



**CITY OF SUNNYVALE
REPORT
Planning Commission**

November 9, 2009

SUBJECT: **2009-0728 - Clearwire LLC** [Applicant] **Pastoria Land and Building Corp** [Owner]: Application for a project located at **375 North Pastoria Avenue** in an M-S (Industrial and Service) Zoning District (APN: 165-30-019);

Motion Use Permit to allow three antennas and three microwave dishes on an existing 100' tall monopole with associated ground equipment.

REPORT IN BRIEF

Existing Site Conditions Existing telecommunications monopole at an Industrial site (Elks Lodge).

Surrounding Land Uses

North	Industrial and Office
South	Industrial and Office
East	Industrial and Office
West	Industrial and Office

Issues Aesthetics

Environmental Status A Class 1 Categorical Exemption relieves this project from California Environmental Quality Act provisions and City Guidelines.

Staff Recommendation Approve with conditions.



PROJECT DATA TABLE

	EXISTING	PROPOSED	REQUIRED/ PERMITTED
General Plan	Industrial	Same	Industrial
Zoning District	M-S (Industrial and Service)	Same	M-S (Industrial and Service)
Lot Size (s.f.)	67,082	Same	22,500 min.
Height of Monopole	100'	Same	100' max. w/out a Variance
Setbacks to Equipment Enclosure (Facing Property)			
Front	315'	Same	125' min.
Left Side	18'6"	Same	None
Right Side	222'	Same	None

ANALYSIS**Description of Proposed Project**

The proposed project is to allow the collocation of three panel antennas, three microwave dishes and three antennas on an existing 100'-tall monopole. Additional ground equipment will be added near the base of the monopole within an existing 12 high fenced enclosure. No generators are proposed as part of this application.

This wireless telecommunication facility is located adjacent to the Elk's Lodge in the Peery Park industrial area of the City. The facility is a good example of a co-location facility, with all wireless carriers located on one pole. This reduces the need for separate structures for each carrier.

The new and replaced antennas will have coax cable that will run inside the pole, so the visual impact will be reduced. Three new microwave dishes are proposed as part of this application. Microwave dishes are necessary to the wireless services that Clearwire provides, as they link all Clearwire sites together by providing point-to-point connections. Associated ground equipment will be added near the existing equipment in the existing equipment enclosure. The project does not include a generator.

According to Sunnyvale Municipal Code (SMC) Section 19.54.080, telecommunications projects in industrial zoning districts involving three or more facilities or carriers on a single site require a major Use Permit. The proposed project would result in the seventh telecommunication facility on this existing monopole; therefore Planning Commission review is required for this project.

Background

Previous Actions on the Site: The following table summarizes previous planning applications related to the subject site. In 2003 the Planning Commission approved an application to allow AT&T to extend the top of the monopole from 90' to 100', with new antennas mounted at the top of the pole. As part of this condition, the Commission required that the pole be camouflaged or stealth. AT&T appealed that decision to the City Council, who granted the appeal and had the camouflage condition removed. Subsequent to that decision, Nextel and T-Mobile have both applied for a new installation on the pole, and the condition to camouflage the pole was not used in order to be consistent with prior City Council direction. Staff is also not asking for a stealth pole under this Use Permit.

The following table summarizes previous planning applications related to the subject site.

File Number	Brief Description	Hearing/Decision	Date
2008-0405	T-Mobile six antennas	Planning Commission/ Approved	6/23/08
2003-0753	Nextel twelve antennas	Planning Commission/ Approved	1/26/04
2003-0493	AT&T six antennas	City Council/ Approved	12/16/03
2001-0234	Cingular three antennas	Planning Commission/ Approved	6/25/01
2000-0066	Sprint six antennas	Planning Commission/ Approved	4/10/00
1994-0039	Verizon six antennas and 100' monopole	Planning Commission/ Approved	9/26/1994

Environmental Review

A Class 1 Categorical Exemption relieves this project from California Environmental Quality Act provisions and City Guidelines. Class 1 Categorical Exemptions include minor additions to existing facilities.

Use Permit

Site Layout: The existing 100' monopole would continue to exist at the location, with the new antenna and structure being added to the existing pole. The entire telecommunications facility is owned by Crown Castle USA, who has a master lease from the Elk's Lodge. Crown Castle leases other antenna placements on the pole and inside the equipment compound for equipment. This facility is leased by six existing wireless carriers. The monopole is located

inside the compound area that Crown Castle leases from the Elk's Lodge. This compound is located along the southern edge of the Elk's property behind the lodge (Attachment C, Site and Architectural Plans).

Design: The existing monopole is a steel pole, 100' tall. Attachment C shows all carriers located on the pole, with the height of each antenna array. All carrier equipment is located inside the leased compound below the pole.

Landscaping: Existing landscaping provides partial screening. No changes are proposed to the existing landscaping.

Parking/Circulation: No additional parking is required for the proposed use.

Radio Frequency (RF) Emissions Exposure: The Federal Communications Commission (FCC) is the final authority on safety of telecommunications facilities. If the facility meets FCC standards, the City is not permitted to make additional judgments on health and safety issues. An RF report was prepared by Hammett & Edison, Inc., which concludes that the individual and cumulative exposure levels for all new Clearwire and existing equipment will be under the maximum limit for general public exposure. The study also states that the microwave dishes make no significant contribution to the RF exposure (Attachment E, RF Study). The project complies with Federal requirements; therefore the proposed application can be considered on design and location criteria only.

Visual Impacts and Project Alternatives: Although the existing monopole is partially screened by existing landscaping and buildings, the proposed project would increase the visibility of the monopole along the street frontage and adjacent properties due to the new equipment installed on the pole (Attachment D, Photosimulations).

Compliance with Development Standards/Guidelines: As previously discussed, the project complies with Federal requirements for RF exposure. The project is also subject to the Sunnyvale wireless telecommunications regulations contained in SMC Section 19.54. The proposed project meets applicable height and setback requirements for the zoning district.

In addition, the Code requires that the facility be designed with sensitivity to the surrounding area. The following design standards apply to this project:

19.54.40 (b) - All facilities shall be designed to minimize the visual impact to the greatest extent feasible, considering technological requirements, by means of placement, screening, and camouflage, to be compatible with existing architectural elements and building materials, and other site characteristics. The applicant shall use the smallest and least visible antennas possible to accomplish the owner/operator's coverage objectives.

- The three proposed panel antennas will be mounted in between existing Nextel antennas. The microwave dishes will also be mounted snug and the RF heads will be placed behind the antennas. Therefore, the visual impact of the added equipment would be minimal.

19.54.40 (c) - SMC 19.54.040 - Colors and materials for facilities shall be chosen to minimize visibility. Facilities shall be painted or textured using colors to match or blend with the primary background

- The applicant proposes to paint all new pole equipment to match the existing monopole.

19.54.40 (j) - All monopoles and lattice towers shall be designed to be the minimum functional height and width required to support the proposed antenna installation.

- The proposed project would not modify the height of the existing monopole. The visual change is limited to the new antennas and microwave dishes, which would be mounted snug against the pole.

19.54.40 (l) - In order of preference, ancillary support equipment for facilities shall be located either within a building, in a rear yard or on a screened roofs top area. Support equipment pads, cabinets, shelters and buildings require architectural, landscape, color, or other camouflage treatment for minimal visual impact.

