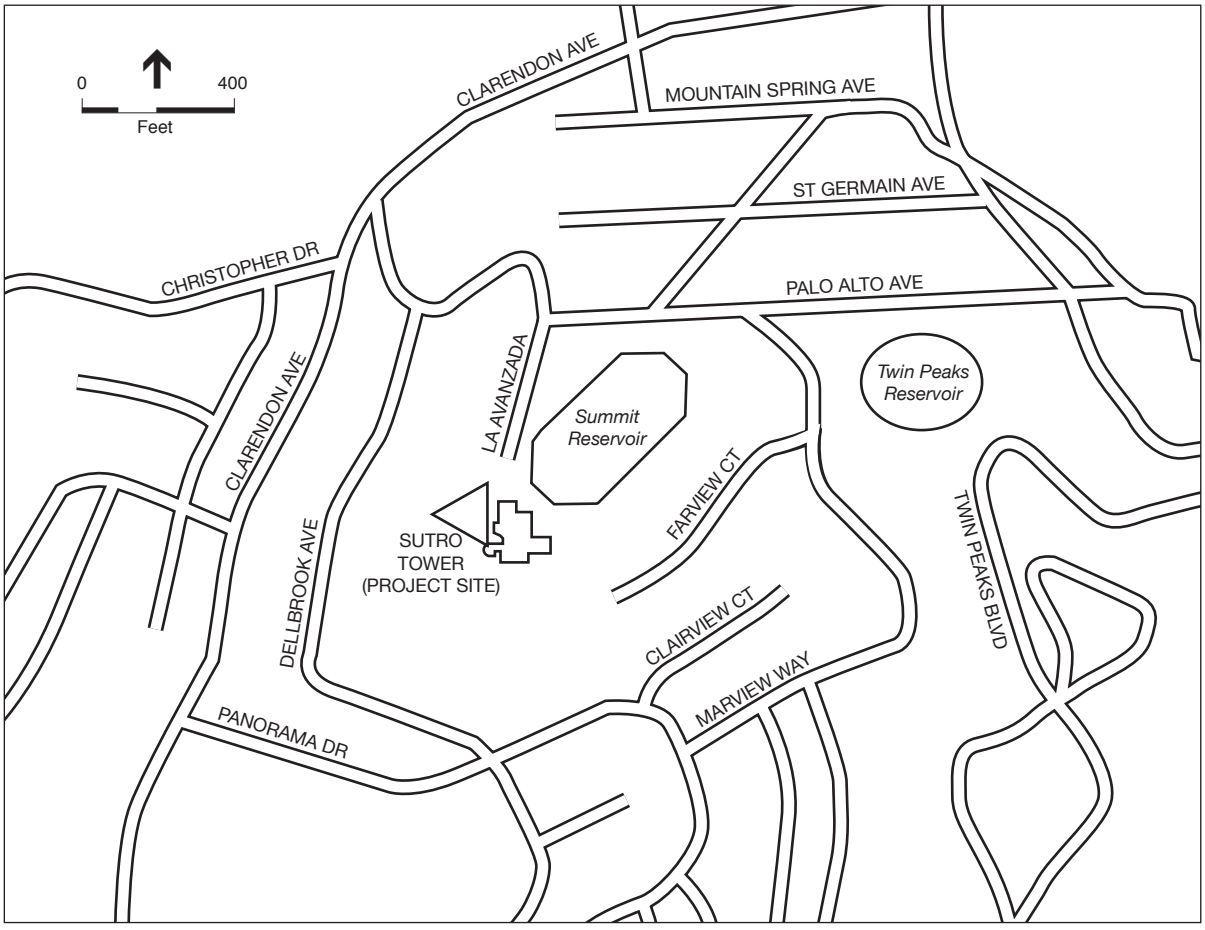
The project site is located in an RH-1(D) zoning district and within a 40-X height and bulk district (40-foot height limit; no bulk limit). RH (Residential, House) districts are designed to accommodate and enhance areas characterized by one- to three-unit dwellings of limited width and height. Existing uses surrounding the project site are predominantly low-density residential uses.

Proposed Project

The Sutro Tower telecommunications facility includes the following: an existing 977-foot tall steel broadcasting tower/structure; a 31,000-square-foot transmission building; a garage/storage building; and a security guard station. The facility is owned and operated by Sutro Tower, Inc. (project sponsor). The project sponsor proposes to convert the television antennas on Sutro Tower from the current combination of analog and digital to an all digital system. The project is being proposed to comply with the Federal Communications Commission's (FCC) mandate to consolidate the United States television into a narrower spectrum space, which will free portions of the broadcast spectrum for



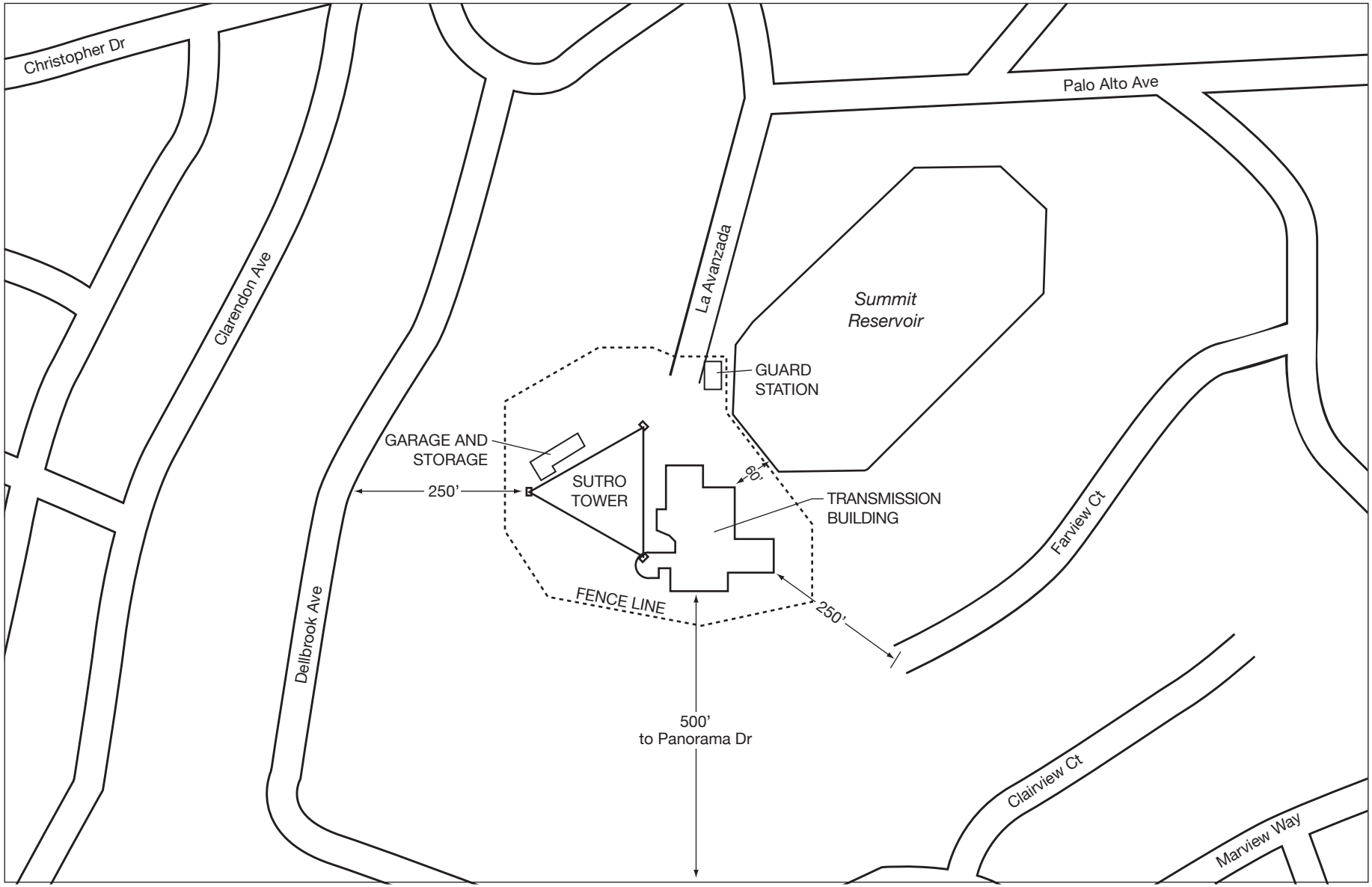




SOURCE: ESA

2007.0206E: Sutro Tower Digital Television - 206334

Figure 1
Project Location



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SOURCE: ESA

2007.0206E: Sutro Tower Digital Television - 206334

Figure 2
Site Plan

other uses. The deadline for the conversion has been set by Congress at February 17, 2009, after which time analog transmission will not be permitted.[1]

