

**Statement of Hammett & Edison, Inc., Consulting Engineers**

The firm of Hammett & Edison, Inc., Consulting Engineers, has been retained by Sutro Tower, Inc., to evaluate the existing radio frequency (RF) exposure conditions at Sutro Tower in San Francisco, California, in anticipation of license renewal filings by the tenant TV stations, who need to certify compliance with appropriate guidelines for limiting radio frequency exposure.

**Electromagnetic Field Exposure Standard**

The U.S. Congress requires that the Federal Communications Commission ("FCC") evaluate its actions for possible significant impact on the environment. In Docket 93-62, effective October 15, 1997, the FCC adopted the 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 Congressionally chartered National Council on Radiation Protection and Measurements ("NCRP"). Separate limits apply for occupational and public exposure conditions, with the latter limits generally five times more restrictive. The more recent Institute of Electrical and Electronics Engineers ("IEEE") Standard C95.1-1999, "Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz," includes nearly identical exposure limits. A summary of the FCC's exposure limits is shown in Figure 1. These limits apply for continuous exposures and are intended to provide a prudent margin of safety for all persons, regardless of age, gender, size, or health.

The guidelines allow higher exposures for short time periods. Exposures can be averaged over a six-minute period, allowing, for example, a two-minute exposure to fields three times the limit if the remainder of the six-minute period does not include any significant exposure.

Restrictions on access to strong fields may be achieved in different manners for casual public exposure than for occupational exposure. Persons who are authorized to be in a site area can be educated to follow procedures that will limit time-averaged exposures to levels not exceeding the guidelines.

**Site Description**

The Sutro Tower Communications Site is entirely encompassed by a chain-link fence, with access into the area controlled by a locked gate. Figure 1 shows a plan view of the site, while Figures 2 and 3 provide a summary of broadcast information and a tower elevation.

Since any individuals requiring entry to the communications site must first be authorized by one of the site users to obtain access, and since the gate is manned 24 hours a day seven days a week, the site is a



## **Sutro Tower, Inc • San Francisco, California**

controlled environment. In addition, on-tower access requires an elevator key, and lockouts are utilized to prevent access to areas that may exceed the occupational limit on the tower.

### **Measurements at Sutro Tower**

The site was visited by the undersigned engineer on June 30, 2006. Measurements were made at over 200 points surrounding the site and throughout the site itself. The measurement equipment used was a Wandel & Goltermann Type EMR-300 Radiation Meter with Type 18 and Type 25 Isotropic Field Probes (Serial Nos. E-0034 and E-0001 respectively). Both meter and probes were under current calibration by manufacturer. The Type 25 probe is frequency-shaped to reflect the occupational exposure limits detailed in the FCC standard, allowing the meter to measure correctly the total exposure levels from the various emitters at the site. Measurements were also made on the fifth and sixth levels of the tower and on the roof of the transmitter building. All broadcast facilities were under normal main antenna operation throughout the duration of the measurements with the exception of FM Station KSOL, which was operating from a single-bay, temporary emergency antenna mounted about 19 meters above the licensed main antenna, reportedly at about 3.2 kW effective radiated power.

### **Ground Level Measurements**

During operation on the main antennas, no ground level areas were found that exceeded the public exposure limit. The maximum ambient RF level in any publicly accessible area measured 8.0% of the FCC public exposure limit. Within the Sutro Tower compound, the maximum ambient RF level at ground level measured 1.3% of the FCC occupational exposure limit, with a maximum of 1.8% on the roof of the transmitter building.

### **On-Tower Measurements**

Measurements were made on the fifth and sixth levels of the tower. The maximum ambient RF levels were found to be less than the occupational exposure limit within 20 feet of the elevator platform on the west side of the tower on both levels. Beyond 20 feet east of the elevator platform on the fifth and sixth levels of the tower, fields were found to exceed the FCC occupational exposure limit.