- All proposed ground equipment would be placed within the existing enclosure (12' high chain link fence), which is located behind a building towards the rear of the property. The ground equipment will not be visible from the street frontage or from adjacent properties.

Fiscal Impact

No fiscal impacts other than normal fees and taxes are expected.

Public Contact

Notice of Public Hearing	Staff Report	Agenda
<ul style="list-style-type: none"> • Published in the <i>Sun</i> newspaper • Posted on the site • 24 notices mailed to the property owners and tenants adjacent to the project site 	<ul style="list-style-type: none"> • Posted on the City of Sunnyvale's web site • Provided at the Reference Section of the City of Sunnyvale's Public Library 	<ul style="list-style-type: none"> • Posted on the City's official notice bulletin board • Posted on the City of Sunnyvale's web site

Conclusion

Findings and General Plan Goals: As conditioned, staff was able to make the required Findings based on the justifications for the Use Permit. Recommended Findings and General Plan Goals are located in Attachment A.

Conditions of Approval: Recommended Conditions of Approval are located in Attachment B.

Alternatives

1. Approve the Use Permit with the attached conditions.
2. Approve the Use Permit with modified conditions.
3. Deny the Use Permit.

Recommendation

Alternative 1.

Prepared by:

Steve Lynch
Project Planner

Reviewed by:

Shaunn Mendrin
Senior Planner

Attachments:

- A. Recommended Findings
- B. Recommended Conditions of Approval
- C. Site and Architectural Plans
- D. Photosimulations
- E. RF Study

Recommended Findings - Use Permit

Goals and Policies that relate to this project are:

Telecommunications Policy Goal B: *Promote universal access to telecommunications services for all Sunnyvale citizens.*

Land Use and Transportation Element Action Statement N1.1 – *Limit the intrusion of incompatible uses and inappropriate development into city neighborhoods.*

Land Use and Transportation Element Policy N1.3 – *Support a full spectrum of conveniently located commercial public and quasi-public uses that add to the positive image of the city.*

1. The proposed use attains the objectives and purposes of the General Plan of the City of Sunnyvale. *[Finding met]*

The proposed project will increase telecommunications coverage, while meeting federal emissions requirements for human exposure. In addition, the project would utilize an existing monopole and would eliminate the need to build a new telecommunications facility elsewhere in the City.

2. The proposed use ensures that the general appearance of proposed structures, or the uses to be made of the property to which the application refers, will not impair either the orderly development of, or the existing uses being made of, adjacent properties. *[Finding met]*

The proposed antennas would be visible from the street frontage but the new ground equipment would be located inside the existing 12' high enclosure and would not be visible from the street or neighboring properties.

Standard Requirements

The following is a list of standard requirements. This list is intended to assist the applicant and public in understanding basic related requirements, and is not intended as an exhaustive list. These requirements cannot be waived or modified.

- A. **Testing Within 15 Days:** The applicant shall test any wireless telecommunications site installed in the City of Sunnyvale within 15 days of operating the tower. The test shall confirm that any Emergency 911 wireless call made through the wireless telecommunications site shall provide Enhanced 911 capability (including phase 2 information when available from the caller's device) and direct the call to the City of Sunnyvale Department of Public Safety dispatcher, ensuring phase 2 information is transferred. If the call is to be directed elsewhere pursuant to State and Federal law the applicant shall ensure that the Enhanced 911 information transfers to that dispatch center. This capability shall be routinely tested to ensure compliance as long as the approved wireless telecommunications site is in service.
- B. **Permit Expiration:** The Use Permit for the use shall expire if the use is discontinued for a period of one year or more.
- C. **Permit Lapse if not Exercised (Ordinance 2895-09):** The Use Permit shall be valid for three (3) years from the date of approval by the final review authority (as adopted by City Council on April 21, 2009, RTC 09-094). Extensions of time may be considered, for a maximum of two one year extensions, if applied for and approved prior to the expiration of the permit approval. If the approval is not exercised within this time frame, the permit is null and void.
- D. **Building Permits:** Obtain Building Permits.
- E. **Certification:** Before January 31 of each even numbered year following the issuance of any authorizing establishment of a wireless telecommunication facility, an authorized representative for each wireless carrier providing service in the City of Sunnyvale shall provide written certification to the City executed under penalty of perjury that (i) each facility is being operated in accordance with the approved local and federal permits and includes test results that confirm the facility meets city noise requirements and federal RF emissions standards; (ii) each facility complies with the then-current general and design standards and is in compliance with the approved plans; (iii) whether the facility is currently being used by the owner or operator; and (iv) the basic contact and site information supplied by the owner or operator is current.
- F. **Renewal:** Every owner or operator of a wireless telecommunication facility shall renew the facility permit at least every ten (10) years from the date of initial approval. If a permit or other entitlement for use is not renewed, it shall automatically become null and void without notice or hearing ten (10) years after it is issued, or upon cessation of use for more than a year and a day, whichever comes first. Unless a new use permit

- or entitlement of use is issued, within one hundred twenty (120) days after a permit becomes null and void all improvements, including foundations and appurtenant ground wires, shall be removed from the property and the site restored to its original pre-installation condition within one hundred eighty (180) days of non-renewal or abandonment.
- G. **Comply with Applicable Regulations:** The facility must comply with any and all applicable regulations and standards promulgated or imposed by any state or federal agency, including but not limited to the Federal Communications Commission and Federal Aviation Agency.
- H. **RF Emissions:** Certification must be provided that the proposed facility will at all times comply with all applicable health requirements and standards pertaining to RF emissions.
- I. **Noise Studies:** The applicant shall submit to the Director of Community Development Noise Analysis at least two reports of field measurements showing: 1.) The noise measurement before construction of the facility and 2.) The actual noise measurement after the facility is in place and operating at or near full capacity.
- J. **Business License:** The owner or operator of the facility shall obtain and maintain current at all times a business license as issued by the city.
- K. **Maintain Current Information:** The owner or operator shall maintain, at all times, a sign mounted on the outside fence showing the operator name, site number and emergency contact telephone number. The owner or operator of the facility shall also submit and maintain current at all times basic contact and site information on a form to be supplied by the city. The applicant shall notify city of any changes to the information submitted within thirty (30) days of any change, including change of the name or legal status of the owner or operator. This information shall include, but is not limited to the following:
- i. Identity, including name, address and telephone number, and legal status of the owner of the facility including official identification numbers and FCC certification, and if different from the owner, the identity and legal status of the person or entity responsible for operating the facility.
 - ii. Name, address and telephone number of a local contact person for emergencies.
 - iii. Type of service provided.
- L. **Good Repair:** All facilities and related equipment, including lighting, fences, shields, cabinets, and poles, shall be maintained in good repair, free from trash, debris, litter and graffiti and other forms of vandalism, and any damage from any cause shall be repaired as soon as reasonably possible so as to minimize occurrences of dangerous conditions or visual blight. Graffiti shall be removed from any facility or equipment as soon as practicable, and in no instance more than forty-eight (48) hours from the time of notification by the city.