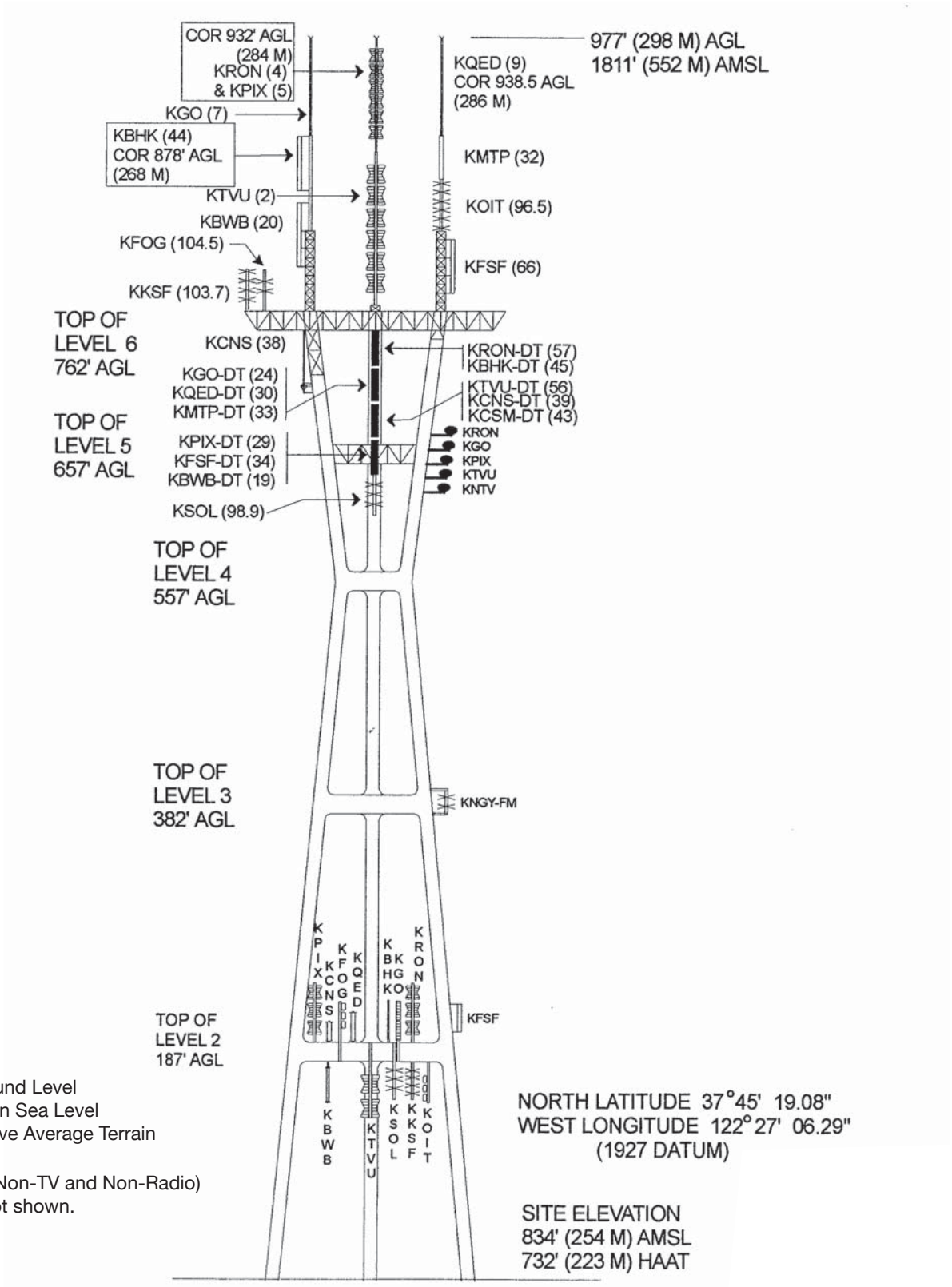
The project sponsor proposes to replace the existing analog television antennas with digital television antennas. With implementation of the proposed project, the total number of television antennas operating at Sutro Tower would be reduced from 22 antennas (nine existing analog main antennas, nine existing analog auxiliary antennas, and four existing digital main antennas) to eight antennas (five digital main antennas and three digital auxiliary antennas). Figures 3 and 4, pp. 5 and 6, show the existing and proposed configuration of antennas on Sutro Tower, respectively. The project also includes installation of several new panel antennas and a microwave dish antenna for two high-speed wireless data services. The number of radio station antennas would remain unchanged at nine antennas. Approximately 184 existing small antennas, the transmitter building at the base of the tower, the garage, and the guard station would remain unchanged. Proposed project components include:

1. **Replacement of nine analog main antennas from the top of Sutro Tower (762 feet to 977 feet above ground level (AGL)) with no more than five digital main antennas at the same location.** The new digital antennas are anticipated to be comparable to or smaller in size and total weight than the existing analog main antennas.

   As shown in Figures 3 and 4, three existing vertical masts extend upward 215 feet in height from Level 6 of the tower (762 feet AGL to 977 feet AGL). These vertical masts constitute the topmost three points of the tower. Each of the masts is secured by guy-wires. The vertical masts have a structural system of X-braces approximately eight feet wide. These X-braces are approximately two-thirds of the width of the 12-foot I-beams that make up the main tower structure below Level 6.

   As currently proposed, one of the three existing vertical masts (Mast B) and the guy-wires would remain. Masts A and C would be replaced with new X-braced masts approximately 156 feet in height, or 59 feet lower than the existing masts. Like the existing masts, the new masts would be secured with guy-wires. Two new digital antennas, each 30 to 40 feet in height, would be attached to Mast B. Two new digital antennas approximately 59 feet in height would be attached to the top of and extend upward from each of the proposed new vertical masts (Masts A and C). A fifth digital antenna, 60 feet in height, would be attached to Mast A below the taller antenna. The topmost points of all three masts, including new digital antennas, would remain at 977 feet AGL. Figure 5, p. 7, depicts a detailed view of the proposed new digital TV antenna configuration on the uppermost level of the tower. The five new digital antennas would serve 11 TV stations that currently broadcast from Sutro Tower (KTVU, KRON, KPIX, KGO, KQED, KBHK, KBWB, KMTP, KCSM, KFSF, and KCNS).

[1] The Digital Television Transition and Public Safety Act of 2005 authorized full-power television stations cease analog broadcasting after February 17, 2009. (National Telecommunications and Information Administration, 2007).



LEGEND

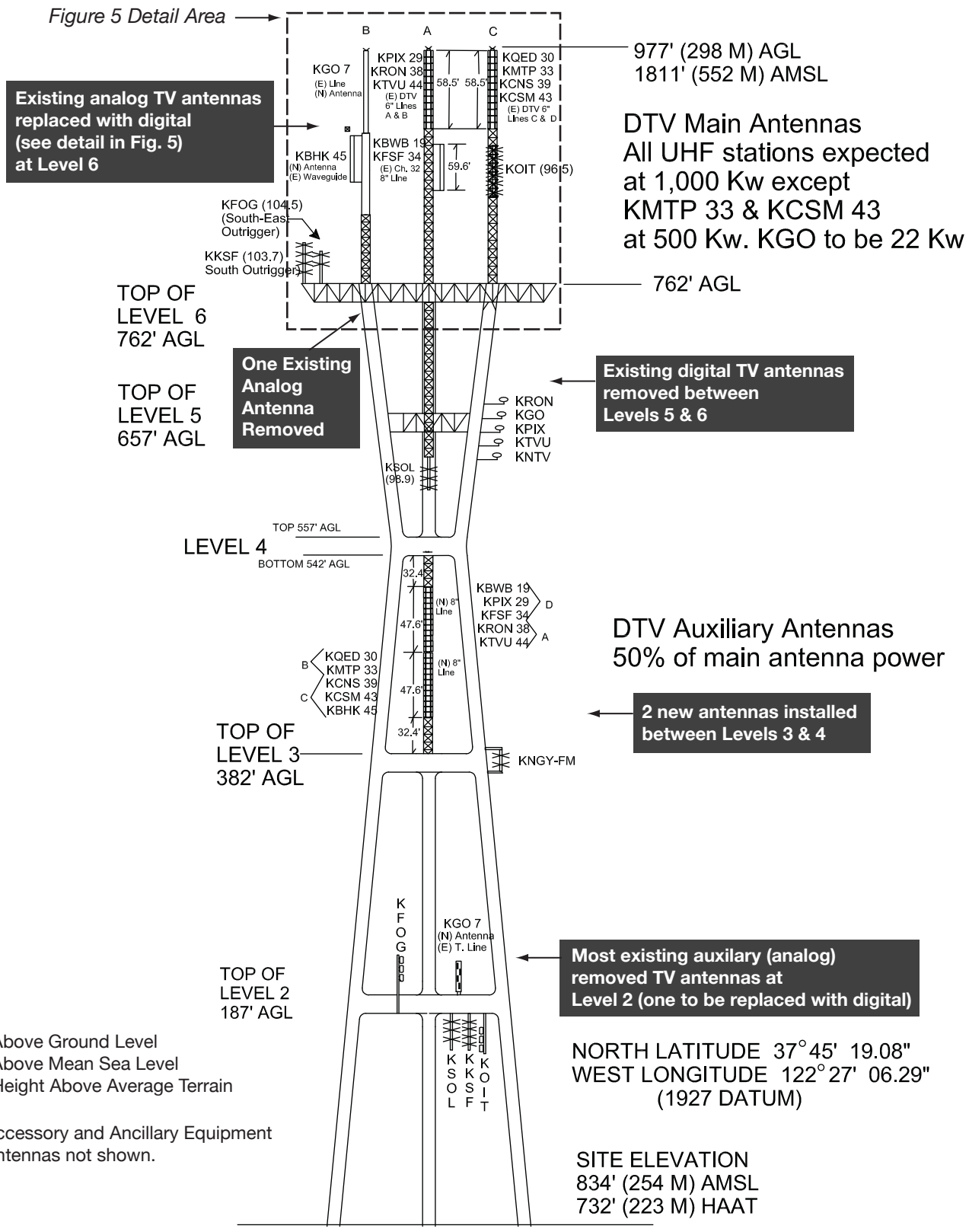
AGL - Above Ground Level
AMSL - Above Mean Sea Level
HAAT - Height Above Average Terrain

NOTE: Accessory (Non-TV and Non-Radio) Antennas not shown.

2007.0206E: Sutro Tower Digital Television - 206334

SOURCE: Sutro Tower, Inc.

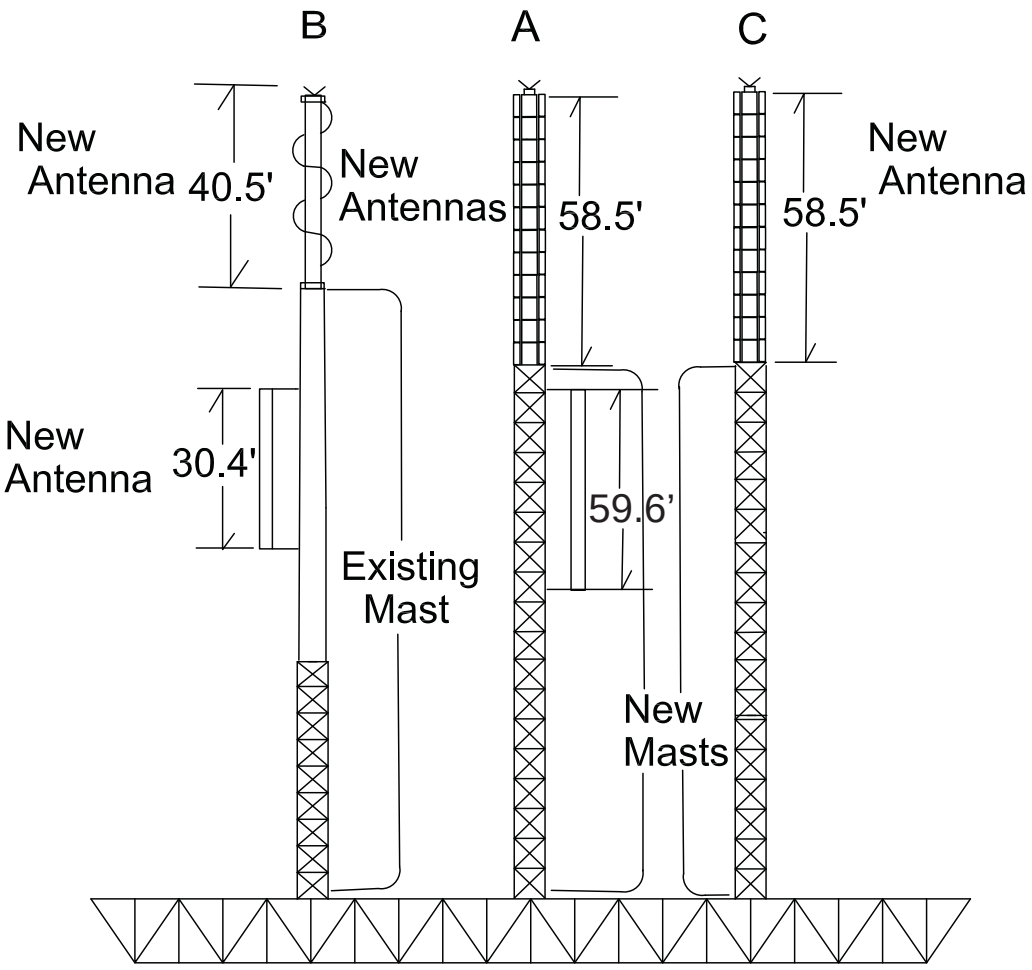
Figure 3
Existing Antenna Configuration



2007.0206E: Sutro Tower Digital Television - 206334

SOURCE: Sutro Tower, Inc.