### **Auxiliary Antenna Operation**

Thirteen stations broadcasting from Sutro Tower also operate auxiliary antennas from the second level of the tower. Detailed auxiliary antenna measurements were last made in September 26, 1993. Since that date a single additional auxiliary antenna has been added on Level 2, for KCNS, NTSC Channel 38; measurements have not been conducted on that antenna.





### **Mitigation Measures**

The Sutro Tower site is entirely fenced to preclude public access; therefore, no further mitigation measures are required for compliance with the FCC's guidelines limiting public exposures under normal main antenna operation. Under auxiliary antenna operation, a table of relative contributions from each antenna is utilized, along with real-time measurements, if necessary, to ensure that no combination of antennas is energized such that fields in publicly accessible areas would exceed the FCC public exposure limit. The KCNS antenna has not yet been evaluated for inclusion in the auxiliary antenna table; however, it is reported that measurements will be utilized if operation of the KCNS auxiliary antenna is required in order to evaluate RF exposure levels from the antenna and to ensure that levels in accessible areas remain below the FCC public exposure limit.

No ground level areas within the broadcast site have been found to exceed the FCC occupational exposure limit under any operational condition. Mitigation measures are in place to ensure that access to on-tower areas that exceed the occupational exposure limit is restricted with the site under normal broadcast operations and broadcasters at the site are reported to have agreed to abide by these directives. 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. Therefore, no further recommendations are required for compliance with the FCC's guidelines limiting occupational exposures.

### **Conclusion**

Based upon our observations and measurements, and upon information provided by Sutro Tower, Inc., the Sutro Tower Communications Site complies with applicable FCC Rules regarding human exposure to RF radiation.

### **List of Figures**

In carrying out these engineering studies, the following attached figures were prepared under my direct supervision:

1. Site map
2. Summary of broadcast station operating parameters
3. Tower elevation drawing.



**Authorship**

The undersigned author of this statement is a qualified Professional Engineer, holding California Registration No. E-16747, which expires on September 30, 2006. This work has been carried out by him or under his direction, and all statements are true and correct of his own knowledge except, where noted, when data has been supplied by others, which data he believes to be correct.