- M. **Minimize Noise:** The facility shall be operated in such a manner so as to minimize any possible disruption caused by noise. Backup generators are not approved for this use.
- N. **Responsibility to Maintain:** The owner or operator of the facility shall routinely and regularly inspect each site to ensure compliance with the standards set forth in the Telecommunications Ordinance.
- O. **Hold Harmless:** The wireless telecommunication facility provider shall defend, indemnify, and hold harmless the city or any of its boards, commissions, agents, officers, and employees from any claim, action or proceeding against the city, its boards, commission, agents, officers, or employees to attack, set aside, void, or annul, the approval of the project when such claim or action is brought within the time period provided for in applicable state and/or local statutes. The city shall promptly notify the provider(s) of any such claim, action or proceeding. The city shall have the option of coordinating in the defense. Nothing contained in this stipulation shall prohibit the city from participating in a defense of any claim, action, or proceeding if the city bears its own attorney's fees and costs, and the city defends the action in good faith.
- P. **Liability:** Facility lessors shall be strictly liable for any and all sudden and accidental pollution and gradual pollution resulting from their use within the city. This liability shall include cleanup, intentional injury or damage to persons or property. Additionally, lessors shall be responsible for any sanctions, fines, or other monetary costs imposed as a result of the release of pollutants from their operations. Pollutants include any solid, liquid, gaseous or thermal irritant or contaminant, including smoke, vapor, soot, fumes, acids, alkalis, chemicals, and waste. Waste includes materials to be recycled, reconditioned or reclaimed.
- Q. **No Interference with City Communication Systems:** The facility operator shall be strictly liable for interference caused by the facility with city communication systems. The operator shall be responsible for all labor and equipment costs for determining the source of the interference, all costs associated with eliminating the interference, (including but not limited to filtering, installing cavities, installing directional antennas, powering down systems, and engineering analysis), and all costs arising from third party claims against the city attributable to the interference.
- R. **No Threat to Public Health:** The facility shall not be sited or operated in such a manner that is poses, either by itself or in combination with other such facilities, a potential threat to public health. To that end, the subject facility and the combination of on-site facilities shall not produce at any time power densities in any inhabited area that exceed the FCC's Maximum Permissible Exposure (MPE) limits for electric and magnetic field strength and power density for transmitters or any more restrictive standard subsequently adopted or promulgated by the federal government.

Recommended Conditions of Approval

In addition to complying with all applicable City, County, State and Federal Statutes, Codes, Ordinances, Resolutions and Regulations, Permittee expressly accepts and agrees to comply with the following conditions of approval of this Permit:

1. **Project Conformance:** Project shall be in conformance with the plans approved at the public hearing(s). Minor changes may be approved by the Director of Community Development, major changes may be approved at a public hearing.
2. **Execute Permit Document:** Execute a Use Permit document prior to issuance of the building permit.
3. **Conditions of Approval on Plans:** The Conditions of Approval shall be reproduced on a page of the plans submitted for a Building permit for this project.
4. **Pole Design:** All new antennas and microwave dishes shall be painted to match the existing monopole.
5. **Microwave Dishes:** All new microwave dishes shall be snug against the pole as much as physically feasible, as shown in the approved plans.
6. **Ground Equipment:** All new equipment inside the ground enclosure shall not exceed the height of existing equipment.
7. **Tree Removal:** No trees shall be removed as part of this application.

clearwire®
wireless broadband

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TEL: (425) 216-7600
FAX: (425) 216-7900

Dyna Limited

TELECOMMUNICATIONS SERVICES

7134 Brookwood Drive
Brookfield, OH 44403
Phone: 800-838-2224
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DYNATEK PROJ. NO.: 7336

DRAWN BY: T.M.

CHECKED BY: Z.M.

SUBMITTALS

2	8/18/09	2D FINALS
1	7/30/09	REDLINE REVISIONS
0	7/23/09	2D 90%

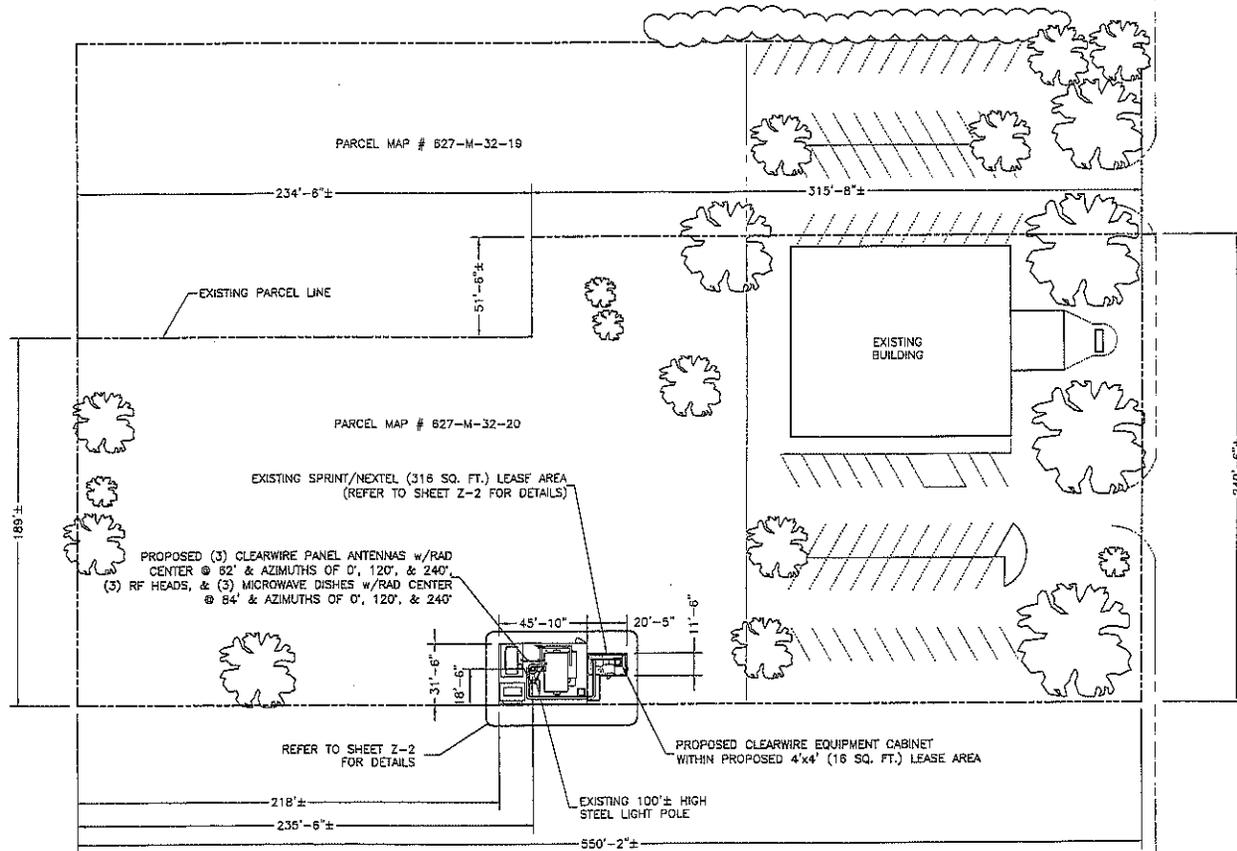
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CROWN-CENTRAL EXPRESSWAY (CA-SJC0044 A)
(Crown #: 814318)
(Sprink #: SF33XC448)
375 N PASTORIA AVE
SUNNYVALE, CA 94085

SHEET TITLE:
OVERALL SITE PLAN

SHEET NUMBER:

Z-1



SUBMITTALS

2	8/18/09	ZD FINALS
1	7/30/09	REDLINE REVISIONS
0	7/23/09	ZD 90%

THE INFORMATION CONTAINED IN THIS SET OF DOCUMENTS IS PROPRIETARY BY NATURE. ANY USE OR DISCLOSURE OTHER THAN THAT WHICH RELATES TO CLIENT NAME IS STRICTLY PROHIBITED.