Figure 4
Proposed Antenna Configuration



2007.0206E: Sutro Tower Digital Television - 206334

SOURCE: Sutro Tower, Inc.

Figure 5

Detail of Proposed Upper Level Antenna Configuration

Three existing radio station antennas are currently located at Sutro Tower Level 6. Two radio antennas are attached to two of the steel horizontal beams at Level 6 where these beams extend beyond the vertical members of the tower ("outriggers"). The third radio antenna is attached to one of the vertical masts. All three radio antennas would remain at their current locations. No change would be made to these antennas.

Also remaining would be a radio station antenna that is attached to the bottom of the 125-foot-long beam suspended from a horizontal beam between Level 5 and Level 6. No change would be made to this radio antenna. (This 125-foot beam currently supports four digital antennas that would be removed as part of the project, as described below.)

In addition, existing microwave dish antennas (each approximately five feet in diameter) that are suspended from the tower's north leg at Level 5 would also remain, with no changes made.

2. **Replace nine analog auxiliary television antennas on Level 2 of Sutro Tower (187 feet AGL) with two digital auxiliary antennas extending between Levels 3 and 4 (462 feet AGL at midpoint between these levels) and one digital auxiliary antenna at Level 2.** The new digital auxiliary antennas are anticipated to be comparable to or smaller in size than the existing analog auxiliary antennas.

   Currently, nine analog auxiliary antennas on Level 2 provide backup broadcasting capacity in the event of a malfunction of the main antenna or in the event of an emergency which disables a primary antenna, and during routine maintenance of the main antennas. One analog auxiliary antenna on Level 2 would be replaced with a new digital auxiliary antenna; the remaining analog auxiliary antennas would be removed from Level 2, and two new digital auxiliary antennas would be installed higher up on the tower between Levels 3 and 4.

   When used, each digital auxiliary antenna would operate at approximately 50 percent of the power levels of the station's primary antenna.

   Four existing radio station auxiliary antennas would remain at Level 2. In addition, one existing auxiliary radio station antenna that is hung from the side of Level 3 would also remain. No change would be made to these radio antennas.

3. **Removal of four digital main television antennas between Levels 5 and 6 of Sutro Tower (between 557 feet and 762 feet AGL).** Currently, four digital main television antennas are attached to a 125-foot long metal beam suspended from a horizontal beam between Levels 5 and 6. This metal beam was installed in 1998 as part of the first phase of Sutro Tower's conversion to digital television broadcasting. Although at that time it was envisioned that beam would support ten digital television antennas, subsequent technological advances resulted in the shared use of a lesser number of antennas. The beam would be retained while the four existing digital antennas would be removed as part of the proposed project. An analog TV antenna suspended from Level 6 would also be removed.

4. **Replacement or addition of small ancillary and accessory antennas and equipment associated with the operation of Sutro Tower broadcasters.** In addition to the television and radio broadcast antennas, Sutro Tower supports a number of smaller-scale antennas and ancillary equipment associated with radio frequency broadcasting. These smaller-scale antennas and equipment are accessory to the television and FM station tenants at Sutro Tower, or are the primary broadcasting equipment for telecommunications and public safety tenants such as the California Highway Patrol (CHP), Federal Bureau of Investigation (FBI), and United States Postal Inspector. This equipment is used for voice, data, dispatch and paging, microwave interconnect, newsgathering, and other broadcast-related uses.

   The smaller-scale antennas and accessory equipment are located on the tower itself, on the transmitter building rooftop, and in a few cases, on the secured grounds of Sutro Tower. Some equipment on the roof of the building is contained within enclosures for weather protection. Typical smaller antennas and accessory antennas include:

   - Weather cameras, weather monitoring stations, anemometers (wind speed gauges), thermometers and security cameras, usually smaller than two feet in any dimension;
   - Cylindrical "whip" antennas two to three inches in diameter and less than 15 feet in height, typically made out of fiberglass or similar materials;
   - Point-to-point microwave "dishes" (similar to a home satellite dish) between two and 10 feet diameter; and
   - Flat panel antennas between eight to 10 inches wide and one to two feet tall.

   There are approximately 184 existing smaller-scale antennas at the Sutro Tower facility in addition to the television and radio antennas described above. Such smaller-scale devices are periodically added, altered or replaced with new equipment of similar or enhanced function. In the past decade, the San Francisco Planning Commission and the Board of Supervisors have deemed additions, alterations or changes in or installations of equipment of this type to be categorically exempt from detailed environmental review as Class 1 exemptions (minor alteration to an existing facility).

   At present, the project sponsor anticipates, as part of the proposed project, that a new 2-foot microwave dish and 14 new 36-inch by 30-inch by 2-inch panel antennas would be installed at Level 3 (385 feet AGL) for two new high-speed wireless data service tenants. Other smaller-scale antennas and equipment may be replaced, altered or added in the future, subject to broadcasting requirements and the availability of appropriate technology. While it is not possible at this time to foresee the specific type, number or locations of any future smaller-scale antennas or accessory equipment, the potential for replacement, alteration or installation of new smaller-scale antennas and equipment is included as part of the project description and is analyzed in this Initial Study. Such effects will also be analyzed in the EIR for applicable topics.

5. **Structural, electrical, elevator, and public safety improvements associated with the proposed project.** A small expansion of one of the existing rooftop equipment enclosures on top of the transmitter building would be required to house digital combining equipment. This expansion is expected to increase the dimension of the existing approximately 600-square-foot rooftop enclosure by about 300 square feet (10 feet by 30 feet), to about 900 square feet. (There would be no change in the existing 10.5-foot height of this equipment enclosure.) Additional electrical, elevator, and public safety improvements (including fire suppression, security, and emergency notice improvements) could also be included as part of the operation of digital signals from Sutro Tower.

   No changes would be made in the transmitter building itself, which would retain its existing footprint and height. Likewise, no changes would be made in the garage/storage area, or in the guard station.

The proposed project would require no demolition or ground disturbing activities on the project site.

Project Operations

No change in ongoing operations of Sutro Tower or employment at the site is anticipated as a result of the project. According to the project sponsor, there is an average of seven employees on-site on a typical day, with as many as 10 and as few as four, depending on daily activities. On the typical day, four employees are Sutro Tower employees who work only at the tower site, while the others are television or radio station employees who work at the tower on certain days and work at their studio sites on other days. No change in this level of employment is anticipated.

Project Approvals and Schedule

Required Approvals

Communication facilities such as Sutro Tower are conditionally permitted in an RH-1(D) district as "Public Facilities and Utilities" under *San Francisco Planning Code* Section 209.6. Because the proposed project does not include major remodeling of the tower, expansion of the transmitter building at the base of the tower, or a change in use, an amendment to the existing conditional use authorization would not be required for the proposed project. However, pursuant to City Planning Commission Resolution No. 11399, adopted July 14, 1988, the Planning Commission will hold a public hearing to review the proposed project under its Discretionary Review authority. The project may also require building and electrical permits to allow Sutro Tower and/or its tenants to make necessary improvements to their leased space to accommodate the described antenna and accessory equipment or to add or alter small-scale accessory and ancillary equipment in the future.

As the relocation or replacement of television antennas with comparable or smaller antennas and the addition or replacement of small-scale antennas and accessory equipment would not increase the height or bulk of the tower, the Project would fall within the requirements of the 40-X height and bulk district by not making any significant change in the height of a legally noncomplying structure.

Standard Conditions

Every Sutro Tower building permit has been subject to the following "Standard Sutro Tower Conditions" since 2000.[2]

Mandatory Structural Inspections

The Standard Conditions include mandatory structural inspections, monitoring of radio frequency radiation (RFR), and communications with neighborhood organizations. The mandatory structural inspections include:

- *Annual Inspection:* Each year, an independent testing laboratory approved by the Department of Building Inspection conducts annual inspections of approximately one-third of the tower, such that the entire structure is evaluated over a three-year interval.
- *In-Depth Inspection:* Every five years, the independent testing laboratory conducts a close-up, hands-on inspection of one or more structural members or connections to identify potential problems not readily detectable in the Annual Inspection. As part of the in-depth inspection, Sutro Tower has non-destructive field testing, load tests, and/or materials tests performed by an independent testing laboratory if so recommended by a licensed engineer.
- *Event Inspections:* In the case of a severe storm, earthquake, mudslide or other triggering event that exceeds the design load of the tower, Sutro Tower must have an independent testing laboratory conduct an event inspection and, if required, an additional in-depth inspection in areas of local damage to the tower.
- *Special Inspections:* An independent testing laboratory conducts special inspections as part of an annual inspection to monitor remedial action resulting from any inspection, and conducts any inspection recommended by the licensed engineer for any reason.

Radio Frequency Emissions

Sutro Tower is subject to detailed conditions concerning RFR as part of the Standard Conditions:

- *FCC Compliance:* Sutro Tower is required to operate in a manner that does not contribute to ambient levels in excess of the FCC standards for RFR emissions.
- *Site Measurements:* Sutro Tower is required to measure radio frequency levels at 200 publicly-accessible sites within 1,000 feet of the tower each three years, or within six months of activation of any DTV antenna. The Department of Public Health must be notified by Sutro Tower at least three days before measurements are taken. Sutro Tower must remedy any ambient or localized measurements that exceed FCC standards for radio frequency exposure. A report of these RFR exposure measurements must be submitted to the Planning Department and Department of Public Health within 45 days of measurement and those reports shall be made available to the public.

[2] A complete copy of the standard conditions of approval for Sutro Tower is available for review by appointment at the Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0206E.