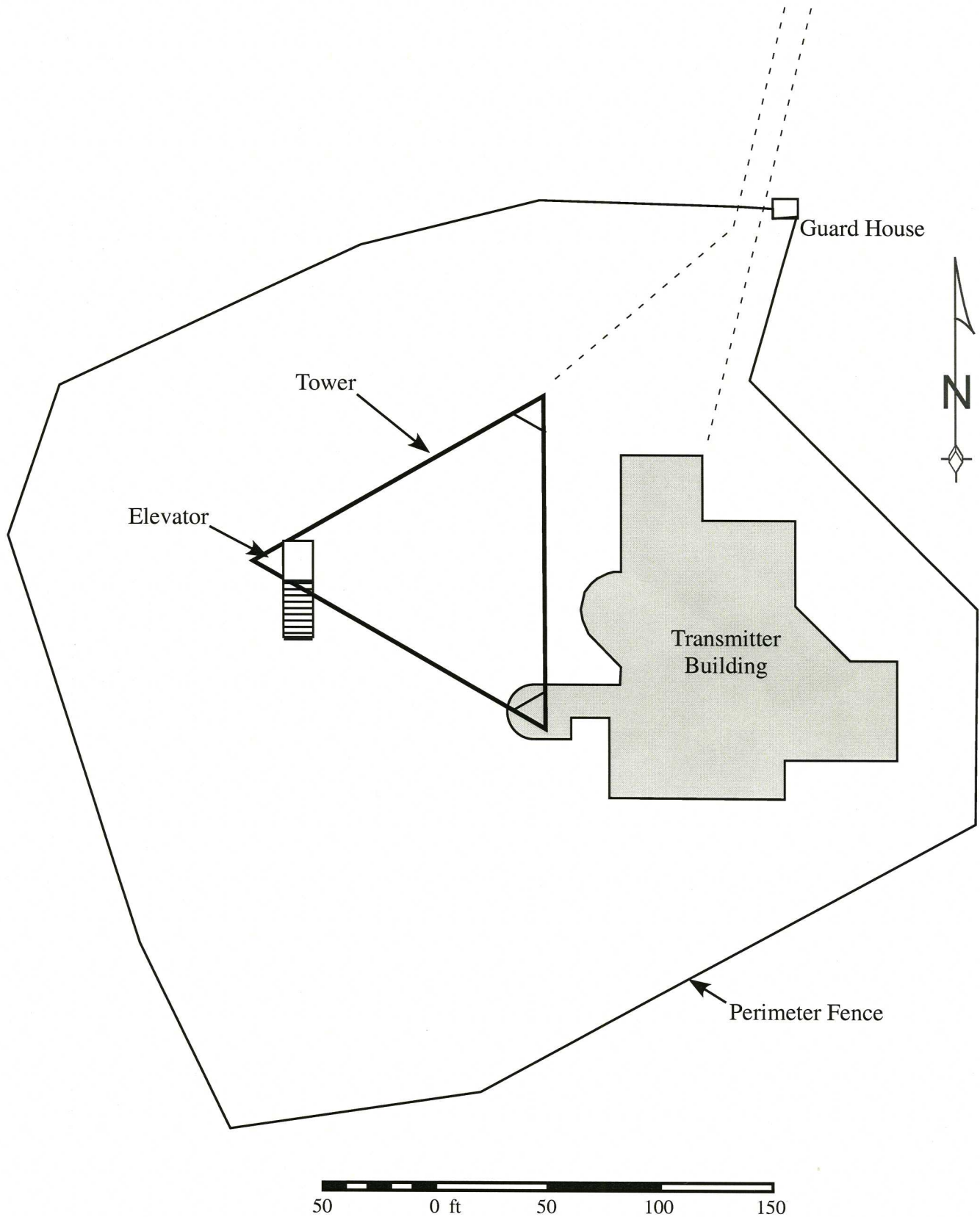
July 11, 2006



  
Mark D. Neumann, P.E.

**Sutro Tower, Inc. • San Francisco, California**

**Site Plan**



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SAN FRANCISCO

060706  
Figure 1

# Sutro Tower, Inc. • San Francisco, California

## Summary of Broadcast Facilities

<u>TV Channel</u>	<u>Call Sign</u>	<u>Effective Antenna Height AMSL</u> *	<u>Effective Radiated Power</u> †
N02	KTVU	510 m	100 kW
N04	KRON-TV	545	100
N05	KPIX-TV	538	100
N07	KGO-TV	540	316
N09	KQED	541	316
D19	KBWB-DT	450	383
N20	KBWB	504	3470
D24	KGO-DT	468	561
D29	KPIX-DT	450	1000
D30	KQED-DT	468	777
N32	KMTP-TV	523	1320
D33	KMTP-DT (STA)	468	400
D34	KFSF-DT	450	150
N38	KCNS	476	5000
D39	KCNS-DT	459	1000
D43	KCSM-DT (STA)	459	250
N44	KBHK-TV	522	5000
D45	KBHK-DT	477	400
D56	KTVU-DT	459	1000
D57	KRON-DT	477	1000
N66	KFSF-TV	497	3470

<u>FM Channel</u>	<u>Call Sign</u>	<u>Effective Antenna Height AMSL</u>	<u>Effective Radiated Power</u>
224A	KNGY (CP)	370 m	0.51 kW
243B	KOIT-FM	511	24.0
255B	KSOL	440	6.1
279B	KKSF	492	7.2
283B	KFOG	490	7.1

\* Site Elevation 254 m AMSL

† Peak visual power for NTSC stations, average power for DTV stations.

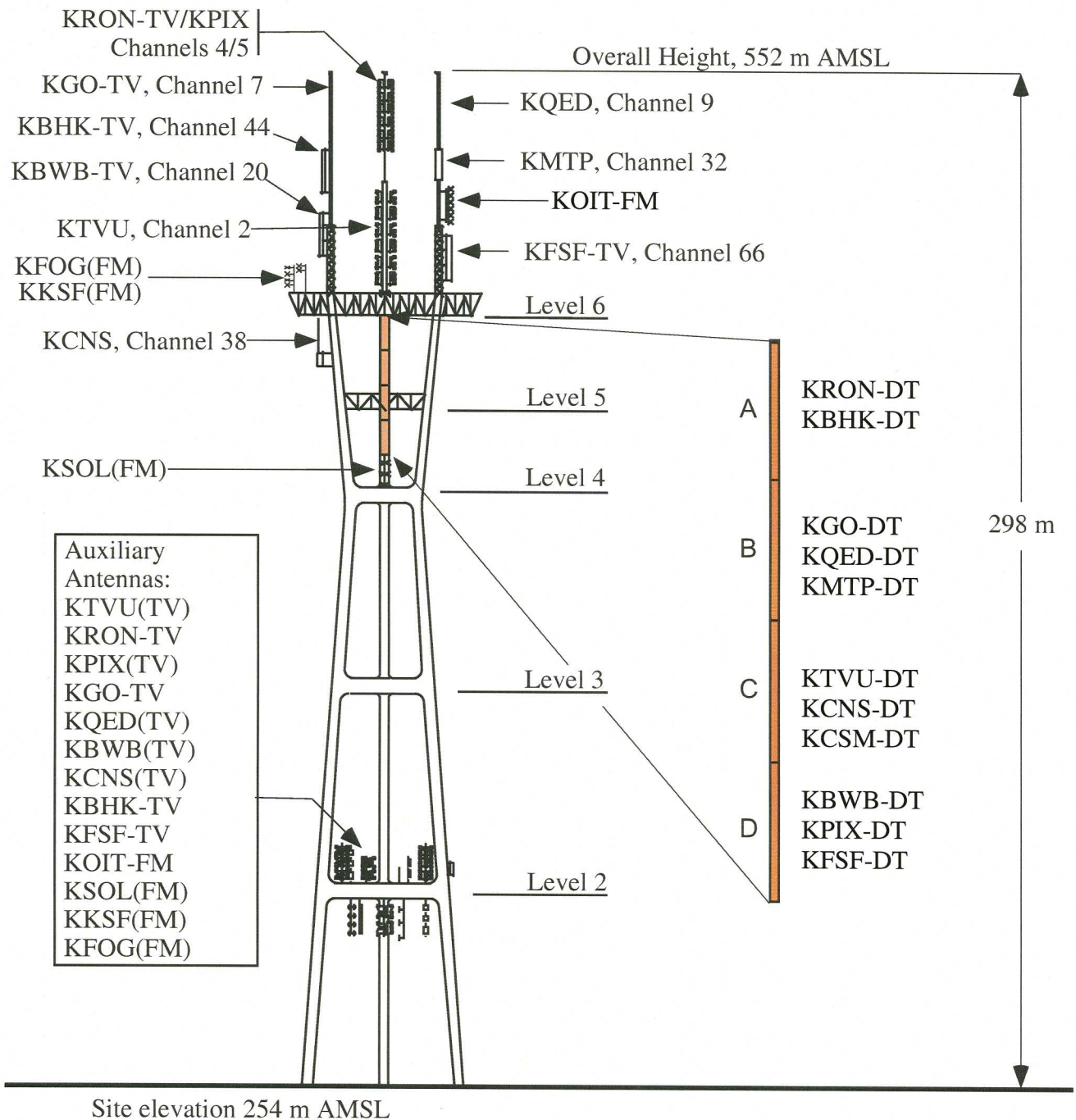


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Figure 2



Antenna Locations



Geographical Coordinates 37° 45' 19" N  
(NAD27) 122° 27' 06" W

(View from east)

Drawing not to scale.  
Painted and lighted as required by FCC.