CROWN-CENTRAL EXPRESSWAY
(CA-SJC0044 A)
(Crown #: 814318)
(Sprint #: SF33XC548)
375 N PASTORIA AVE
SUNNYVALE, CA 95085

SHEET TITLE:
SITE ELEVATIONS

SHEET NUMBER:

Z-3

EQUIPMENT SPECIFICATIONS:

CABINET-GTS/DDB:

OVERALL DIMENSION: 54"x45"Wx27"D
FOOTPRINT: 25.5"Wx25"D
WEIGHT W/BATTERIES: 550 lbs.

ANTENNAS:

(1) PER SECTOR
DIMENSION: 42"x12.7"Wx2.8"D
WEIGHT: 35 lbs.

RRU/RF HEAD:

MOTOROLA MODEL:

(1) PER SECTOR (MOUNTED BEHIND ANTENNA)
DIMENSION: 26"x8"Wx3"D
WEIGHT: 25 lbs.

HUAWEI MODEL:

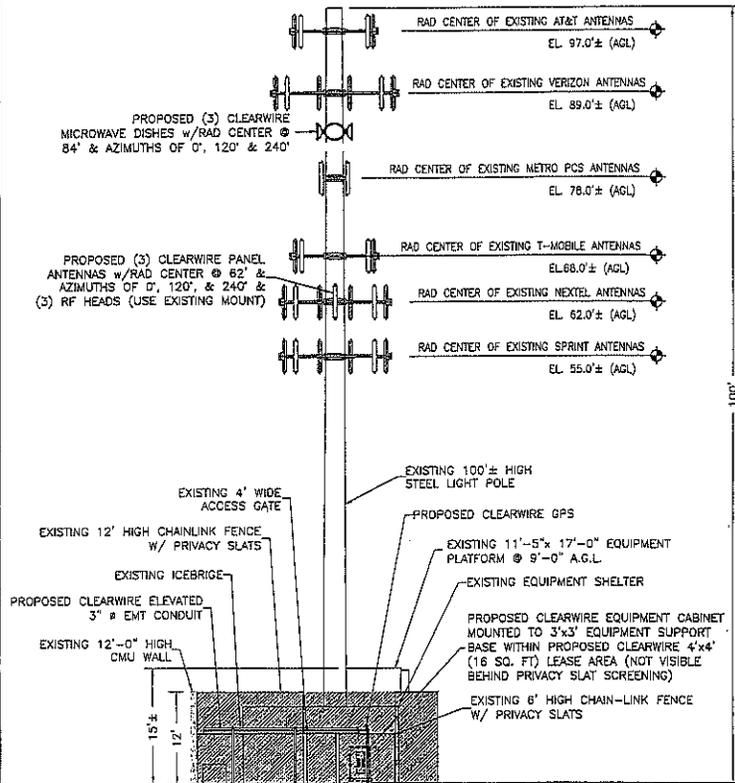
(1) PER SECTOR (MOUNTED BEHIND ANTENNA)
DIMENSION: 18.9"x14"Wx4.7"D
WEIGHT: 44 lbs.

MICROWAVE:

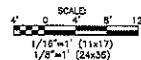
(2) PLUS PER SITE (VARIES)
DIMENSION: 1" TO 2.5" DIAMETER

SIZES:

(1) PER SITE

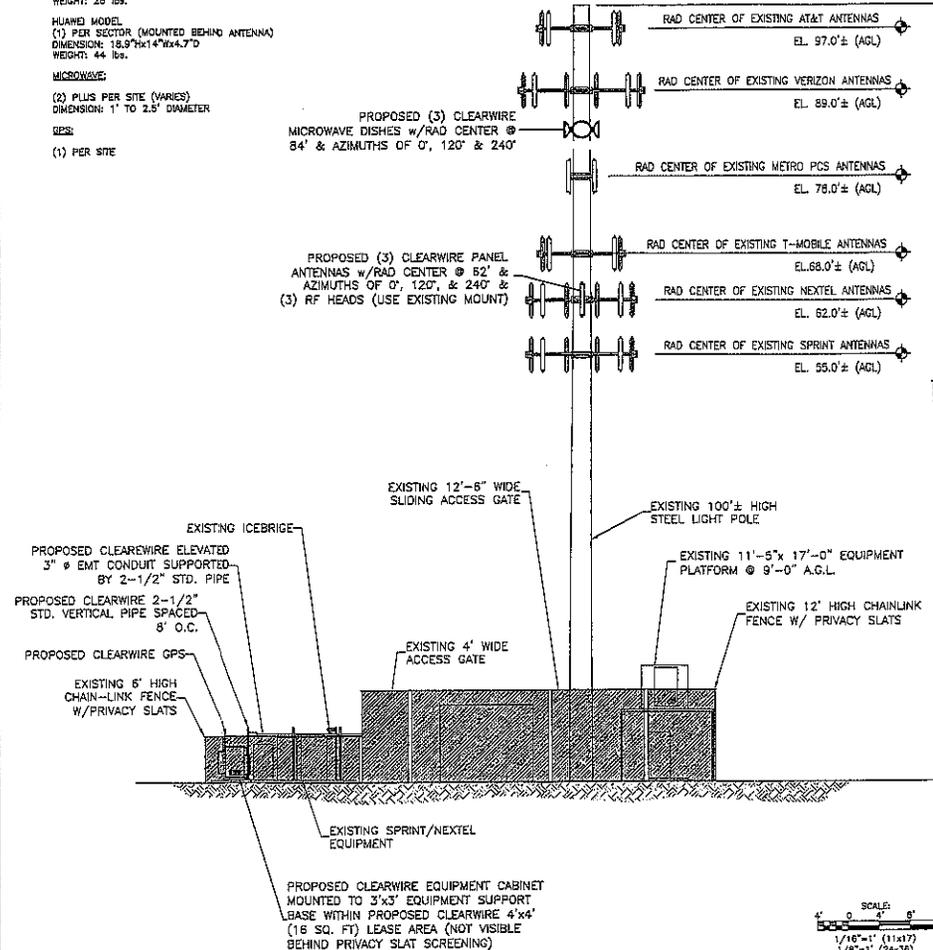


- NOTES:
- NOT ALL EQUIPMENT SHOWN FOR CLARITY
 - ALL CLEARWIRE EQUIPMENT MOUNTED TO POLE TO BE PAINTED TO MATCH

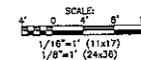


EAST ELEVATION

1

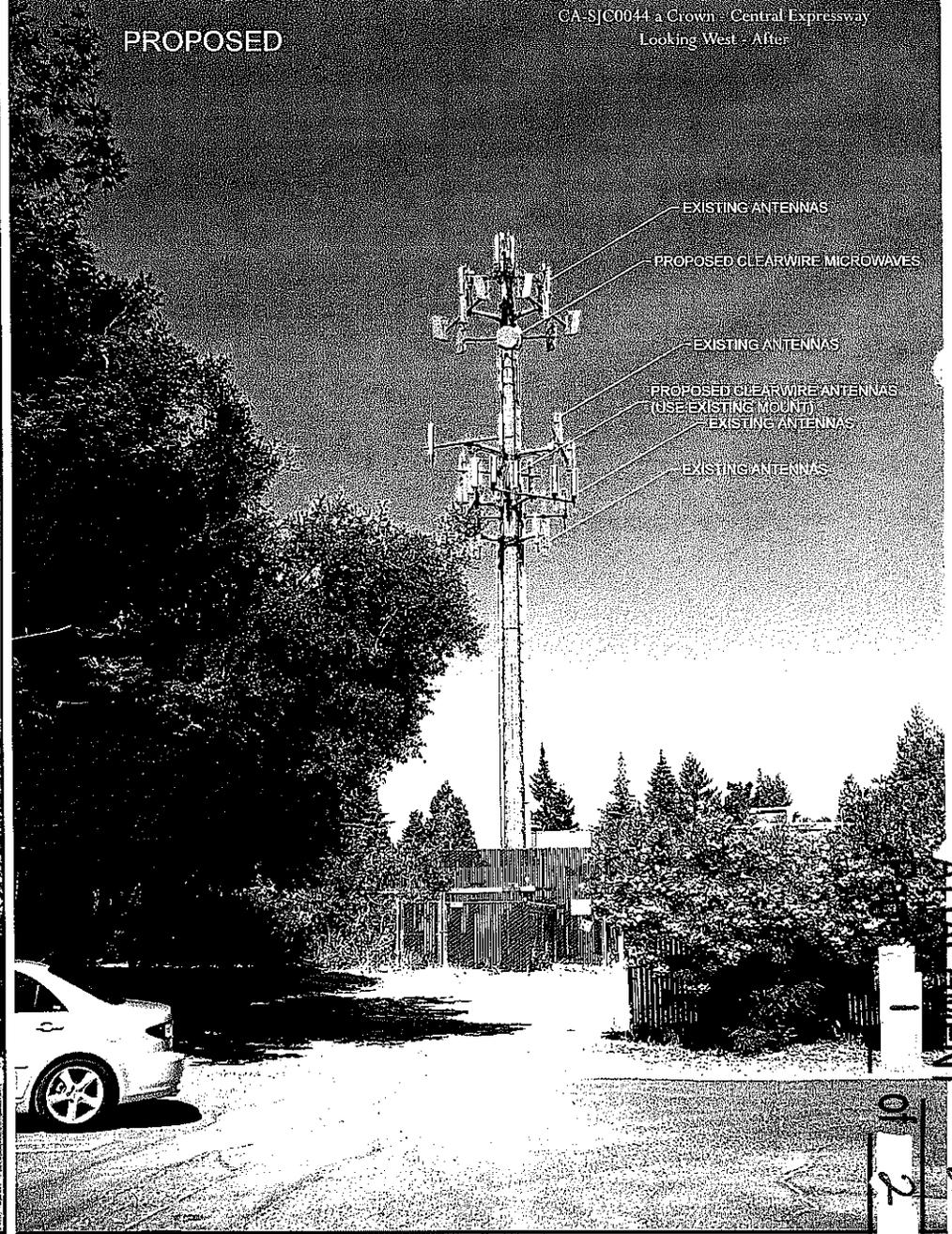
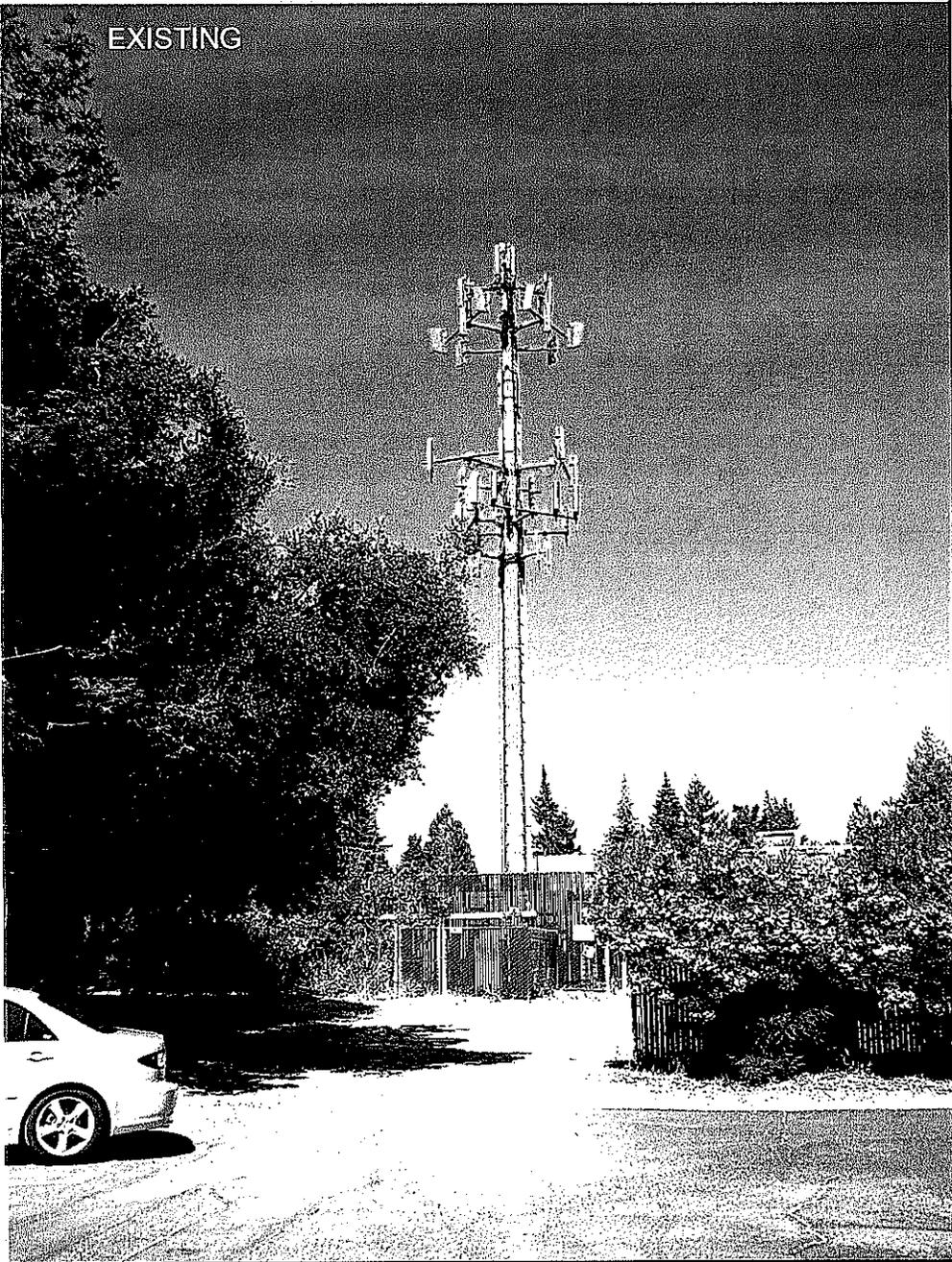


- NOTES:
- NOT ALL EQUIPMENT SHOWN FOR CLARITY
 - ALL CLEARWIRE EQUIPMENT MOUNTED TO POLE TO BE PAINTED TO MATCH



NORTH ELEVATION

1

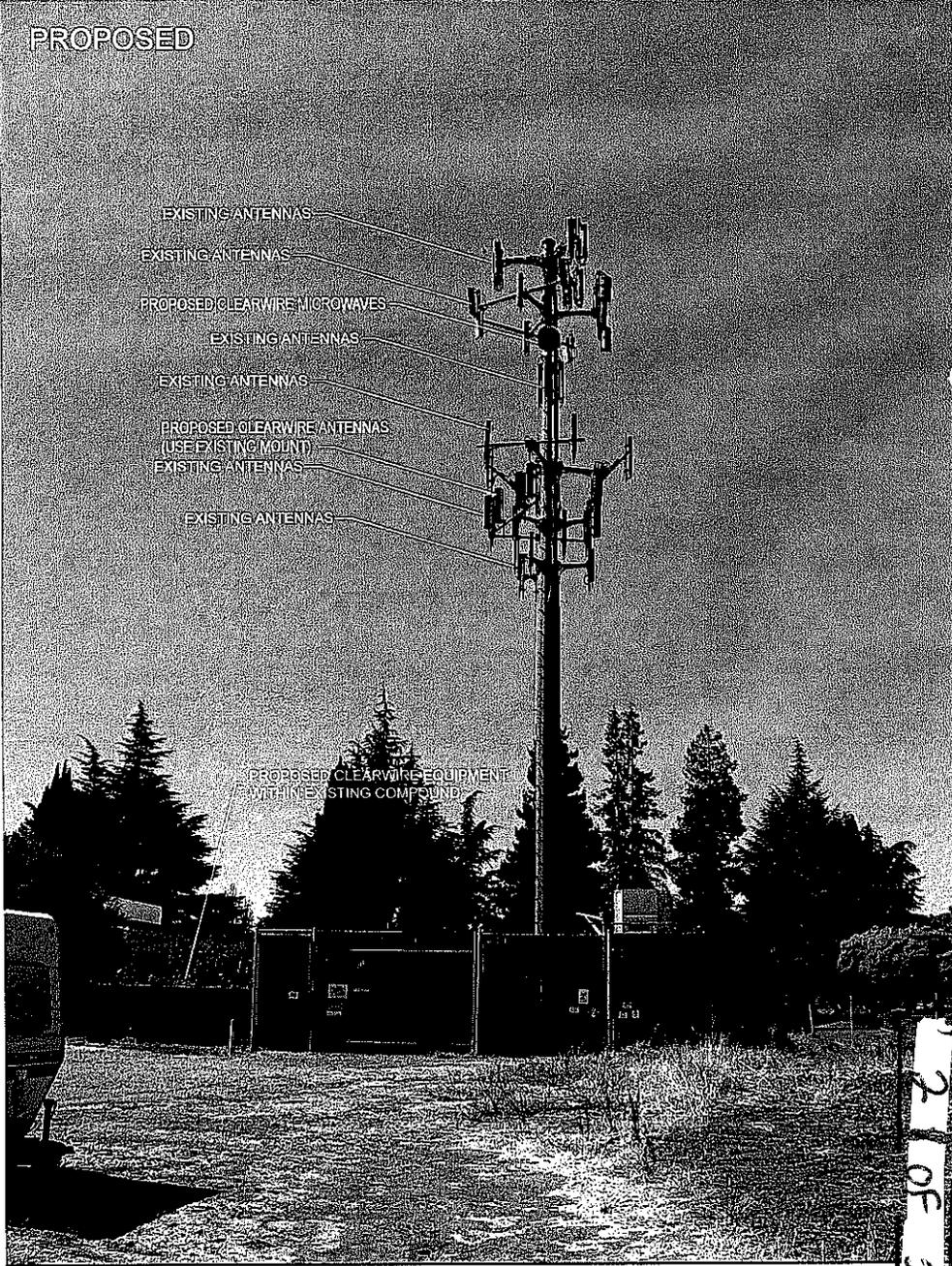
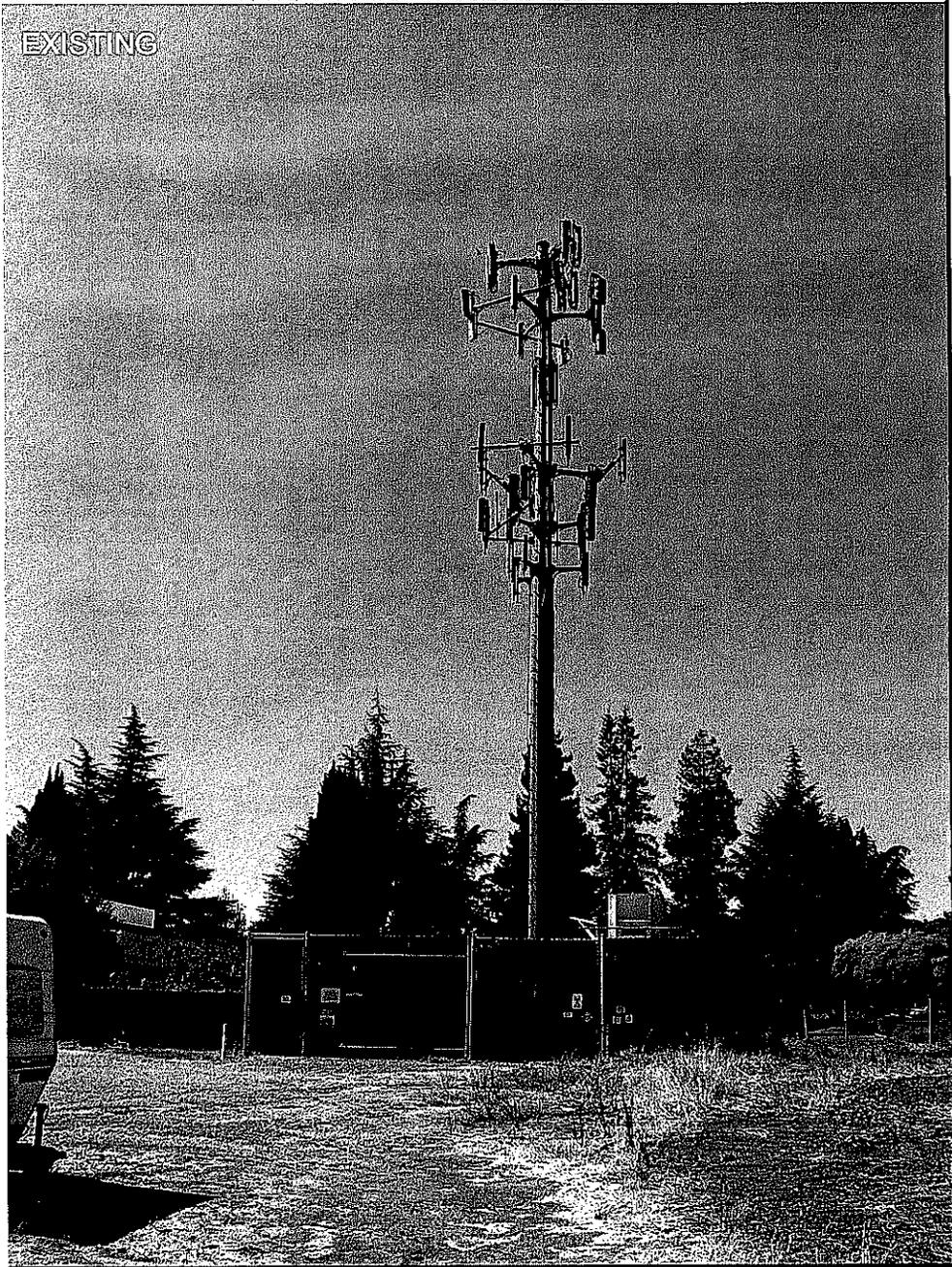


ATTACHMENT

1
of
2

D

Photosimulation of the proposed antenna and equipment installation as seen looking west toward Potrero Avenue



Photosimulation of the proposed antenna and equipment installation as seen looking south toward Hermosa Drive

ATTACHMENT D
21052

**Clearwire, LLC • Proposed Base Station (Site No. CA-SJC0044)
375 North Pastoria Avenue • Sunnyvale, California**

Statement of Hammett & Edison, Inc., Consulting Engineers

The firm of Hammett & Edison, Inc., Consulting Engineers, has been retained on behalf of Clearwire, LLC, a personal wireless service provider, to evaluate the base station (Site No. CA-SJC0044) proposed to be located at 375 North Pastoria Avenue in Sunnyvale, California, for compliance with appropriate guidelines limiting human exposure to radio frequency ("RF") electromagnetic fields.

Prevailing Exposure Standards

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 standard, developed by the Institute of Electrical and Electronics Engineers and approved as American National Standard ANSI/IEEE C95.1-2006, "Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz," includes similar 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 most restrictive FCC limit for exposures of unlimited duration to radio frequency energy for several personal wireless services are as follows:

Personal Wireless Service	Approx. Frequency	Occupational Limit	Public Limit
Broadband Radio ("BRS")	2,600 MHz	5.00 mW/cm ²	1.00 mW/cm ²
Advanced Wireless ("AWS")	2,100	5.00	1.00
Personal Communication ("PCS")	1,950	5.00	1.00
Cellular Telephone	870	2.90	0.58
Specialized Mobile Radio ("SMR")	855	2.85	0.57
Long Term Evolution ("LTE")	700	2.33	0.47
[most restrictive frequency range]	30-300	1.00	0.20

General Facility Requirements

Base stations typically consist of two distinct parts: the electronic transceivers (also called "radios" or "channels") that are connected to the traditional wired telephone lines, and the passive antennas that send the wireless signals created by the radios out to be received by individual subscriber units. The transceivers are often located at ground level and are connected to the antennas by coaxial cables about 1 inch thick. Because of the short wavelength of the frequencies assigned by the FCC for



**Clearwire, LLC • Proposed Base Station (Site No. CA-SJC0044)
375 North Pastoria Avenue • Sunnyvale, California**

wireless services, the antennas require line-of-sight paths for their signals to propagate well and so are installed at some height above ground. The antennas are designed to concentrate their energy toward the horizon, with very little energy wasted toward the sky or the ground. Along with the low power of such facilities, this means that it is generally not possible for exposure conditions to approach the maximum permissible exposure limits without being physically very near the antennas.

Computer Modeling Method

The FCC provides direction for determining compliance in its Office of Engineering and Technology Bulletin No. 65, "Evaluating Compliance with FCC-Specified Guidelines for Human Exposure to Radio Frequency Radiation," dated August 1997. Figure 2 attached describes the calculation methodologies, reflecting the facts that a directional antenna's radiation pattern is not fully formed at locations very close by (the "near-field" effect) and that at greater distances the power level from an energy source decreases with the square of the distance from it (the "inverse square law"). The conservative nature of this method for evaluating exposure conditions has been verified by numerous field tests.

Site and Facility Description

Based upon information provided by Clearwire, including drawings by Dyna Limited, dated July 23, 2009, it is proposed to mount three Argus Model LLPX310R directional panel antennas on an existing 100-foot pole sited west of the single-story building located at 375 North Pastoria Avenue in Sunnyvale. The antennas would be mounted with 2° downtilt at an effective height of about 62 feet above ground and would be oriented at about 120° spacing, to provide service in all directions. The maximum effective radiated power in any direction would be 970 watts. Also proposed to be located with the antennas are three microwave "dish" antennas, for interconnection of this site with others in the Clearwire network.

Presently installed on the same pole are similar antennas for use by AT&T, MetroPCS, Sprint Nextel, T-Mobile, and Verizon Wireless, other wireless telecommunications carriers. For the limited purposes of this study, it is assumed that the transmitting facilities of those carriers are as follows:

Carrier	Service	Maximum ERP	Antenna Model	Height
AT&T	PCS	1,500 watts	} Kathrein 742-265	97 ft
	Cellular	1,500		
Metro	PCS	1,890	Allgon 7250.03	78
Sprint Nextel	PCS	1,500	Andrew RR90-17	55
	SMR	1,500	RFS ALE866513-42T0	62
T-Mobile	PCS	1,920	} APXV18-206516S	68
	AWS	770		
Verizon	PCS	1,500	} Andrew 731DG65	89
	Cellular	1,500		



**Clearwire, LLC • Proposed Base Station (Site No. CA-SJC0044)
375 North Pastoria Avenue • Sunnyvale, California**

Study Results

For a person anywhere at ground, the maximum ambient RF exposure level due to the proposed Clearwire operation by itself would be 0.00059 mW/cm², which is 0.059% of the applicable public limit. The maximum calculated cumulative level at ground, for the simultaneous operation of all six carriers, is 1.9% of the applicable public limit; the maximum calculated cumulative level at the second-floor elevation of any nearby building* is 2.0% of the applicable public limit. It should be noted that these results include several "worst-case" assumptions and therefore are expected to overstate actual power density levels. The microwave antennas would be in point-to-point service and are so directional that they make no significant contribution to RF exposure conditions at ground level.

No Recommended Mitigation Measures

Due to their mounting locations, the Clearwire antennas would not be accessible to the general public, and so no mitigation measures are necessary to comply with the FCC public exposure guidelines. It is assumed that Clearwire and the other carriers will, as FCC licensees, take adequate steps to ensure that their employees or contractors comply with FCC occupational exposure guidelines whenever work is required near the antennas themselves.

Conclusion

Based on the information and analysis above, it is the undersigned's professional opinion that the base station proposed by Clearwire, LLC at 375 North Pastoria Avenue in Sunnyvale, California, will comply with the prevailing standards for limiting public exposure to radio frequency energy and, therefore, will not for this reason cause a significant impact on the environment. The highest calculated level in publicly accessible areas is much less than the prevailing standards allow for exposures of unlimited duration. This finding is consistent with measurements of actual exposure conditions taken at other operating base stations.

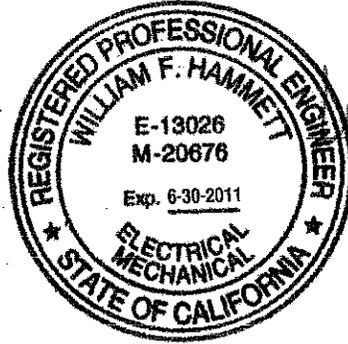
* Located at least 90 feet away, based on aerial photographs from Google Maps.



Clearwire, LLC • Proposed Base Station (Site No. CA-SJC0044)
375 North Pastoria Avenue • Sunnyvale, California

Authorship

The undersigned author of this statement is a qualified Professional Engineer, holding California Registration Nos. E-13026 and M-20676, which expire on June 30, 2011. This work has been carried out 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.



William F. Hammett
William F. Hammett, P.E.

August 21, 2009



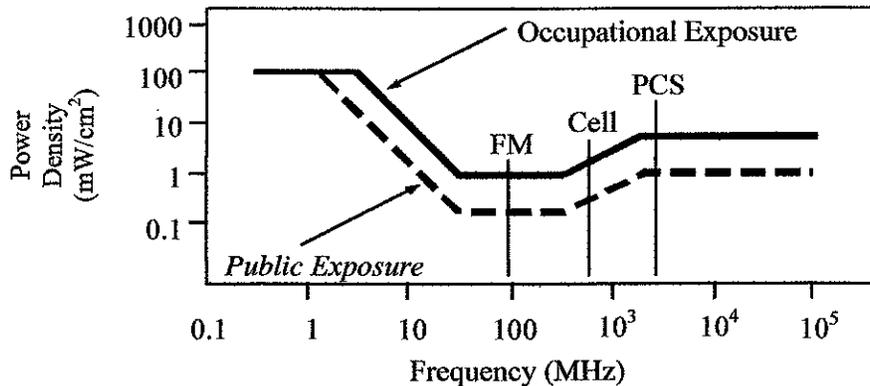
HAMMETT & EDISON, INC.
CONSULTING ENGINEERS
SAN FRANCISCO

FCC Radio Frequency Protection Guide

The U.S. Congress required (1996 Telecom Act) the Federal Communications Commission (“FCC”) to adopt a nationwide human exposure standard to ensure that its licensees do not, cumulatively, have a significant impact on the environment. The FCC adopted the limits from 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 standard, developed by the Institute of Electrical and Electronics Engineers and approved as American National Standard ANSI/IEEE C95.1-2006, “Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz,” includes similar limits. These limits apply for continuous exposures from all sources and are intended to provide a prudent margin of safety for all persons, regardless of age, gender, size, or health.

As shown in the table and chart below, separate limits apply for occupational and public exposure conditions, with the latter limits (in *italics* and/or dashed) up to five times more restrictive:

Frequency Applicable Range (MHz)	Electromagnetic Fields (f is frequency of emission in MHz)					
	Electric Field Strength (V/m)		Magnetic Field Strength (A/m)		Equivalent Far-Field Power Density (mW/cm ²)	
0.3 – 1.34	614	<i>614</i>	1.63	<i>1.63</i>	100	<i>100</i>
1.34 – 3.0	614	<i>823.8/f</i>	1.63	<i>2.19/f</i>	100	<i>180/f²</i>
3.0 – 30	1842/ f	<i>823.8/f</i>	4.89/ f	<i>2.19/f</i>	900/ f ²	<i>180/f²</i>
30 – 300	61.4	<i>27.5</i>	0.163	<i>0.0729</i>	1.0	<i>0.2</i>
300 – 1,500	3.54√f	<i>1.59√f</i>	√f/106	<i>√f/238</i>	f/300	<i>f/1500</i>
1,500 – 100,000	137	<i>61.4</i>	0.364	<i>0.163</i>	5.0	<i>1.0</i>



Higher levels are allowed for short periods of time, such that total exposure levels averaged over six or thirty minutes, for occupational or public settings, respectively, do not exceed the limits, and higher levels also are allowed for exposures to small areas, such that the spatially averaged levels do not exceed the limits. However, neither of these allowances is incorporated in the conservative calculation formulas in the FCC Office of Engineering and Technology Bulletin No. 65 (August 1997) for projecting field levels. Hammett & Edison has built those formulas into a proprietary program that calculates, at each location on an arbitrary rectangular grid, the total expected power density from any number of individual radio sources. The program allows for the description of buildings and uneven terrain, if required to obtain more accurate projections.

RFR.CALC™ Calculation Methodology

Assessment by Calculation of Compliance with FCC Exposure Guidelines

The U.S. Congress required (1996 Telecom Act) the Federal Communications Commission ("FCC") to adopt a nationwide human exposure standard to ensure that its licensees do not, cumulatively, have a significant impact on the environment. The maximum permissible exposure limits adopted by the FCC (see Figure 1) apply for continuous exposures from all sources and are intended to provide a prudent margin of safety for all persons, regardless of age, gender, size, or health. Higher levels are allowed for short periods of time, such that total exposure levels averaged over six or thirty minutes, for occupational or public settings, respectively, do not exceed the limits.

Near Field.

Prediction methods have been developed for the near field zone of panel (directional) and whip (omnidirectional) antennas, typical at wireless telecommunications base stations, as well as dish (aperture) antennas, typically used for microwave links. The antenna patterns are not fully formed in the near field at these antennas, and the FCC Office of Engineering and Technology Bulletin No. 65 (August 1997) gives suitable formulas for calculating power density within such zones.

For a panel or whip antenna, power density $S = \frac{180}{\theta_{BW}} \times \frac{0.1 \times P_{net}}{\pi \times D^2 \times h}$, in mW/cm²,

and for an aperture antenna, maximum power density $S_{max} = \frac{0.1 \times 16 \times \eta \times P_{net}}{\pi \times h^2}$, in mW/cm²,

where θ_{BW} = half-power beamwidth of the antenna, in degrees, and

P_{net} = net power input to the antenna, in watts,

D = distance from antenna, in meters,

h = aperture height of the antenna, in meters, and

η = aperture efficiency (unitless, typically 0.5-0.8).

The factor of 0.1 in the numerators converts to the desired units of power density.

Far Field.

OET-65 gives this formula for calculating power density in the far field of an individual RF source:

power density $S = \frac{2.56 \times 1.64 \times 100 \times RFF^2 \times ERP}{4 \times \pi \times D^2}$, in mW/cm²,

where ERP = total ERP (all polarizations), in kilowatts,

RFF = relative field factor at the direction to the actual point of calculation, and

D = distance from the center of radiation to the point of calculation, in meters.

The factor of 2.56 accounts for the increase in power density due to ground reflection, assuming a reflection coefficient of 1.6 ($1.6 \times 1.6 = 2.56$). The factor of 1.64 is the gain of a half-wave dipole relative to an isotropic radiator. The factor of 100 in the numerator converts to the desired units of power density. This formula has been built into a proprietary program that calculates, at each location on an arbitrary rectangular grid, the total expected power density from any number of individual radiation sources. The program also allows for the description of uneven terrain in the vicinity, to obtain more accurate projections.