- *Private Property:* Upon written request from an individual property owner within 1,000 feet of the tower, Sutro Tower must measure radio frequency exposure levels at the accessible front yard and rear yard of the property and remedy any ambient or localized field found to exceed FCC standards.

Neighborhood Communication

As stipulated in the Standard Conditions, Sutro Tower, Inc. regularly communicates with and through the "Sutro Tower liaisons" designated by Twin Peaks Improvement Association, Midtown Terrace Homeowners Association, and Forest Knolls Neighborhood Association. Representatives of each of these organizations speak directly with and meet with Sutro Tower's general manager regarding both permit-related and operational issues.

Since 2000, the general manager of Sutro Tower has personally notified each Sutro Tower liaison within 10 days of filing any final permit application or report with any local agency.

The main posting location for any public hearing is at the entrance gate, which is the only access point to the facility. Pursuant to the directives of the Zoning Administrator in 1998, seven additional copies of this notice are also posted at the intersections of Oak Park and Clarendon, Panorama and Clarendon, Olympia and Clarendon, Marview and Panorama, Farview and Marview, Palo Alto and Glen View, and Twin Peaks and Clarendon to ensure extensive public awareness of all Sutro Tower hearings.

Schedule

Project construction for installation of new digital television antennas and removal of existing analog television antennas, along with related structural, electrical, elevator, and public safety improvements, is anticipated to commence in 2008 and would take approximately one year with an estimated cost of two million dollars. The entire project would be completed as a continuous process. The project would not require excavation.

Construction would involve the presence of an average of about 10 construction workers daily during the project, with as many as 15 workers present during periods of peak activity.

B. Project Setting

Land use in the surrounding neighborhoods is primarily residential, with some institutional and open space uses in the vicinity. The project site is immediately surrounded by open space that spans much of the area between Twin Peaks and Mount Sutro. The closest residences to the project site are located along Dellbrook Avenue, Farview Court, and Palo Alto Avenue; the nearest dwelling is approximately 200 feet from the tower. Other nearby residences are on St. Germain Avenue, Panorama Drive, Clairview Court, Forest Knolls Avenue, and Oak Park Drive. Open spaces in the project vicinity include the Midtown Terrace Playground, located less than one-fourth mile southwest from the project site, across Panorama Drive and Dellbrook Avenue; the City's designated Interior Greenbelt, along Clarendon Avenue and between Stanyan Street and the UCSF Medical Center; the Mount Sutro Open Space Reserve (owned by the University of California), located approximately one-fourth mile northwest of the project site, across

Clarendon Avenue, and Twin Peaks, about one-third mile southeast of the site. Sutro Tower is roughly equidistant between Golden Gate Park, to the northwest; Glen Canyon Park, to the southeast; and Mount Davidson Park, to the south: each is approximately one mile from the project site.

Institutional uses in the area include the UCSF Medical Center to the north, Clarendon Alternative Elementary School, located across Clarendon Avenue from Midtown Terrace Playground; San Francisco Fire Station No. 20, at Clarendon Avenue and Olympia Way (across Olympia Way from Midtown Terrace Playground); Laguna Honda Hospital and Youth Guidance Center farther south; and four city reservoirs. The nearest concentration of commercial uses is about two-thirds of a mile south of the project site, on Portola Drive.

C. Compatibility with Existing Zoning and Plans

	Applicable	*Not Applicable*
Discuss any variances, special authorizations, or changes proposed to the Planning Code or Zoning Map, if applicable.	☐	☒
Discuss any conflicts with any adopted plans and goals of the City or Region, if applicable.	☐	☒
Discuss any approvals and/or permits from City departments other than the Planning Department or the Department of Building Inspection, or from Regional, State, or Federal Agencies.	☐	☒

Planning Code

The *San Francisco Planning Code* (*Planning Code*), which incorporates by reference the City's Zoning Maps, governs permitted uses, densities and the configuration of buildings in San Francisco. Permits to construct new structures (or to alter or demolish existing ones) may not be issued unless either the proposed action conforms to the *Planning Code*, or an exception is granted pursuant to provisions of the *Planning Code*, or a reclassification of the site occurs.

The project site is within a RH-1(D) (Residential, House, Single-Family Detached) zoning district. Areas designated as RH districts are generally characterized by dwellings in the form of houses, usually with one to three units with separate entrances, plentiful open space, and few non-residential uses. Buildings in these districts typically range from two to four stories and rarely exceed 40 feet in height. Communication facilities such as Sutro Tower are conditionally permitted in an RH-1(D) district as "Public Facilities and Utilities."[3] In 1966, a conditional use permit was approved authorizing the construction and operation of Sutro Tower as a "transmission tower and building" for "the purpose of originating, receiving, and transmitting frequency modulation, facsimile and television broadcasts, and other forms of radio communications."[4] The permit specified that "the structural safety of the tower would be governed by applicable city building codes." Sutro Tower's original construction complied with all relevant

3 San Francisco Planning Code Section 209.6.

4 Planning Commission Resolution No. 5967, March 10, 1966. Available for review by appointment at the Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0206E.

requirements of the *San Francisco Building Code*. When constructed in 1972, Sutro Tower was designed to withstand an earthquake of 8.3 on the Richter scale without significant structural damage. The tower has subsequently undergone a structural upgrade program (see Section 13, Geology and Soils).

The project site is within a 40-X height and bulk district. This district allows a maximum building height of 40 feet, and has no bulk limit. The existing 977-foot-tall tower is a legal noncomplying facility for the height and bulk district. As the proposed relocation or replacement of existing television antennas with comparable or smaller antennas and the addition or replacement of smaller-scale antennas and accessory equipment would not increase the height or bulk of the tower, the proposed project would comply with the requirements of both the height and bulk limits.

The project is not located within any Special Use District or Preservation District Overlays. The proposed project would, therefore, not violate any regulations set forth by any overlay designation.

In 1997, the City determined that Sutro Tower was an "essential facility" pursuant to state law as part of the City's emergency communications resources.[5] Sutro Tower ensures free over-the-air information and news in the case of a man-made or natural disaster, and provides back-up facilities in case station studios are destroyed or damaged during an emergency situation. In addition to Sutro Tower's television and radio broadcasters, current public safety broadcasters operating emergency dispatch equipment at Sutro Tower include the Federal Bureau of Investigation, the California Highway Patrol, and the United States Postal Inspector.

As noted under Required Approvals, the Planning Commission in 1988 adopted a policy requiring all Sutro Tower building permits to come before the Commission for discretionary review.[6]

The foregoing notwithstanding, the proposed project would be consistent with the existing zoning of the project site, and no change in land use controls is required for project approval.

Plans and Policies

San Francisco General Plan

In addition to the *San Francisco Planning Code*, the project site is subject to the *San Francisco General Plan*. The *San Francisco General Plan* provides general policies and objectives to guide land use decisions. Any conflicts between the proposed project and policies that relate to physical environmental issues are discussed in Section D, Evaluation of Environmental Effects. The compatibility of the proposed project with *General Plan* policies that do not relate to physical environmental issues will be considered by decision-makers as part of their decision whether to approve or disapprove the proposed project. Any

[5] An essential services building is "any building or a portion of which is used or designed to be used as a fire station, police station, emergency operation center, California Highway Patrol office, sheriff's office or emergency communications dispatch center (California Building Standards Administrative Code, Chapter 4, Article 1 4.207). Among other requirements, Sutro Tower must comply with very stringent construction standards as an essential facility.

[6] Planning Commission Resolution No. 11399, July 14, 1988. Available for review by appointment at the Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0206E.

potential conflicts identified as part of the process would not alter the physical environmental effects of the proposed project. Project consistency with applicable *General Plan* objectives and policies, including the Community Safety Element (currently being updated), which addresses preparation for and recovery from earthquakes, will be discussed in the EIR.

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 Environmental Evaluation addressing the environmental issues associated with the policies, are: (1) preservation and enhancement of neighborhood-serving retail uses; (2) protection of neighborhood character (Question 1c, Land Use and Land Use Planning); (3) preservation and enhancement of affordable housing (Question 3b, Population and Housing, with regard to housing supply and displacement issues); (4) discouragement of commuter automobiles (Questions 5a, b, f, and g, Transportation and Circulation); (5) protection of industrial and service land uses from commercial office development and enhancement of resident employment and business ownership (Question 1c, Land Use and Land Use Planning); (6) maximization of earthquake preparedness (Questions 13a – 13d, Geology and Soils); (7) landmark and historic building preservation (Question 4a, Cultural Resources); and (8) protection of open space (Questions 8a and b, Wind and Shadow, and Questions 9a and c, Recreation). Prior to issuing a permit for any project which requires an Initial Study under the California Environmental Quality Act (CEQA), and 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. As noted above, the consistency of the proposed project with the environmental topics associated with the Priority Policies is discussed in the Evaluation of Environmental Effects, providing information for use in the case report for the proposed project. 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.

Other Plans and Policies

Environmental plans and policies, like the *Bay Area 2005 Ozone Strategy*, directly address physical environmental issues and/or contain standards or targets that must be met in order to preserve or improve specific components of the City's physical environment. The proposed project would not obviously or substantially conflict with any such adopted environmental plan or policy.

D. Summary of Environmental Effects

The proposed project could potentially affect the environmental factor(s) checked below. The following pages present a more detailed checklist and discussion of each environmental factor.

☐ Land Use	☐ Air Quality	☐ Hydrology and Water Quality
☒ Aesthetics	☐ Recreation and Public Space	☒ Hazards/Hazardous Materials
☐ Population and Housing	☐ Utilities and Service Systems	☐ Mineral and Energy Resources
☐ Cultural Resources	☐ Public Services	☐ Agricultural Resources
☐ Transportation and Circulation	☐ Biological Resources	☐ Mandatory Findings of Significance
☐ Noise	☒ Geology, Soils and Seismicity	

Effects Found to be Potentially Significant

The proposed project has been evaluated to determine whether it would result in significant environmental impacts. The project could contribute to a significant Aesthetic impact because replacing antennas and additional ancillary equipment on Sutro Tower could affect views of the site. The proposed project could have a significant Geology and Soils impact due to the potential for damage from earthquake-induced groundshaking. The proposed project could also result in a significant impact on Hazards and Hazardous Materials because the tower would emit radio frequency radiation (RFR). Accordingly, Aesthetics, Geology and Soils, and Hazards and Hazardous Materials will be analyzed in the Environmental Impact Report (EIR).

Effects Found Not to be Significant

The following effects of the proposed project have been determined to be either insignificant or to be mitigated through mitigation measure(s) included in this Initial Study: Land Use, Cultural Resources, Population and Housing, Transportation and Circulation, Noise, Air Quality, Wind and Shadows, Recreation, Utilities and Service Systems, Public Services, Biological Resources, Hydrology and Water Quality, Mineral and Energy Resources, and Agricultural Resources. Additionally, while the proposed project could result in a significant Aesthetic impact because it could degrade the existing visual character, it would neither substantially affect a scenic resource nor increase light and glare in the project vicinity; therefore, these impacts were found to be less than significant. The above listed topics are discussed below and require no further environmental analysis in the EIR. All mitigation measure(s) listed on page 40 have been agreed to by the project sponsor and will be incorporated into the proposed project.

E. Evaluation of Environmental Effects

Topics:		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Not Applicable
1.	**LAND USE AND LAND USE PLANNING— Would the project:**					
a)	Physically divide an established community?	☐	☐	☒	☐	☐
b)	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 plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒	☐
c)	Have a substantial impact upon the existing character of the vicinity?	☐	☐	☒	☐	☐

The approximately 5.6-acre project site is located near the geographic center of San Francisco, in the Midtown Terrace section of the Twin Peaks neighborhood, at 1 La Avanzada Street. The site is accessed via Dellbrook and Clarendon Avenues. At 834 feet above sea level, the project site is located at one of highest points in the City. The site has been used for radio frequency broadcasting for more than 50 years. Sutro Tower itself was constructed in 1972. As described in the Project Description, above, the Sutro Tower facility includes a 977-foot tower, a 30,122-square-foot transmitter building, a 1,458-square-foot garage and storage building, a 100-square-foot guard station, emergency generators, ancillary antennas and equipment associated with radio communications, and a surface parking lot with striping to accommodate 23 cars. The site is completely enclosed with a security fence.

Land use in the surrounding neighborhoods is primarily residential, with some institutional and open space uses in the vicinity. The project site is immediately surrounded by open space that is a part of the greenbelt running between Twin Peaks and Mount Sutro. The closest residences to the project site are located along Dellbrook Avenue, Farview Court, and Palo Alto Avenue; the nearest dwelling is approximately 200 feet from the tower. Other nearby residences are on St. Germain Avenue, Panorama Drive, Clairview Court, Forest Knolls Avenue, and Oak Park Drive. Open spaces in the project vicinity include the Midtown Terrace Playground, located less than one-fourth mile southwest from the project site, across Panorama Drive and Dellbrook Avenue; the City's designated Interior Greenbelt, along Clarendon Avenue and between Stanyan Street and the UCSF Medical Center; the Mount Sutro Open Space Reserve (owned by the University of California), located approximately one-fourth mile northwest of the project site, across Clarendon Avenue; and Twin Peaks, about one-third mile southeast of the site. Sutro Tower is roughly equidistant between Golden Gate Park, to the northwest; Glen Canyon Park, to the southeast; and Mount Davidson Park, to the south: each is approximately one mile from the project site.

Institutional uses in the area include the UCSF Medical Center to the north; Clarendon Alternative Elementary School, located across Clarendon Avenue from Midtown Terrace Playground; San Francisco Fire Station No. 20, at Clarendon Avenue and Olympia Way (across Olympia Way from Midtown

Terrace Playground); Laguna Honda Hospital and Youth Guidance Center farther south; and four city reservoirs. The nearest concentration of commercial uses is about two-thirds of a mile south, on Portola Drive.

The proposed project would include the replacement of existing analog television antennas with digital television antennas on Sutro Tower, as well as the potential future replacement, alteration and/or installation of an unknown number of smaller-scale antennas and accessory equipment. There would be no expansion to the tower itself or the transmitter building at the base of the tower. The proposed project would also include structural, electrical, elevator, and public safety improvements.

The proposed construction would occur entirely within the existing lot configuration, and subsequent operations of the tower would be unchanged from those at present. Therefore, the project would not physically divide the arrangement of existing uses and activities that surround it. The surrounding land uses (described above) would be expected to continue in operation and to be able to interrelate with each other as they do currently, without disruption from the proposed project. Furthermore, because the project would neither change the use of the existing facility nor change the bulk and intensity of the tower and associated buildings on the project site, the proposed project would not introduce new or incompatible land uses to the area. Once project construction has been completed, the change at the site would not be readily apparent (also see Section 2, Aesthetics). Therefore, the proposed project would not have a substantial impact on the character of the project vicinity.

Additionally, as described above in Section C, Compatibility with Existing Zoning and Plans, the proposed 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. As previously noted, the proposed project is located on a site that is zoned RH-1(D) where public utilities such as Sutro Tower are conditionally permitted. A conditional use permit was issued for Sutro Tower in 1966 authorizing the construction of the tower and accessory structures and authorizing the use of the facility for radio frequency broadcasting. As the proposed project does not include any major alterations to or expansion of the tower or structures and is for the purpose of continued radio frequency communication, no amendment to the existing CUP is required.

Since the proposed project would not divide an established community, substantially affect the existing character of the area, or conflict with any applicable land use plan, policy, or regulation, it would result in a less-than-significant land use impact.

Topics:		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Not Applicable
2.	**AESTHETICS—Would the project:**					
a)	Have a substantial adverse effect on a scenic vista?	☐	☐	☒	☐	☐
b)	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?	☐	☐	☒	☐	☐
c)	Substantially degrade the existing visual character or quality of the site and its surroundings?	☒	☐	☐	☐	☐
d)	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?	☐	☐	☐	☒	☐

Sutro Tower is an existing facility. The appearance or aesthetic effect of the 977-foot tower with extensive cross-bracing, cable-ties, trusses, and guy-wires, the existing radio and television antennas, and the existing 184 smaller-scale antennas and equipment, as well as that of the ground-level building and other equipment, are part of the existing setting. Consideration of the project's aesthetic impacts is limited to any significant effect(s) of the digital television conversion project and minor equipment changes or alterations associated with continued use of Sutro Tower for radio frequency communications, including the potential future replacement, alteration and/or installation of an unknown number of smaller-scale antennas and accessory equipment.

Sutro Tower, a three-pronged television and radio antenna tower, is the San Francisco Bay Area's tallest structure, surpassing the 853-foot Transamerica Pyramid by more than 100 feet. Located about three miles southwest of the downtown skyline near Mount Sutro and Twin Peaks, the tower stands 977 feet above ground on one of the highest points in the City (834 feet above sea level), reaching a height of 1,800 feet above sea level. On clear days, the tower's basic hourglass shape and structural lines are visible in most cityscape or panoramic views of the City. As a large structure on a prominent hilltop, the tower is considered by some to be visually intrusive, and by others to be a visual icon on the skyline.

The tower's height and location make it highly visible from public sidewalks and streets surrounding the project site and in surrounding neighborhoods. With the exception of the UCSF Medical Center, nearby neighborhoods primarily consist of single-family residences, relatively small multi-family housing structures, and neighborhood-serving commercial facilities. Most buildings in the project vicinity are under four stories and set in the relatively dense urban fabric with varied topography. Because the tower is situated within stands of mature Eucalyptus trees, the ancillary structures and 150 to 200 feet of the tower's base are partially screened from view from off-site locations. With implementation of the project,

views would substantially remain the same because the proposed project would not increase the tower's height or bulk.

As the Sutro Tower facility is surrounded by a fence, the site itself is not a scenic vista point that offers panoramic views of the City. The proposed project would not substantially damage any scenic resources, including trees or rock outcroppings, as none exist on the project site.

The tower is painted in relatively distinctive white and international orange color bands, as required by the Federal Aviation Administration (FAA). Additionally, pursuant to FAA Advisory Circular AC 70/7460-1K, Sutro Tower is equipped with FAA-approved lighting including 12 high-intensity white flashing obstruction beacons, nine medium intensity flashing red beacons, 18 steady-burning obstruction lights and three red/white antenna beacons. The FAA-required beacons are the only source of night light attributable to the facility, and this condition would remain unchanged with implementation of the proposed project. Additionally, the new antennas atop the tower would be composed of non-reflective metal or painted the same color (white) as the upper portion of the tower. Except for low-level security lighting, no exterior lighting is provided for the ancillary buildings on the site. No additional exterior lighting for these buildings is proposed, and the project therefore would not create additional light or glare at the project site. Therefore, the proposed project would not result in any impact from new light or glare.

It is not expected that the change in antennas or their configuration would be generally noticeable. In the context of the tower's existing physical elements, such as the three-legged structure with its cross-bracing, cable ties, and trusses, and the existing antennas at various levels of the tower, the proposed installation of new digital antennas and removal of existing analog antennas would be noticeable only upon close inspection. However, due to the visual prominence of Sutro Tower both in the surrounding neighborhoods and in long-range views of the City, the potential effects of the proposed project on visual resources will be analyzed in the EIR.

Topics:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*	*Not Applicable*
3. POPULATION AND HOUSING— Would the project:					
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒	☐
b) Displace substantial numbers of existing housing units or create demand for additional housing, necessitating the construction of replacement housing?	☐	☐	☐	☒	☐
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒	☐

Construction of the proposed project, including installation of new digital television antennas and removal of existing analog television antennas, along with related structural, electrical, elevator, and public safety improvements, would be expected to last approximately one year. The total number of construction crew members for the proposed project is estimated at approximately 10 persons on average, ranging from as few as five to as many as 15 persons. The proposed construction activities would be temporary, and therefore would not result in any growth-inducing impacts, significantly increase in local population or housing, or indirectly induce growth by creating new opportunities for local industry or commerce. Once the new facilities were operational, no change in employment at or occupancy of the tower facilities is anticipated. The potential future replacement, alteration and/or installation of an unknown number of smaller-scale antennas and accessory equipment would involve considerably less construction activity than would installation of the new digital television antennas and removal of the existing analog television antennas, and the impact of constriction activity and employment would be expected to be minimal to the point of being nearly indistinguishable even by nearby residents, and thus would be less than significant, both individually and cumulatively. Such equipment is typically installed by teams of fewer than four persons and does not require heavy construction equipment or large trucks.

Growth in the project area is planned and regulated by applicable local planning policies and zoning ordinances. The availability of improved radio and television communication services by itself does not normally ensure or encourage growth within a particular area. Other factors such as economic conditions, land availability, population trends, availability of water supply or sewer services and local planning policies have a more direct effect on growth. Therefore, the proposed project would have no effect on population growth in the project area.

There are no housing or commercial uses on the project site. Therefore, the project would not result in any displacement of residential or commercial uses or people.

The proposed project would not contribute to any potential cumulative effects related to population, as the project would not result in displacement or create unmet housing demand.

Topics:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*	*Not Applicable*
4. CULTURAL RESOURCES— Would the project:					
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5, including those resources listed in Article 10 or Article 11 of the San Francisco *Planning Code*?	☐	☐	☒	☐	☐
b) Cause a substantial adverse change in the significance of a unique archaeological resource pursuant to §15064.5?	☐	☐	☒	☐	☐

Topics:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Not Applicable
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?	☐	☐	☒	☐	☐

The project site has been disturbed by construction in the past, primarily during the original construction of Sutro Tower and its ancillary buildings. No records have indicated that cultural resources have been previously identified within or directly adjacent to the project site, or within a one-quarter mile of the project area. Additionally, Sutro Tower is not an historical or cultural resource as defined by CEQA Section 15064.5, nor is it in an historic district. The site is largely covered by impervious surfaces and buildings and the proposed project would not involve any ground disturbing activities. Thus, the proposed project would not have a significant adverse impact on cultural resources.

Topics:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Not Applicable
5. TRANSPORTATION AND CIRCULATION— Would the project:					
a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume-to-capacity ratio on roads, or congestion at intersections)?	☐	☐	☒	☐	☐
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways (unless it is practical to achieve the standard through increased use of alternative transportation modes)?	☐	☐	☒	☐	☐
c) Result in a change in air traffic patterns, including either an increase in traffic levels, obstructions to flight, or a change in location, that results in substantial safety risks?	☐	☐	☒	☐	☐
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses?	☐	☐	☒	☐	☐
e) Result in inadequate emergency access?	☐	☐	☒	☐	☐
f) Result in inadequate parking capacity that could not be accommodated by alternative solutions?	☐	☐	☒	☐	☐

Topics:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Not Applicable
g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., conflict with policies promoting bus turnouts, bicycle racks, etc.), or cause a substantial increase in transit demand which cannot be accommodated by existing or proposed transit capacity or alternative travel modes?	☐	☐	☒	☐	☐

The project site is accessible via Dellbrook Avenue and La Avanzada Street. Dellbrook Avenue is a residential street that intersects with Clarendon Avenue. La Avanzada Street is a paved, private road that leads to the site. The proposed project would not introduce any new uses to the project corridor that would generate long-term changes in traffic. Thus, potential traffic and transportation effects on area roadways would be confined to construction of the proposed project.

Construction activities would include daily vehicle trips generated by the arrival and departure of construction workers. Approximately five to 15 workers would commute to the construction site each day for approximately one year for installation of new digital television antennas and removal of existing analog television antennas, along with related structural, electrical, elevator, and public safety improvements. Construction workers would park in the existing parking lot. Trucks would haul the assembly materials and pre-fabricated antenna sections to the site. The project sponsor intends to have larger shipments delivered from the manufacturer directly to an off-site drayage company warehouse and arrange for project components to be hauled to the project site on an as-needed basis. In this way, deliveries to the Sutro Tower site would be made via smaller trucks (*i.e.*, not 18-wheel semi-trailer trucks). The sponsor estimates that up to about 15 truckloads of material (30 one-way truck trips) could be required over the approximately one-year construction period for installation of new digital television antennas and removal of existing analog television antennas, along with related structural, electrical, elevator, and public safety improvements. La Avanzada Street would be used to access the site to haul the antenna sections and other materials, with trucks likely arriving via Market Street, 17th Street, and Clarendon Avenue. Construction of the proposed project would not require any lane closures.

Construction-generated traffic would be temporary and would not result in any long-term degradation in operating conditions or level of service on any of the roadways in the vicinity of the proposed project. Therefore, this short-term increase in vehicle trips would not substantially affect level of service and traffic flow on local roadways. The primary impacts from the movement of construction trucks would include short-term and intermittent lessening of roadway capacities due to slower movements and larger turning radii of the trucks compared to passenger vehicles. Because relatively smaller trucks would be used, and because, on average, slightly in excess of one truckload would arrive per month, it is not anticipated that truck traffic associated with project construction would substantially adversely affect either traffic conditions or cause substantial damage to local streets.

Once constructed, the new antennas and other equipment would require routine maintenance trips and inspection. Maintenance activities would not increase above existing levels for the facility and therefore, would not result in an increase in traffic in the proposed project area.

As noted above under Population and Housing, the potential future replacement, alteration and/or installation of an unknown number of smaller-scale antennas and accessory equipment would involve considerably less construction activity than would installation of the new digital television antennas and removal of the existing analog television antennas, and would not require heavy construction equipment or large trucks. Because such equipment is typically installed by work crews of four or fewer, the traffic impact of such potential future changes at Sutro Tower would be expected to be minimal to the point of being nearly indistinguishable even by nearby residents, and thus would be less than significant, both individually and cumulatively.

The nearest airport to the project site is the San Francisco International Airport, located about 13 miles southeast of the City of San Francisco. At present, the tower is in compliance with all FAA regulations, which includes 12 FAA-approved high-intensity white flashing obstruction beacons, nine FAA-approved medium intensity flashing red beacons, 18 FAA-approved steady-burning obstruction lights, and three FAA-approved red and white antenna beacons. The proposed project would not require additional FAA-approved lighting, as the project would not add additional height or bulk to the tower. There are no other elements of the proposed project that would create a safety hazard for air traffic. Consequently, the project would have a less-than-significant impact on air traffic safety.

There are no unusual design features or uses proposed as part of the project that would substantially increase traffic hazards. Likewise, the proposed project would not result in a significant impact with regard to emergency access, as the project site is accessible from major streets, including Clarendon Avenue and Twin Peaks Boulevard.

In summary, the project would not result in significant effects with regard to transportation.

Topics:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*	*Not Applicable*
6. NOISE—Would the project:					
a) Result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐	☐
b) Result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐	☐
c) Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☒	☐

Topics:		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Not Applicable
d)	Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without 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?	☐	☐	☐	☐	☒
f)	For a project located in the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☐	☒
g)	Be substantially affected by existing noise levels?	☐	☐	☐	☒	☐

The project site is not within an airport land use plan area, nor is it in the vicinity of a private airstrip. Therefore, topics 6e and 6f are not applicable.

Ambient noise levels in the project vicinity are typical of noise levels in greater San Francisco, which are dominated by vehicular traffic, including trucks, cars, Muni buses, and emergency vehicles. Observation indicates that surrounding land uses do not conduct noticeably noisy operations.

Traffic Noise

Generally, traffic must double in volume to produce a noticeable increase in ambient noise levels. The proposed project would not generate any long-term increase in traffic, nor would traffic volumes be expected to double on area streets as a result of cumulative traffic growth, because there are no known projects proposed in the vicinity that have the potential to result in substantial traffic increases. Therefore, the project would not cause a noticeable increase in the ambient noise level in the project vicinity, nor would the project contribute to any potential cumulative traffic noise effects.

Operational Noise

After the proposed construction, operation of the Sutro Tower facility would not result in any appreciable increase to the existing ambient noise levels in the project vicinity because the use and number of employees would not change from existing levels.

Construction Noise

The proposed alterations to the tower and associated facilities would temporarily increase noise in the project vicinity. Construction equipment would generate noise and possibly vibrations that could be considered an annoyance by occupants of nearby properties. No pile-driving or the use of impact tools is proposed as part of the project. Therefore, the project would not result in unusual levels of groundborne vibration that would be expected to disturb nearby residents or businesses, and vibration impacts would be less than significant.

In the early 1990s, some neighbors indicated that construction cables were occasionally "clanking" against the tower structure during maintenance and construction activities. Sutro Tower, Inc. thereafter adopted new protocols requiring maintenance and construction personnel to secure construction cables while working on the tower. According to the general manager of Sutro Tower, no complaints about construction cable "clanking" have been received by Sutro Tower since these new protocols were put in place.

According to the project sponsor, the construction period for the digital television antenna installation and removal of analog television antennas, along with related structural, electrical, elevator, and public safety improvements, would last approximately one year. Construction noise levels would fluctuate depending on construction phase, equipment type and duration of use, distance between noise source and listener, and presence or absence of barriers.

Construction noise is regulated by the San Francisco Noise Ordinance (Article 29 of the *Police Code*). 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. 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 five dBA at the project property line, unless a special permit is authorized by the Director of Public Works. The project must comply with regulations set forth in the San Francisco Noise Ordinance (Article 29 of the *Police Code*).

The closest sensitive noise receptors to the project site that have the potential to be adversely affected by construction noise are the residents living immediately surrounding the project site on Dellbrook Avenue, Palo Alto Avenue, and Farview Court. The closest residences are located approximately 200 feet from the base of the tower. As discussed above, no unusual levels of construction noise are anticipated (such as from pile driving or jack-hammering). Since the project sponsor would be required to comply with the Noise Ordinance and to adhere to all required specifications that aim to reduce construction noise levels, construction impacts of the project would be less than significant. Additionally, due to attenuation, noise generated from the attachment of the antennas would be lessened because construction would occur between about 185 feet and 760 feet above ground and the closest sensitive receptor is located approximately 200 feet from the base of the tower.[7]

The potential future replacement, alteration and/or installation of an unknown number of smaller-scale antennas and accessory equipment would involve considerably less construction activity than would installation of the new digital television antennas and removal of the existing analog television antennas, and the noise impact of such activity would be expected to be minimal and less than significant, both individually and cumulatively, given that this work typically involves no heavy construction equipment or large trucks and is performed by smaller work crews.

In light of the above, effects related to construction noise would not be significant.

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7 The rate of attenuation (lessening of noise) is about six decibels (dBA) for every doubling of distance from a point source.

Wind Noise

The guy-wires installed to secure Sutro Tower's antenna stacks were originally composed of a stiff fiberglass material. In the early years of Sutro Tower's operation, several neighbors complained of vibration noise from these guy-wires in high wind conditions. In the late 1970s, all original guy-wires were replaced with new strands composed of a more flexible material, and vibration dampers were attached to each new guy-wire. The general manager for Sutro Tower, Inc. reports that he has received no complaints from neighbors about noise from the guy-wires in his 15 years of tenure.

None of the proposed modifications to the tower would be expected to change existing noise conditions. Therefore, effects of wind-generated noise would be less than significant because the proposed project would not substantially alter existing noise levels resulting from wind passing through the tower structure and the new antennas would be more than 200 feet above ground level.

Topics:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*	*Not Applicable*
7. AIR QUALITY Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. **Would the project:**					
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	☒	☐
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	☐	☒	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal, state, or regional ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	☒	☐	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☒	☐	☐	☐
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☒	☐	☐

Construction Air Quality Emissions

Although demolition and grading activities can temporarily affect local air quality, the proposed project does not include any ground disturbing activities that could generate dust. Nevertheless, truck traffic and other equipment operating during the approximately one-year construction period of the digital television antenna component of the proposed project, along with related structural, electrical, elevator, and public safety improvements, could cause some temporary increases in particulate dust and other pollutants that would increase particulate concentrations near the project site. Dustfall can be expected at times on surfaces within 200 to 800 feet of the source. In general, dust generated by demolition and construction

activity would result in more of a nuisance than a health hazard in the vicinity of the project site. About one-third of the dust generated by demolition and construction activities consists of smaller size particles in the range that can be inhaled by humans (i.e., particles 10 microns or smaller in diameter, known as PM-10, although those particles are generally inert). Persons with respiratory diseases immediately downwind of the site, as well as any unprotected electronics equipment, could be sensitive to this dust.

The potential future replacement, alteration and/or installation of an unknown number of smaller-scale antennas and accessory equipment would involve considerably less construction activity than would installation of the new digital television antennas and removal of the existing analog television antennas, and air quality impact of such activity would be minimal and not significant, both individually and cumulatively, given that this work typically involves no heavy construction equipment or large trucks and is performed by smaller crews.

The proposed project would include a measure (Mitigation Measure No. 1, p. 40) that would implement the appropriate Bay Area Air Quality Management District (BAAQMD) measures by requiring the project contractor to water the site (with reclaimed water), cover soil and other materials, cover trucks, and sweep the streets to minimize dust generation. The contractor also would minimize vehicle emissions by prohibiting idling of engines and by implementing a vehicle maintenance program. Because the proposed project would include these mitigation measures, it would not cause significant construction-related air quality effects.

Operational Air Quality Emissions

Transportation vehicles are the primary source of operational project-related emissions.[8] According to CEQA guidance issued by the BAAQMD, a project would have potentially significant emissions impacts if the project were to generate more than 2,000 vehicle trips per day. The proposed project would not alter the use of the facility nor increase permanent employment on the project site; therefore, the project would be well below the BAAQMD's threshold for air quality analysis because the number of vehicles on nearby roads and at the project site would not increase. Consistent with BAAQMD guidance, no quantitative analysis of transportation air quality is required, and the project would not result in a significant effect with regard to operational air quality. Moreover, because the project would generate no permanent increase in emissions, the project would not contribute considerably to cumulative air quality impacts, nor would it interfere with implementation of the *Bay Area 2005 Ozone Strategy* or the *2001 Ozone Attainment Plan*, which are the applicable regional air quality plans developed to improve air quality towards attaining the state and federal ambient air quality standards.

Odors

The project would not result in a perceptible increase or change in odors on the project site or in the vicinity of the project, as it would not include uses prone to generation of odors.

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8 Bay Area Air Quality Management District, *BAAQMD CEQA Guidelines, Assessing the Air Quality Impacts of Projects and Plans*, December 1999.

Topics:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Not Applicable
8. WIND AND SHADOW—Would the project:					
a) Alter wind in a manner that substantially affects public areas?	☐	☐	☒	☐	☐
b) Create new shadow in a manner that substantially affects outdoor recreation facilities or other public areas?	☐	☐	☒	☐	☐

Wind

Wind impacts are generally caused by large building masses extending substantially above their surroundings, and by buildings oriented such that a large wall catches a prevailing wind, particularly if such a wall includes little or no articulation. Since the proposed project would not increase the height or bulk of the existing Sutro Tower, the project would not result in changes to existing ground-level winds. Additionally, the proposed project would not affect the climate either in the neighborhood or regionally. Accordingly, the proposed project would result in a less-than-significant wind impact.

Shadow

Section 295 of the *Planning Code* was adopted in response to Proposition K (passed November 1984) in order to protect certain public open spaces from shadowing by new structures during the period between one hour after sunrise and one hour before sunset, year round. The relocation or replacement of television broadcasting antennas with comparable or smaller antennas would not increase the height or bulk of the existing Sutro Tower. Therefore, the proposed project would not substantially alter shadows in the area. To the extent that shadow patterns from the tower would be altered by the changed locations of antennas on the tower, these changes would be minimal, because the various antennas would be at least 200 feet above ground level and no more than about eight feet in width, and thus would cast minimal shadow on the ground.[9] As a result, shadow effects would be less than significant.

Topics:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Not Applicable
9. 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?	☐	☐	☐	☒	☐

[9] Because the sun is a sphere, not a point, sunlight strikes a given object from multiple, slightly differing angles. This means that the edge of a shadow cast by a distant object is not a bright line, but is slightly diffuse, and therefore distant narrow objects (such as an antenna high up on the tower) do not generally cast clearly defined shadows.

Topics:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Not Applicable
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?	☐	☐	☐	☒	☐

Major publicly accessible open spaces in the project vicinity include the Midtown Terrace Playground (a 13.3-acre park located less than one-fourth mile southwest of the project site between Panorama Drive and Olympia Way between Clarendon and Dellbrook Avenues); the Mount Sutro Open Space Reserve (a 61-acre reserve owned by the UCSF Medical Center less than one-half mile northwest of the project site across Clarendon Avenue); the Interior Green Belt (a natural area less than one-half mile north of the project site at the intersection of Stanyan and 17th Streets); and Golden Gate Park (a large regional park located approximately one mile north of the project site, with the closest intersection at Stanyan Street and Lincoln Way).

The proposed project would result in no permanent increase in population or employment or occupancy of the site, and therefore would create no increase in demand for or use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facilities would occur. The proposed physical changes to the antennas also would not affect nearby recreational uses. Therefore, the project would not have a substantial impact on recreation or open space, and the impact would be less than significant.

Topics:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Not Applicable
10. UTILITIES AND SERVICE SYSTEMS—Would the project:					
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒	☐
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒	☐
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒	☐
d) Have sufficient water supply available to serve the project from existing entitlements and resources, or require new or expanded water supply resources or entitlements?	☐	☐	☐	☒	☐

Topics:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Not Applicable
e) Result in a determination by the wastewater treatment provider that would serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒	☐
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☐	☒	☐
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☒	☐

The project site is within an urban area that is served by utilities and service systems, including water, wastewater and storm water collection and treatment, solid waste collection and disposal, gas, and electricity. As previously discussed, the proposed project would not increase the population in the project area, either directly or indirectly. Thus, the project would not increase the demand for, and use of, public utilities in excess of amounts expected and provided for in this area. No new water delivery or wastewater collection and treatment facilities would be required to serve the proposed project.

In light of the above, utilities and service systems would not be adversely affected by the project, individually or cumulatively, and no significant effect would ensue.

Topics:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact	Not Applicable
11. 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?	☐	☐	☐	☒	☐

Fire and Police Protection Impacts

The project site currently receives fire and police protection services from the San Francisco Fire Department (SFFD) and the San Francisco Police Department (SFPD), respectively. The proposed project would not create additional demand for fire suppression and police service in the area because it would not increase the amount or type of activity on the project site.

Police service is provided to the site primarily by the SFPD's Park Station, at 1899 Waller Street (at Kezar Drive), approximately 2.5 miles north of the project site. Fire protection is provided primarily by

the three closest fire stations: Station 20, at 285 Olympia Way at Clarendon Avenue (approximately one-half mile south of the project site); Station 12 at 1145 Stanyan Street at Grattan Street (approximately one mile north); and Station 24, at 100 Hoffman Avenue at Alvarado Street (approximately 1.5 miles east). Each of these three stations houses an engine (pumper); Station 12 also houses a (ladder) truck and a medic unit (ambulance). Because the proposed project would not alter the use of the existing Sutro Tower or add new population to the area (no increase in on-site employment), the proposed project would not require new or physically altered SFFD and SFPD facilities. Therefore, the proposed project would result in no impact on fire and police services.

Schools and Parks Impacts

The proposed project would not add new population to the area, and therefore, would not have an impact on public schools.

As discussed in the Recreation section of this document, p. 29, the proposed project would have a less-than-significant impact on parks and recreational facilities in the project area.

In light of the above, public services would not be adversely affected by the project, individually or cumulatively, and no significant effect would ensue.

Topics:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*	*Not Applicable*
12. BIOLOGICAL RESOURCES— Would the project:					
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☒	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☐	☐	☒
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☐	☒
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☒	☐	☐

Topics:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact	Not Applicable
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒	☐
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?	☐	☐	☐	☐	☒

The proposed project is in a developed area and is not located within or near any riparian habitat, sensitive natural community, federally protected wetlands, or an adopted conservation plan area. Therefore, topics 12b, 12c, and 12f are not applicable to the proposed project.

The project site is a graded, relatively level area largely covered with structures, a parking lot, and other impermeable surfaces. Because the project site is in a developed urban area and is almost completely covered by impermeable surfaces, the proposed project would not affect any rare plants or possible animal habitats, including riparian habitat. No rare, threatened, or endangered species would be affected by the proposed project. No existing trees would be removed. Additionally, no ground-disturbing activities are proposed for project construction.

The proposed project would not alter the height or bulk of Sutro Tower. Moreover, the proposed project would result in a net decrease of 14 television antennas. Therefore, the proposed project would not result in increased impacts to a wildlife migration corridor. Further, the project applicant has indicated that Sutro Tower's existing design protects migratory birds from potential impacts by using the minimum amount of warning and obstruction lighting required by the FAA, with the minimum number and intensity of strobe flashes per minute allowed by the FAA. Additionally, as a self-supporting structure, Sutro Tower has very few guy-wires, which are each located within the tower structure itself and therefore are not positioned in a manner that would be likely to result in avian impacts. Also, by co-locating communication equipment at one site, Sutro Tower reduces the overall number of communication towers and the potential for avian tower impacts that might otherwise occur in San Francisco. While the FCC does not have any existing regulations pertaining to migratory birds, it is currently in the process of gathering and reviewing comments and information on the impacts communication towers may have on migratory birds.[10] The Department of the Interior's United States Fish and Wildlife Service (USFWS) is the federal agency with primary authority to enforce federal statutes intended to protect migratory birds and other wildlife. The USFWS has issued voluntary

[10] The Federal Communications Commission (FCC) initiated a Notice of Inquiry, released in August 2003, to gather comments and information on the impact that communications towers may have on migratory birds. Building on the record developed in response to that NOI, in November 2006, the FCC released a Notice of Proposed Rulemaking seeking comments on whether the FCC should take measures to reduce the number of instances in which migratory birds collide with communications towers (the comment deadline was April 23, 2007). This inquiry is designed to gather comments and information on scientific research and other related data relevant to migratory bird collisions with communications towers. Depending on the record developed in this proceeding, the FCC will consider whether the current state of research would support further action by the FCC in this area, including possible amendments of its environmental rules.

guidelines for the construction, operation, and decommissioning of communication towers to help protect migratory birds. Sutro Tower's design, as described above, complies with these voluntary guidelines. Moreover, according to the project sponsor, no reports of dead or injured birds being found on Sutro Tower property have been received since at least 1992.[11] In summary, Sutro Tower has not posed a significant threat to local avian migration in the past and the proposed project would not pose an additional threat to migratory birds in the future. Finally, Sutro Tower is an existing facility, and the relatively minor changes in antennas and their configuration proposed with the project would not be expected to alter the tower's existing effects, if any, on birds.

The potential future replacement, alteration and/or installation of an unknown number of smaller-scale antennas and accessory equipment would involve considerably less alteration of the overall massing and bulk of the tower and its attached facility than would installation of the new digital television antennas and removal of the existing analog television antennas. Thus, effects on migratory birds would likewise be less than significant, both individually and cumulatively.

Based on the above, the project would not result in any significant effect with regard to biology, nor would the project contribute to any potential cumulative impacts on biological resources.

Topics:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*	*Not Applicable*
13. GEOLOGY AND SOILS— Would the project:					
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:					
i) 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 Division of Mines and Geology Special Publication 42.)	☒	☐	☐	☐	☐
ii) Strong seismic ground shaking?	☒	☐	☐	☐	☐
iii) Seismic-related ground failure, including liquefaction?	☒	☐	☐	☐	☐
iv) Landslides?	☒	☐	☐	☐	☐
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☐	☒	☐
c) Be located on geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	☒	☐	☐	☐	☐

[11] Gene Zastrow, General Manager, Sutro Tower, Memorandum, October 19, 2006. This memorandum is available for review by appointment at the Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0206E.

Topics:		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Not Applicable
d)	Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code, creating substantial risks to life or property?	☐	☐	☒	☐	☐
e)	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?	☐	☐	☐	☐	☒
f)	Change substantially the topography or any unique geologic or physical features of the site?	☐	☐	☐	☒	☐

Sutro Tower does not use septic systems and this would not change as a result of the project. Therefore, topic 13e is not applicable to the proposed project.

The proposed project would not require excavation; therefore it would not alter the overall topography of the site, which would remain a generally level site. Moreover, with no excavation, the project would not result in any erosion or loss of topsoil. Therefore, these topics will not be discussed further in the EIR.

Project effects related to seismic activity will be analyzed in the EIR.

Topics:		Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact	Not Applicable
14.	**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 which 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 that would result in substantial erosion of 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 that would result in flooding on- or off-site?	☐	☐	☒	☐	☐

Topics:		Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact	Not Applicable
e)	Create or contribute runoff water which 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?	☐	☐	☐	☒	☐

During construction, the proposed project would be required to comply with all local wastewater discharge and water quality requirements (i.e., before entering the project site, construction equipment would be required to be checked and maintained to avoid discharge of oil or other pollutants from the equipment). Therefore, project construction would not substantially degrade water quality.

The tower is currently painted with water-resistant paints that are not known to leach into surface water during storm events. The new set of antennas and any additional structural members added as part of the structural improvements would be unpainted or similarly treated, and would not be expected to affect surface water quality. Likewise, potential future smaller-scale antennas and accessory equipment would be unpainted or similarly treated, and would not be expected to affect surface water quality, either individually or cumulatively.

The project site is currently developed with an existing tower, associated buildings, and paved parking lot. The project would not change the amount of impervious surface area nor measurably affect current runoff or groundwater. Therefore, neither groundwater resources nor runoff and drainage would be adversely affected.

Additionally, construction of the proposed project, including installation of new digital television antennas and removal of existing analog television antennas, as well as the potential future replacement, alteration and/or installation of an unknown number of smaller-scale antennas and accessory equipment, would not require any ground disturbing activities, including excavation. Therefore, water quality impacts from erosion and sedimentation would not likely occur.

The proposed project would result in no permanent increase in population, employment, or occupancy of the site, and therefore would result in no increase in wastewater generation.

The project area is not subject to flooding and the project would have no impacts on flooding, as the amount of impervious surface at the site would not change as a result of the project. The project site is not within a 100-year flood zone, nor is it subject to inundation in the event of reservoir failure.

Due to the high elevation and distance of the project site from a large inland water body, project impacts associated with seiches and tsunami hazards are considered less than significant. The project is not located in an area that would be susceptible to mudflows.

In light of the above, effects related to water resources would not be significant, either individually or cumulatively.

Topics:		*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*	*Not Applicable*
15.	**HAZARDS AND HAZARDOUS MATERIALS Would the project:**					
a)	Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐	☐
b)	Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☒	☐	☐	☐	☐
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?	☐	☐	☐	☐	☒
g)	Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐	☐
h)	Expose people or structures to a significant risk of loss, injury or death involving fires?	☐	☐	☒	☐	☐

An area of public controversy surrounding radio frequency broadcasting involves the potential for adverse health effects from radio frequency radiation (RFR). The proposed project is anticipated to reduce levels

of RFR emitted from Sutro Tower due to the net reduction in the number of antennas as well as the new, more efficient design of the digital antennas. RFR will be further discussed in the EIR.

There are no other elements of the proposed project that would create a safety hazard. The project site has been used for radio frequency broadcasting for more than 50 years and has been fully graded and paved. The Tower itself was constructed in 1972. The Tower facility includes seven emergency generators and four fuel tanks to ensure continued broadcasting activities during the case of emergency. The tanks are inspected and leak detection equipment tested annually by an independent testing contractor under the Department of Public Health. No other hazardous materials beyond routine use of paints and solvents would be used at the site. Additionally, the proposed project would not require any demolition or excavation.

The project site is not listed on an environmental database, nor is the project site in proximity to any properties lists on the State Contaminant List, Underground Storage Tanks, Leaking Underground Storage Tanks, or other sites of potential environmental concern. No contaminant plumes were identified which extend to the project site from off-site sources.

The project site is not located within two miles of any public airport or private airstrip. The nearest airport is the San Francisco International Airport, located about 13 miles southeast of the City of San Francisco. At present, the tower is in compliance with all FAA regulations, which includes 12 FAA-approved high-intensity white flashing obstruction beacons, nine FAA-approved medium intensity flashing red beacons, 18 FAA-approved steady-burning obstruction lights, and three FAA-approved red and white antenna beacons. The proposed project would not require additional FAA-approved lighting, as the project would not add additional height or bulk to the tower. There are no other elements of the proposed project that would create a safety hazard for air traffic. Consequently, the project would have a less-than-significant impact on air traffic safety, and this topic will not be discussed further in the EIR.

The proposed project would not expose people or structures to a significant risk of loss, injury or death involving fire because the project would not result in any substantial changes to any buildings on the project site. Additionally, existing emergency access to the project site would not be affected by the proposed project. Finally, the proposed project would result in no permanent increase in population, employment, or occupancy of the site. Therefore, effects related to risk of fire and emergency access would be less than significant, and this topic will not be discussed further in the EIR.

Topics:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*	*Not Applicable*
16. 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?	☐	☐	☐	☐	☒

Topics:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Not Applicable
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?	☐	☐	☐	☐	☒
c) Encourage activities which result in the use of large amounts of fuel, water, or energy, or use these in a wasteful manner?	☐	☐	☒	☐	☐

No mineral resources are located on or near the project site. Therefore topics 16a and 16b are not applicable to the proposed project.

Sutro Tower is powered by two separate 12.5 kilovolt, high-voltage lines provided by Pacific Gas & Electric Co. Because federal regulation requires broadcasting of DTV signals and because the proposed project would meet current state and local codes concerning energy consumption, this operational use would not cause a wasteful use of energy. Effects related to energy consumption would be less than significant.

Topics:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Not Applicable
17. AGRICULTURE RESOURCES In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. **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) 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?	☐	☐	☐	☐	☒

The project site is located within an urban area in the City and County of San Francisco. The California Department of Conservation's Farmland Mapping and Monitoring Program identifies the site as *Urban and Built-Up Land*, which is defined as "…land [that] is used for residential, industrial, commercial, institutional, public administrative purposes, railroad and other transportation yards, cemeteries, airports, golf courses, sanitary landfills, sewage treatment, water control structures, and other developed purposes." Because the site does not contain agricultural uses and 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 it would not conflict with existing zoning for agricultural land use or a Williamson Act contract, nor would it involve any changes to the environment that could result in the conversion of farmland. Accordingly, topics 17a, b, and c are not applicable to the proposed project.

Topics:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*	*Not Applicable*
18. MANDATORY FINDINGS OF SIGNIFICANCE—Would the project:					
a) 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 prehistory?	☐	☐	☒	☐	☐
b) Have impacts that would be individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)	☐	☐	☒	☐	☐
c) Have environmental effects that would cause substantial adverse effects on human beings, either directly or indirectly?	☒	☐	☐	☐	☐

F. Mitigation Measures

Mitigation measure(s) necessary to focus topics out of the EIR are identified herein. The following mitigation measure(s) relate to topics determined to require no further analysis in the EIR. The EIR will contain a mitigation chapter describing these measure(s), and measures that would be, or could be, adopted to reduce significant adverse effects of the project.

The project sponsor has agreed to implement the following mitigation measure that is necessary to avoid potential significant effects as identified in this Initial Study.

Mitigation Measure No. 1—Construction Air Quality

The project sponsor shall require the contractor(s) to spray the site with water during demolition, excavation and construction activity; spray unpaved construction areas with water at least twice per day; cover stockpiles of soil, sand, and other material; cover trucks hauling debris, soil, sand or other such material; and sweep surrounding streets during demolition and construction 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 that the contractor(s) 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 a prohibition on idling motors when equipment is not in use or when trucks are waiting in queues, and implementation of specific maintenance programs to reduce emissions for equipment that would be in frequent use for much of the construction period.

G. Alternatives

The EIR will analyze alternatives to the proposed project that would reduce or eliminate any significant environmental effects. At a minimum, these alternatives would include a No Project Alternative and an Off-Site Alternative. The possible selection of an additional alternative for evaluation would be guided by the EIR's analysis of potentially significant environmental impacts.

H. Determination

On the basis of this initial study:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ 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 revisions in the project have been made by or agreed to by the project proponent. 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.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, no further environmental documentation is required.

DATE January 8, 2008

Bill Wycko
Acting Environmental Review Officer
for
John Rahaim
Director of Planning

CHAPTER X
EIR Authors and Consultants

EIR Authors

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Major Environmental Analysis
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PLACE
POSTAGE

HERE

San Francisco Planning Department
Major Environmental Analysis
1650 Mission Street, Suite 400
San Francisco, California 94103

Attn: Viktoriya Wise, EIR Coordinator
2007.0206E — Sutro Tower Digital Television Project

PLEASE CUT ALONG DOTTED LINE

RETURN REQUEST REQUIRED FOR FINAL
ENVIRONMENTAL IMPACT REPORT

REQUEST FOR FINAL ENVIRONMENTAL IMPACT REPORT

TO: San Francisco Planning Department, Major Environmental Analysis

Check one box: ☐ Please send me a copy of the Final EIR on CD.
☐ Please send me a paper copy of the Final EIR.

Signed: _____

Print Your Name and Address in the Box Below: