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STAFF REPORT TO: AMADOR COUNTY PLANNING COMMISSION
FOR MEETING OF MARCH 8, 2016

Item 3 - PUBLIC HEARING - REQUEST FOR A USE PERMIT TO EXCEED THE 35' HEIGHT LIMIT IN THE "R1A," (SINGLE FAMILY RESIDENTIAL DISTRICT) TO ALLOW FOR CONSTRUCTION OF AN AMATUER RADIO TOWER WITH A VARIABLE HEIGHT OF 35-82 FEET (APN 015-280-023).

APPLICANT: Steven & Susan Allred

SUPERVISORIAL DISTRICT V

LOCATION: 17160 Red Mule Road, approximately one-half mile south of Fiddletown Road in the Fiddletown community.

A. GENERAL PLAN DESIGNATION: A-T, Agricultural-Transitional

B. ZONING: "R1A," Single Family Residential and Agricultural District

C. DESCRIPTION / BACKGROUND: This request is for a Use Permit to exceed the 35' height limit in an "R1A," Single Family Residential and Agricultural District for construction of an amateur radio tower. Per County Code Section 19.48.090B, "Gas holders, radio, microwave radio relay and T.V. transmission towers, monuments, water tanks and similar structures may be erected to a greater height that the limit established for the district in which they are located, subject to securing a use permit in each case." The tower erected by the applicant has a constant height of 35 feet, and is adjustable up to 85 feet.

California Government Code Section 65850.3 (attached) limits local regulations governing amateur radio antennas. The Federal Communications Commission's Personal Radio Branch issued an order in 1984 (PRB-1, attached) which requires local governments to reasonably accommodate amateur radio communications, and local codes cannot establish heights and dimensions that are necessary to accommodate amateur radio service communication. These State and Federal rules do not preclude establishing setback requirements or reasonable aesthetic conditions through a use permit process.

D. TAC REVIEW: The application was reviewed by the Technical Advisory Committee on February 8, 2016. The applicant was asked to provide evidence that the tower did not require review or clearance from the Federal Aviation Administration (FAA). The applicant presented evidence in the form the attached FAA Notice Criteria Tool during the February 22, 2016 TAC meeting. TAC has no technical objection to the granting of this request subject to the Findings and Conditions attached to the staff report.

E. PLANNING COMMISSION ACTION: If the Planning Commission moves to grant the Use Permit the following conditions and findings, are recommended for adoption:

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Findings:

1. The granting of this Use Permit as conditioned, complies with County Code Section 19.48.090B (Height Regulations) and is consistent with County Code Section 19.56 (Use Permits) in that the establishment of this structure will not under the circumstances of the particular case be detrimental to the health, safety, peace, morals, comfort and general welfare of persons residing in the neighborhood of the proposed structure or be detrimental or injurious to property and improvements in the neighborhood or to the general welfare of the county.

2. The granting of this Use Permit is categorically exempt from CEQA pursuant to Section 15303 Class 3 of the CEQA Guidelines (New Construction or Conversion of Small Structures) and a Notice of Exemption shall be filed with the County Recorder.

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AMADOR COUNTY PLANNING COMMISSION

Conditions of Approval

PROJECT: Use Permit for Amatuer Radio Tower

SUBDIVIDER: Steven & Susan Allred

DESCRIPTION: Use Permit to allow the construction of an amateur radio tower with an adjustable height of 35-85 feet in the "R1A," Single-family Residential & Agricultural district.

ENVIRONMENTAL DOCUMENT: Categorical Exemption

PLANNING COMMISION APPROVAL DATE:

IMPORTANT NOTES

NOTE A: It is suggested the subdivider contact the Health, Public Works, and Planning Departments and any other agencies involved prior to commencing the preceding requirements. Improvement work shall not begin prior to the review of the plans and the issuance of a permit by the Public Works Agency. The Inspector must have a minimum of 48 hours notice prior to the start of any construction.

NOTE B: An extension of this tentative map is possible, provided said extension is applied for by the applicant to the Planning Department, in writing, prior to the expiration date of the tentative map.

NOTE C: Information concerning this map can be obtained through the Amador County Planning Department, 810 Court Street, Jackson, CA 95642. Phone: (209) 223-6380.

CONDITIONS OF APPROVAL

1. This Use Permit shall not become valid, nor shall any uses commence until such time as the Permittee is either found to be in compliance with or has agreed, in writing, to a program of compliance acceptable to the County. At that time the permit shall be signed by the Planning Department and the use shall commence. THE PLANNING DEPARTMENT SHALL MONITOR THIS CONDITION.

2. The issuance of this Use Permit is expressly conditioned upon the permittee's compliance with all the provisions contained herein and if any of the provisions contained herein are violated, this Use Permit may be subject to revocation proceedings as set forth in Amador County Code. THE PLANNING DEPARTMENT SHALL MONITOR THIS CONDITION.

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3. The project shall be substantially the same as approved. Any substantial changes must be submitted for approval by the Amador County Planning Commission. THE PLANNING DEPARTMENT SHALL MONITOR THIS CONDITION.

4. Prior to the issuance of this use permit, the permittee shall obtain all necessary permits from the Building Department, Environmental Health Department, and Public Works Agency associated with the construction of the gymnasium. THE BUILDING DEPARTMENT, ENVIRONMENTAL HEALTH DEPARTMENT, AND PUBLIC WORKS AGENCY SHALL MONITOR THIS CONDITION IN CONJUNCTION WITH THE PLANNING DEPARTMENT.

5. During periods of non-use, the tower shall be retracted to its lowest possible height. THE PLANNING DEPARTMENT SHALL MONITOR THIS CONDITION.

_____

Chairman
Amador County Board of Supervisors

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19.48.090 Height regulations.

A. Chimney, vents and other architectural mechanical appurtenances may be erected to a greater height than the limit established for the district in which the building is located.

B. Gas holders, radio, microwave radio relay and T.V. transmission towers, monuments, water tanks and similar structures may be erected to a greater height than the limit established for the district in which they are located, subject to securing a use permit in each case.

C. Any building in any R district may be erected to a greater height than the limit established for the district in which the building is to be located; provided, that the required side yards shall be increased by one foot for each one foot over the height limit and subject to securing a use permit in each case.

D. Any building in any C or M district may be erected to a greater height than the limit established for the district in which the building is to be located; provided, that the cubical contents of the building shall not be greater than that possible for a building erected within the height limit, subject to securing a use permit in each case.

E. In a district with a height limit of less than seventy-five feet, public and quasi-public buildings, schools, churches, hospitals and other institutions permitted in such district may be erected to a height not to exceed seventy-five feet; providing, that the front, rear and side yards shall be increased one foot for each one foot of height that such building exceeds the height limit hereinbefore established for such district.

F. Upon the securing of a permit as provided in Chapter 19.56 of this title, any building may be erected to a height exceeding that hereinbefore specified for the respective districts; provided, that the total floor area of such building shall not exceed that possible for a building in such respective district specified for such district. (Ord. 351 §12.3, 1962).

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Federal Aviation Administration

« OE/AAA

Notice Criteria Tool

Notice Criteria Tool - Desk Reference Guide V_2014.2.0

The requirements for filing with the Federal Aviation Administration for proposed structures vary based on a number of factors: height, proximity to an airport, location, and frequencies emitted from the structure, etc. For more details, please reference CFR Title 14 Part 77.9.

You must file with the FAA at least 45 days prior to construction if:

- your structure will exceed 200ft above ground level
- your structure will be in proximity to an airport and will exceed the slope ratio
- your structure involves construction of a traverseway (i.e. highway, railroad, waterway etc...) and once adjusted upward with the appropriate vertical distance would exceed a standard of 77.9(a) or (b)
- your structure will emit frequencies, and does not meet the conditions of the FAA Co-location Policy
- your structure will be in an instrument approach area and might exceed part 77 Subpart C
- your proposed structure will be in proximity to a navigation facility and may impact the assurance of navigation signal reception
- your structure will be on an airport or heliport
- filing has been requested by the FAA

If you require additional information regarding the filing requirements for your structure, please identify and contact the appropriate FAA representative using the Air Traffic Areas of Responsibility map for Off Airport construction, or contact the FAA Airports Region / District Office for On Airport construction.

The tool below will assist in applying Part 77 Notice Criteria.

Latitude:	38 Deg 29 M 35.41 S N
Longitude:	120 Deg 41 M 48.08 S W
Horizontal Datum:	NAD83
Site Elevation (SE):	2450 (nearest foot)
Structure Height (AGL):	83 (nearest foot)
Traverseway:	No Traverseway (Additional height is added to certain structures under 77.9(c))
Is structure on airport:	(•) No ( ) Yes

Results

You do not exceed Notice Criteria.

Steve Allred
17610 Red Mule Rd
Fiddletown, CA

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California LEGISLATIVE INFORMATION

Code: Select Code Section: Search

Up^ << Previous Next >> cross-reference chaptered bills PDF | Add To My Favorites Highlight

GOVERNMENT CODE - GOV

TITLE 7. PLANNING AND LAND USE [65000 - 66499.58] *(Heading of Title 7 amended by Stats. 1974, Ch. 1536.)*
DIVISION 1. PLANNING AND ZONING [65000 - 66103] *(Heading of Division 1 added by Stats. 1974, Ch. 1536.)*
CHAPTER 4. Zoning Regulations [65800 - 65912] *(Chapter 4 repealed and added by Stats. 1965, Ch. 1880.)*

ARTICLE 2. Adoption of Regulations [65850 - 65863.13] *(Article 2 added by Stats. 1965, Ch. 1880.)*

65850.3. Any ordinance adopted by the legislative body of a city or county that regulates amateur radio station antenna structures shall allow those structures to be erected at heights and dimensions sufficient to accommodate amateur radio service communications, shall not preclude amateur radio service communications, shall reasonably accommodate amateur radio service communications, and shall constitute the minimum practicable regulation to accomplish the city's or county's legitimate purpose.

It is the intent of the Legislature in adding this section to the Government Code, to codify in state law the provisions of Section 97.15 of Title 47 of the Code of Federal Regulations, which expresses the Federal Communications Commission's limited preemption of local regulations governing amateur radio station facilities.

(Added by Stats. 2003, Ch. 50, Sec. 1. Effective January 1, 2004.)

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Memorandum Opinion and Order in PRB-1

Before the
Federal Communications Commission
Washington, DC 20554

FCC 85-506
36149

In the Matter of	)	
	)	
Federal preemption of state and	)	**PRB-1**
local regulations pertaining	)	
to Amateur radio facilities.	)	

MEMORANDUM OPINION AND ORDER

Adopted: September 16, 1985 ; Released: September 19, 1985

By the Commission: Commissioner Rivera not participating.

Background

1. On July 16, 1984, the American Radio Relay League, Inc (ARRL) filed a Request for Issuance of a Declaratory Ruling asking us to delineate the limitations of local zoning and other local and state regulatory authority over Federally-licensed radio facilities. Specifically, the ARRL wanted an explicit statement that would preempt all local ordinances which provably preclude or significantly inhibit effective reliable amateur radio communications. The ARRL acknowledges that local authorities can regulate amateur installations to insure the safety and health of persons in the community, but believes that those regulations cannot be so restrictive that they preclude effective amateur communications.

2. Interested parties were advised that they could file comments in the matter.[1] With extension, comments were due on or before December 26, 1984,[2] with reply comments due on or before January 25, 1985.[3] Over sixteen hundred comments were filed.

Local Ordinances

3. Conflicts between amateur operators regarding radio antennas and local authorities regarding restrictive ordinances are common. The amateur operator is governed by the regulations contained in Part 97 of our rules. Those rules do not limit the height of an amateur

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antenna but they require, for aviation safety reasons, that certain FAA notification and FCC approval procedures must be followed for antennas which exceed 200 feet in height above ground level or antennas which are to be erected near airports. Thus, under FCC rules some antenna support structures require obstruction marking and lighting. On the other hand, local municipalities or governing bodies frequently enact regulations limiting antennas and their support structures in height and location, e.g. to side or rear yards, for health, safety or aesthetic considerations. These limiting regulations can result in conflict because the effectiveness of the communications that emanate from an amateur radio station are directly dependent upon the location and the height of the antenna. Amateur operators maintain that they are precluded from operating in certain bands allocated for their use if the height of their antennas is limited by a local ordinance.

4. Examples of restrictive local ordinances were submitted by several amateur operators in this proceeding. Stanley J. Cichy, San Diego, California, noted that in San Diego amateur radio antennas come under a structures ruling which limits building heights to 30 feet. Thus, antennas there are also limited to 30 feet. Alexander Vrenios, Mundelein, Illinois, wrote that an ordinance of the Village of Mundelein provides that an antenna must be a distance from the property line that is equal to one and one-half times its height. In his case, he is limited to an antenna tower for his amateur station just over 53 feet in height.

5. John C. Chapman, an amateur living in Bloomington, Minnesota, commented that he was not able to obtain a building permit to install an amateur radio antenna exceeding 35 feet in height because the Bloomington city ordinance restricted "structures" heights to 35 feet. Mr. Chapman said that the ordinance, when written, undoubtedly applied to buildings but was now being applied to antennas in the absence of a specific ordinance regulating them. There were two options open to him if he wanted to engage in amateur communications. He could request a variance to the ordinance by way of a hearing before the City Council, or he could obtain affidavits from his neighbors swearing that they had no objection to the proposed antenna installation. He got the building permit after obtaining the cooperation of his neighbors. His concern, however, is that he had to get permission from several people before he could effectively engage in radio communications for which he had a valid FCC amateur license.

6. In addition to height restrictions, other limits are enacted by local jurisdictions—anti-climb devices on towers or fences around them; minimum distances from high voltage power lines; minimum distances of towers from property lines; and regulations pertaining to the structural soundness of the antenna installation. By and large, amateurs do not find these safety precautions objectionable. What they do object to are the sometimes prohibitive, non-refundable application filing fees to obtain a permit to erect an antenna installation and those provisions in ordinances which regulate antennas for purely aesthetic reasons. The amateurs contend, almost universally, that "beauty is in the eye of the beholder." They assert that an antenna installation is not more aesthetically displeasing than other objects that people keep on their property, e.g. motor homes, trailers, pick-up trucks, solar collectors and gardening equipment.

Restrictive Covenants

7. Amateur operators also oppose restrictions on their amateur operations which are contained in the deeds for their homes or in their apartment leases. Since these restrictive

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covenants are contractual agreements between private parties, they are not generally a matter of concern to the Commission. However, since some amateurs who commented in this proceeding provided us with examples of restrictive covenants, they are included for information. Mr. Eugene O. Thomas of Hollister, California, included in his comments an extract of the Declaration of Covenants and Restrictions for Ridgemark Estates, County of San Benito, State of California. It provides:

> No antenna for transmission or reception of radio signals shall be erected outdoors for use by any dwelling unit except upon approval of the Directors. No radio or television signals or any other form of electromagnetic radiation shall be permitted to originate from any lot which may unreasonably interfere with the reception of television or radio signals upon any other lot.

Marshall Wilson, Jr. provided a copy of the restrictive covenant contained in deeds for the Bell Martin Addition #2, Irving, Texas. It is binding upon all of the owners or purchasers of the lots in the said addition, his or their heirs, executors, administrators or assigns. It reads:

> No antenna or tower shall be erected upon any lot for the purposes of radio operations.

William J. Hamilton resides in an apartment building in Gladstone, Missouri. He cites a clause in his lease prohibiting the erection of an antenna. He states that he has been forced to give up operating amateur radio equipment except a hand-held 2 meter (144-148 MHz) radio transceiver. He maintains that he should not be penalized just because he lives in an apartment.

Other restrictive covenants are less global in scope than those cited above. For example, Robert Webb purchased a home in Houston, Texas. His deed restriction prohibited "transmitting or receiving antennas extending above the roof line."

8. Amateur operators generally oppose restrictive covenants for several reasons. They maintain that such restrictions limit the places that they can reside if they want to pursue their hobby of amateur radio. Some state that they impinge on First Amendment rights of speech. Others believe that a constitutional right is being abridged because, in their view, everyone has a right to access the airwaves regardless of where they live.

9. The contrary belief held by housing subdivision communities and condominium or homeowner's associations is that amateur radio installations constitute safety hazards, cause interference to other electronic equipment which may be operated in the home (television, radio, stereos) or are eyesores that detract from the aesthetic and tasteful appearance of the housing development or apartment complex. To counteract these negative consequences, the subdivisions and associations include in their deeds, leases or by-laws, restrictions and limitations on the location and height of antennas or, in some cases, prohibit them altogether. The restrictive covenants are contained in the contractual agreement entered into at the time of the sale or lease of the property. Purchasers or lessees are free to choose whether they wish to reside where such restrictions on amateur antennas are in effect or settle elsewhere.

Supporting Comments

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10. The Department of Defense (DOD) supported the ARRL and emphasized in its comments that continued success of existing national security and emergency preparedness telecommunications plans involving amateur stations would be severely diminished if state and local ordinances were allowed to prohibit the construction and usage of effective amateur transmission facilities. DOD utilizes volunteers in the Military Affiliate Radio Service (MARS),[4] Civil Air Patrol (CAP) and the Radio Amateur Civil Emergency Service (RACES). It points out that these volunteer communicators are operating radio equipment installed in their homes and that undue restrictions on antennas by local authorities adversely affect their efforts. DOD states that the responsiveness of these volunteer systems would be impaired if local ordinances interfere with the effectiveness of these important national telecommunication resources. DOD favors the issuance of a ruling that would set limits for local and state regulatory bodies when they are dealing with amateur stations.

11. Various chapters of the American Red Cross also came forward to support the ARRL's request for a preemptive ruling. The Red Cross works closely with amateur radio volunteers. It believes that without amateurs' dedicated support, disaster relief operations would significantly suffer and that its ability to serve disaster victims would be hampered. It feels that antenna height limitations that might be imposed by local bodies will negatively affect the service now rendered by the volunteers.

12. Cities and counties from various parts of the United States filed comments in support of the ARRL's request for a Federal preemption ruling. The comments from the Director of Civil Defense, Port Arthur, Texas, are representative:

> The Amateur Radio Service plays a vital role with our Civil Defense program here in Port Arthur and the design of these antennas and towers lends greatly to our ability to communicate during times of disaster.
>
> We do not believe there should be any restrictions on the antennas and towers except for reasonable safety precautions. Tropical storms, hurricanes and tornadoes are a way of life here on the Texas Gulf Coast and good communications are absolutely essential when preparing for a hurricane and even more so during recovery operations after the hurricane has past.

13. The Quarter Century Wireless Association took a strong stand in favor of the Issuance of a declaratory ruling. It believes that Federal preemption is necessary so that there will be uniformity for all Amateur Radio installations on private property throughout the United States.

14. In its comments, the ARRL argued that the Commission has the jurisdiction to preempt certain local land use regulations which frustrate or prohibit amateur radio communications. It said that the appropriate standard in preemption cases is not the extent of state and local interest in a given regulation, but rather the impact of the regulation on Federal goals. Its position is that Federal preemption is warranted whenever local government regulations relate adversely to the operational aspects of amateur communication. The ARRL maintains that localities routinely employ a variety of land use devices to preclude the installation of effective amateur antennas, including height restrictions, conditional use permits, building setbacks and dimensional limitations on antennas. It sees a declaratory ruling of Federal preemption as necessary to cause municipalities to accommodate amateur operator needs in land use planning efforts.

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15. James C. O'Connell, an attorney who has represented several amateurs before local zoning authorities, said that requiring amateurs to seek variances or special use approval to erect reasonable antennas unduly restricts the operation of amateur stations. He suggested that the Commission preempt zoning ordinances which impose antenna height limits of less than 65 feet. He said that this height would represent a reasonable accommodation of the communication needs of most amateurs and the legitimate concerns of local zoning authorities.

Opposing Comments

16. The City of La Mesa, California, has a zoning regulation which controls amateur antennas. Its comments reflected an attempt to reach a balanced view.

> This regulation has neither the intent, nor the effect, of precluding or inhibiting effective and reliable communications. Such antennas may be built as long as their construction does not unreasonably block views or constitute eyesores. The reasonable assumption is that there are always alternatives at a given site for different placement, and/or methods for aesthetic treatment. Thus, both public objectives of controlling land use for the public health, safety, and convenience, and providing an effective communications network, can be satisfied. A blanket to completely set aside local control, or a ruling which recognizes control only for the purpose of safety of antenna construction, would be contrary to...legitimate local control.

17. Comments from the County of San Diego state:

> While we are aware of the benefits provided by amateur operators, we oppose the issuance of a preemption ruling which would elevate 'antenna effectiveness' to a position above all other considerations. We must, however, argue that the local government must have the ability to place reasonable limitations upon the placement and configuration of amateur radio transmitting and receiving antennas. Such ability is necessary to assure that the local decision-makers have the authority to protect the public health, safety and welfare of all citizens.
>
> In conclusion, I would like to emphasize an important difference between your regulatory powers and that of local governments. Your Commission's approval of the preemptive requests would establish a "national policy." However, any regulation adopted by a local jurisdiction could be overturned by your Commission or a court if such regulation was determined to be unreasonable.

18. The City of Anderson, Indiana, summarized some of the problems that face local communities:

> I am sympathetic to the concerns of these antenna owners and I understand that to gain the maximum reception from their devices, optimal location is necessary. However, the preservation of residential zoning districts as "liveable" neighborhoods is jeopardized by placing these antennas in front yards of homes. Major problems of public safety have been encountered, particularly vision blockage for auto and pedestrian access. In addition, all communities are faced

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> with various building lot sizes. Many building lots are so small that established setback requirements (in order to preserve adequate air and light) are vulnerable to the unregulated placement of antennas. ...the exercise of preemptive authority by the FCC in granting this request would not be in the best interest of the general public.

19. The National Association of Counties (NACO), the American Planning Association (APA) and the National League of Cities (NLC) all opposed the issuance of an antenna preemption ruling. NACO emphasized that federal and state power must be viewed in harmony and warns that Federal intrusion into local concerns of health, safety and welfare could weaken the traditional police power exercised by the state and unduly interfere with the legitimate activities of the states. NLC believed that both Federal and local interests can be accommodated without preempting local authority to regulate the installation of amateur radio antennas. The APA said that the FCC should continue to leave the issue of regulating amateur antennas with the local government and with the state and Federal courts.

Discussion

20. When considering preemption, we must begin with two constitutional provisions. The tenth amendment provides that any powers which the constitution either does not delegate to the United States or does not prohibit the states from exercising are reserved to the states. These are the police powers of the states. The Supremacy Clause, however, provides that the constitution and the laws of the United States shall supersede any state law to the contrary. Article III, Section 2. Given these basic premises, state laws may be preempted in three ways: First, Congress may expressly preempt the state law. See Jones v. Rath Packing Co., 430 U.S. 519, 525 (1977). Or, Congress may indicate its intent to completely occupy a given field so that any state law encompassed within that field would implicitly be preempted. Such intent to preempt could be found in a congressional regulatory scheme that was so pervasive that it would be reasonable to assume that Congress did not intend to permit the states to supplement it. See Fidelity Federal Savings & Loan Ass'n v. de la Cuesta, 458 U.S. 141, 153 (1982). Finally, preemption may be warranted when state law conflicts with federal law. Such conflicts may occur when "compliance with both Federal and state regulations is a physical impossibility," Florida Lime & Avocado Growers, Inc. v. Paul, 373 U.S. 132, 142, 143 (1963), or when state law "stands as an obstacle to the accomplishment and execution of the full purposes and objectives of Congress," Hines v. Davidowitz, 312 U.S. 52, 67 (1941). Furthermore, federal regulations have the same preemptive effect as federal statues, Fidelity Federal Savings & Loan Association v. de la Cuesta, supra.

21. The situation before us requires us to determine the extent to which state and local zoning regulations may conflict with federal policies concerning amateur radio operators.

22. Few matters coming before us present such a clear dichotomy of view point as does the instant issue. The cities, countries, local communities and housing associations see an obligation to all of their citizens and try to address their concerns. This is accomplished through regulations, ordinances or covenants oriented toward the health, safety and general welfare of those they regulate. At the opposite pole are the individual amateur operators and their support

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groups who are troubled by local regulations which may inhibit the use of amateur stations or, in some instances, totally preclude amateur communications. Aligned with the operators are such entities as the Department of Defense, the American Red Cross and local civil defense and emergency organizations who have found in Amateur Radio a pool of skilled radio operators and a readily available backup network. In this situation, we believe it is appropriate to strike a balance between the federal interest in promoting amateur operations and the legitimate interests of local governments in regulating local zoning matters. The cornerstone on which we will predicate our decision is that a reasonable accommodation may be made between the two sides.

23. Preemption is primarily a function of the extent of the conflict between federal and state and local regulation. Thus, in considering whether our regulations or policies can tolerate a state regulation, we may consider such factors as the severity of the conflict and the reasons underlying the state's regulations. In this regard, we have previously recognized the legitimate and important state interests reflected in local zoning regulations. For example, in Earth Satellite Communications, Inc., 95 FCC 2d 1223 (1983), we recognized that

> ...countervailing state interests inhere in the present situation...For example, we do not wish to preclude a state or locality from exercising jurisdiction over certain elements of an SMATV operation that properly may fall within its authority, such as zoning or public safety and health, provided the regulation in question is not undertaken as a pretext for the actual purpose of frustrating achievement of the preeminent federal objective and so long as the non-federal regulation is applied in a nondiscriminatory manner.

24. Similarly, we recognize here that there are certain general state and local interests which may, in their even-handed application, legitimately affect amateur radio facilities. Nonetheless, there is also a strong federal interest in promoting amateur communications. Evidence of this interest may be found in the comprehensive set of rules that the Commission has adopted to regulate the amateur service. [5] Those rules set forth procedures for the licensing of stations and operators, frequency allocations, technical standards which amateur radio equipment must meet and operating practices which amateur operators must follow. We recognize the amateur radio service as a voluntary, noncommercial communication service, particularly with respect to providing emergency communications. Moreover, the amateur radio service provides a reservoir of trained operators, technicians and electronic experts who can be called on in times of national or local emergencies. By its nature, the Amateur Radio Service also provides the opportunity for individual operators to further international goodwill. Upon weighing these interests, we believe a limited preemption policy is warranted. State and local regulations that operate to preclude amateur communications in their communities are in direct conflict with federal objectives and must be preempted.

25. Because amateur station communications are only as effective as the antennas employed, antenna height restrictions directly affect the effectiveness of amateur communications. Some amateur antenna configurations require more substantial installations than others if they are to provide the amateur operator with the communications that he/she desires to engage in. For example, an antenna array for international amateur communications will differ from an antenna used to contact other amateur operators at shorter distances. We will not, however, specify any particular height limitation below which a local government may not regulate, nor will we suggest the precise language that must be contained in local ordinances,

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such as mechanisms for special exceptions, variances, or conditional use permits. Nevertheless, local regulations which involve placement, screening, or height of antennas based on health, safety, or aesthetic considerations must be crafted to accommodate reasonably amateur communications, and to represent the minimum practicable regulation to accomplish the local authority's legitimate purpose.[6]

26. Obviously, we do not have the staff or financial resources to review all state and local laws that affect amateur operations. We are confident, however, that state and local governments will endeavor to legislate in a manner that affords appropriate recognition to the important federal interest at stake here and thereby avoid unnecessary conflicts with federal policy, as well as time-consuming and expensive litigation in this area. Amateur operators who believe that local or state governments have been overreaching and thereby have precluded accomplishment of their legitimate communications goals, may, in addition, use this document to bring our policies to the attention of local tribunals and forums.

27. Accordingly, the Request for Declaratory Ruling filed July 16, 1984, by the American Radio Relay League, Inc., IS GRANTED to the extent indicated herein and in all other respects, IS DENIED.

FEDERAL COMMUNICATIONS COMMISSION
William J. Tricarico
Secretary

Footnotes

[1]Public Notice, August 30, 1984, Mimeo. No. 6299, 49 F.R. 36113, September 14, 1984.

[2]Public Notice, December 19,1984, Mimeo. No. 1498.

[3]Order, November 8, 1984, Mimeo, No. 770.

[4]MARS is solely under the auspices of the military which recruits volunteer amateur operators to render assistance to it. The Comission is not involved in the MARS program.

[5]47 CFR Part 97.

[6]We reiterate that our ruling herein does not reach restrictive covenants in private contractual agreements. Such agreements are voluntarily entered into by the buyer or tenant when the agreement is executed and do not usually concern this Commission.

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AMADOR COUNTY COMMUNITY DEVELOPMENT AGENCY
PLANNING DEPARTMENT

PHONE: (209) 223-6380
FAX: (209) 257-5002
WEBSITE: www.amadorgov.org
E-MAIL: planning@amadorgov.org

COUNTY ADMINISTRATION CENTER • 810 COURT STREET • JACKSON, CA 95642-2132

APPLICATION REFERRAL

TO: Mike Israel, Environmental Health Department
Jered Reinking, Department of Transportation and Public Works
Steve Stokes, Building Department
David Bellerive, Amador Fire Protection District
Jim McHargue, Waste Management/Air District
Steve Zanetta, Surveying Department
Greg Gillott, County Counsel
Jim Wegner, Undersheriff
Carla Meyer, Amador Transit
Caltrans, District 10
Darin McFarlin, Cal Fire
John Gedney, ACTC
CDFW, Region 2

DATE: January 27, 2015

FROM: Chuck Beatty, Planning Department

PROJECT: Request from Steven & Susan Allred for a Use Permit (UP-16;1-2) to allow the erection of a retractable amateur radio tower with a height range of 35 to 82 feet. Per Amador County Code, radio antennae may be erected to a greater height than the 35-foot height limit established for the R1A, Single-family Residential/Agricultural district subject to securing a Use Permit.

LOCATION: 17610 Red Mule Road, approximately one-half mile south of Fiddletown Road (APN 015-280-023).

REVIEW: As part of the review process, this project is being sent to County staff as well as State and local agencies for their review and comment. The **Amador County Technical Advisory Committee** (TAC) will meet on **Monday, February 8, 2016** at 10:00 a.m. in Conference Room "A" at the County Administration Building, 810 Court Street, Jackson, CA, to review the project for completeness. At this time, staff anticipates that a Notice of Exemption will be the appropriate CEQA document for this project.

cc: Steven Allred, applicant/property owner

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PLANNING DEPARTMENT
LAND USE AGENCY
COUNTY ADMINISTRATION CENTER

810 Court Street • Jackson, CA 95642-2132
Telephone: (209) 223-6380
website: www.co.amador.ca.us
e-mail: planning@co.amador.ca.us

APPLICATION PROCEDURE FOR USE PERMIT

A Public Hearing before the Planning Commission will be scheduled after the following information has been completed and submitted to the Planning Department Office:

X 1. Complete the following:

Name of Applicant Steve + Sue Allred.
Mailing Address 17610 Red Mule Rd.
Phone Number 209-296-5989
Assessor Parcel Number 015-280-023-000

X 2. Use Permit Applied For:

___ Excessive Height
** ___ Bed and Breakfast Inn
** ___ Temporary Caretaker Mobile Home
** ___ Mobile Home for Farm Labor Quarters
** X Other Amateur Radio Tower

X 3. Attach a letter explaining the purpose and need for the Use Permit.

X 4. Attach a copy of the deed of the property (can be obtained from the County Recorder's Office).

n/a 5. If Applicant is not the property owner, a consent letter must be attached.

X 6. Assessor Plat Map (can be obtained from the County Surveyor's Office).

X 7. Plot Plan (no larger than 11" X 17") of parcel showing location of request in relation to property lines, road easements, other structures, etc. (see Plot Plan Guidelines). Larger map(s) or plans may be submitted if a photo reduction is provided for notices, Staff Reports, etc. The need is for easy, mass reproduction.

X 8. Planning Department Filing Fee: $ 575.00

X Public Works Agency Review Fee: $ 500.00

X Environmental Health Review Fee: $ 192.00

___ 9. If necessary, complete an Environmental Information Form (ask Planning Department Staff).

n/a 10. Proposed floor plan (Guest House applications only).

** Environmental Health and Public Works Fee's apply.

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01/25/2016

Project Information in Support of a Use Permit for an Amateur Radio Tower

Applicant: Steve Allred
(FCC license K6SCA)

17610 Red Mule Rd
Fiddletown, CA 95629

Prepared by: James E. Varney, P.E.

1. About the Amateur Radio Tower

Make and model: Tashjian LM470
Style: Galvanized steel lattice tower, retractable, and telescoping.
Extended Height: 82 feet (to top of mast above 70 foot tower)
Retracted Height: 35 feet (to top of mast above 23 foot retracted tower)
Width at base: 23 inches
Width at top: 14 inches
Tower Sections: 4
Antenna Wingspan: 47 feet

2. What Is Amateur Radio?

Amateur radio is a federally authorized public service, is non-profit, and is regulated under the Communications Act of 1934. Use of the amateur radio bands requires taking a test demonstrating technical proficiency in radio and electronic theory, safety, and knowledge of FCC regulations. There are over 725,000 licensed operators ("hams") in the United States.[1]

Amateur radio is strictly non-profit and non-commercial. Regulations expressly prohibit hams from accepting monetary compensation for radio traffic or messages. Hams are also prohibited from broadcasting to the general public.[2]

The typical amateur radio station is located at a private residence using towers or masts as accessory structures located on the property.

1 Amateur Radio Relay League press release, 3/4/2015.
2 47 CFR 97.113

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3. Importance of Amateur Radio to the Community

a. Communications of Last Resort. During non-emergency "normal" times, amateur radio is primarily a hobby. It is the intent of Congress and the FCC for the hobby aspect to serve as practice so that hams maintain readiness to provide communications in times of severe emergencies. Cell phones, landlines, and the internet often fail during disasters, either from infrastructure damage or from overwhelming demand. Immediately after the Butte Fire, many residents had no power, no landlines and no cell service.[3]

b. Neighborhood Communications During Disasters. Hams do not need to be first responders to be valuable during a disaster. When cell phones, landline and internet are down, hams can provide neighbors:

- A way for neighbors to reach 911 if all phone service is down.
- A way for neighbors to send status messages to loved ones in non-affected cities or states. This, in turn, relieves first responders to focus on higher priority work.

c. Non-Emergency Public Communications. Mr. Allred operates a VHF *repeater* which robotically relays amateur communications, expanding radio coverage throughout the Sierra foothills. Amateur radio clubs use repeaters to help them support community events, such as the annual Sierra Century bicycle ride.

3. Why Does the Tower Need to be 70 feet Tall?

This height is necessary to support both short-range (VHF/UHF) and long-range (HF) communications:

a. Short-Range Communications. VHF or UHF amateur signals behave like FM radio or cell phones -- limited to short range and "line of sight." The 70-foot tower height is needed so the antennas can "see" over terrain and trees.

b. Medium- and Long-Range Communication. HF or "shortwave" amateur signals are not limited to line of sight because they bounce off the ionosphere and can "skip" over the horizon. HF signals can reach thousands of miles. Contacts can be made reliably throughout the U.S. on HF and, when conditions permit, internationally.

A physical property of HF signals is that the antenna needs to be at least 1/2 wavelength high to prevent the ground from absorbing most of the signal. The most reliable HF frequency band at 7 MHz has a wavelength of 140 feet. One-half of 140 feet is 70 feet, the same height as the subject tower.

Height (feet)	Signal Strength (15 deg elev.)	Percent Signal Loss Relative to 140 feet
140	8.3 dB	0
100	7.6 dB	-14.9%
70	6.3 dB	-36.9%
40	1.3 dB	-80.0%
10	-6.0 dB	-96.3%

Table 1: Height vs. Signal Loss. *At 7 MHz, antennas below 70 feet rapidly lose signal due to ground absorption.*

c. 70 Feet Is Widely Accepted As A Reasonable Tower Height. The Amateur Radio Relay League, a national organization representing ham radio, has recommended 70 feet as a reasonable height that balances radio effectiveness with community interests. The 70-foot height has

3 "Butte Fire Fully Contained," Calaveras Enterprise, 10/5/2015.

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been codified by some states and localities (e.g., Oregon, New Mexico, Pennsylvania, Virgina, City of Sunnyvale CA) to ensure permits for amateur radio are not unreasonably denied.

4. Safety

The Tashjian LM-470 includes an important safety feature, which is the ability to be lowered into a crouching position when high winds are expected.

Plans and calculations have been developed by a registered Civil Engineer independent of the Tashjian company. The tower was analyzed and it was determined it meets current California Building Code and TIA-222-G standards when operated as the manufacturer intended, which is to retract the tower when high winds are forecast. The code standards require the tower to withstand the highest credible wind velocity in Amador County, which is a 3-second gust of 85 mph.

If the tower were inadvertently left in the extended position during a severe windstorm, structural failure is highly unlikely. With the safety factors included in the TIA-222-G standard, the estimated strength is 80 mph. With the safety factors removed the ultimate survivability is estimated at 104 mph, while extended. The tower exceeds the 85 mph standard when retracted.

5. Environmental Impact

The tower's only potential environmental impact is to visual aesthetics. A few observations about the tower location:

- Large Lots. Due to the large lots in this rural location, nearby homes are dispersed. The nearest neighbor is nearly 400 feet away.
- No Severe Obstruction. The tower is not immediately in front of any neighbor's window, nor does it loom prominently over any neighbor's patio or yards. The tower may be visible to some on their skyline, depending on tree cover.
- View From Local Roads. Due to tree cover in the area, the tower is often fully obscured or partially obscured by trees. The tower does not obscure any extraordinary scenic views in the area. There are short sections of treeless areas on Burnt Wheel and Holly from which the tower can be seen.

Due to the tower's small construction footprint, impacts to flora, fauna and associated habitat are neglible.

6. Aeronautical Impacts

There are none. Subject tower is 9.4 miles from the nearest airport (Martell) and therefore FAA height restrictions do not apply.

7. California Law on Amateur Radio Structures

California state law, specifically Gov. Code 65850.3, states cities and counties "shall reasonably

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accommodate" antenna structures for amateur radio purposes.

8. Parcel Description

Parcel No.: 015280023000
Subvision: None
Zoning: R1A
Acreage: 2.03
Homeowner's Association: None.

9. Conclusion

It is respectfully requested that the Use Permit for the subject amateur radio tower be granted. The project is compatible with area land use, provides a positive benefit to the community, and negative impacts (if any) are minor or insignificant.

###

Thank you,
Steve Allred
K6SCA

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PROJECT INFORMATION
STRUCTURAL ANALYSIS REPORT

"AS BUILT" PERMIT FOR AMATEUR RADIO TOWER

Owner: Steven C. Allred
17610 Red Mule Rd
Fiddletown, CA 95629

Engineer: James Varney, P.E.

Contents and Summary 1/6/2016

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Project Description

The project consists of an "as-built" amateur radio tower at a private residence. The tower, installed in September 2015, is a self-supporting telescoping steel lattice tower manufactured by Tashjian Towers Corp., Fowler, CA. The tower is retractable when not in use. When in use, the extended height is 82 feet; when retracted, the height is 35 feet. It is 23 inches wide at the base, tapering to 14 inches wide at the top. It has been installed as an accessory structure adjacent to the applicant's existing home. The tower was purchased new and installed following Tashjian Towers' standard plans.

Scope of this Analysis

The author of this report is a California-licensed Civil Engineer, who is independent of and not associated with Tashjian Towers. The purpose of this report is to determine if the Owner's tower installation meets current building codes and standards.

Parcel Data and Zoning Information

Parcel No.: 015280023000
Subvision: None
Zoning: R1A
Acreage: 2.03
Homeowner's Association: None.

Design Criteria, Codes, Standards, Assumptions in this Analysis

Tower: Tashjian LM470 steel lattice standalone tower.

Codes: 2013 California Building Code
TIA-222-G Structural Standard for Antenna Supporting Structures and Antennas
ACI 318-11 (Concrete) and ASTM (Steel items)

Note: The 2013 CBC in Chapter 31, "Special Construction," states in 3108.1, "Towers shall be designed and constructed in accordance with the provisions of TIA-222."

Seismic: Equivalent lateral force, per TIA-222-G Table 2-10

Factors: Basic wind speed = 85 mph (see supporting information below)
Ice loading = 0

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Structure Class = I
Exposure Class = B
Topography Class = 4

Soil: TIA-222 Annex F, "Sand," 3000 psi ultimate bearing strength (LRFD)
CBC 1806, Soil class SM, 2000 psi allowable bearing strength (ASD)
(see Soil Observations)

Concrete: 2500 psi f'c

Supporting data for parameters and factors:

Parameters Provided by TIA-222-G Annex B

County	Min. Basic Wind Speed V (mph)	Max. Basic Wind Speed V (mph)	Min. Basic Wind Speed with Ice Vi (mph)	Max. Basic Wind Speed with Ice Vi (mph)	Min. Design Ice Thick-ness ti (in.)	Max. Design Ice Thick-ness ti (in.)	Design Frost Depth (in.)	Min. S_s	Max. S_s	Notes
AMADOR	85	85	30	30	0	0	10	0.38	1.17	--

(see next page)

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Structure Classification (TIA-222-G Table 2-1)

Class	Description of Structure Class	At site?
I	Structures that due to height, use or location represent a low hazard to human life and damage to property in the event of failure and/or used for services that are optional and/or where a delay in returning the services would be acceptable.	Y
II	Structures that due to height, use or location represent a substantial hazard to human life and/or damage to property in the event of failure and/or used for services that may be provided by other means.	N
III	Structures that due to height, use or location represent a high hazard to human life and/or damage to property in the event of failure and/or used primarily for essential communications.	N

The tower is located in a rural area with large lots; hazard to human life is practically nil. No essential services are dependent on this tower. Structure is therefore Class I.

Exposure Category Assessment (TIA-222-G 2.6.5.1)

Class	Description of Exposure	At site?
B	Urban and suburban areas, wooded areas...Use of this exposure shall be limited to those areas for which terrain representative of Exposure B surrounds the structure in all directions for a distance of at least 2,630 ft [800 m] or ten times the height of the structure, whichever is greater.	Y
C	Open terrain... flat, open country, grasslands...	N
D	Shorelines exposed to wind flowing over open water...	N

The tower site is in a semi-wooded rural area with large lots and trees in numerous directions. Exposure Class B is the closest fit of the three classes.

(see next page)

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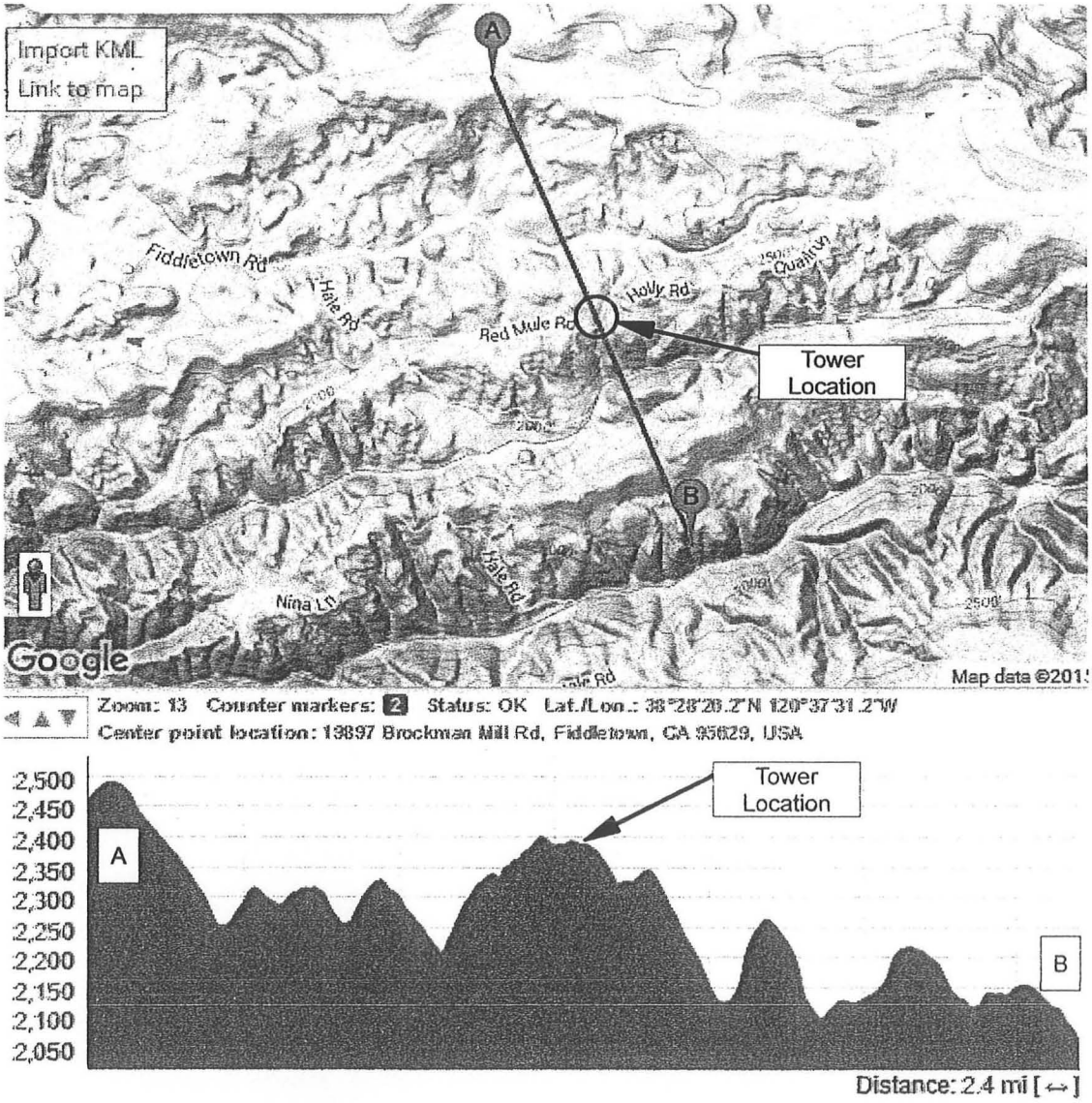
Topographic Classification Assessment (TIA-222-G 2.6.6.2)



Code requires the use of wind speed-up factors (venturi effect) if the tower is located on a hill or ridge that is isolated and protrudes above average terrain by a factor of two in a 2-mile radius. The tower is on a minor ridge near other ridges, but is not higher than average terrain by a 2x factor and therefore wind speed-up factors do not apply.

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2.6.6.2 Topographic Categories	At site?
Category 1: No abrupt changes in general topography, e.g. flat or rolling terrain, no wind speed-up consideration shall be required.	N
Category 2: Structures located at or near the crest of an escarpment. Wind speed-up shall be considered to occur in all directions. Structures located vertically on the lower half of an escarpment or horizontally beyond 8 times the height of the escarpment from its crest, shall be permitted to be considered as Topographic Category 1.	N
Category 3: Structures located in the upper half of a hill. Wind speed-up shall be considered to occur in all directions. Structures located vertically on the lower half of a hill shall be permitted to be considered as Topographic Category 1.	N
Category 4: Structures located in the upper half of a ridge. Wind speed-up shall be considered to occur in all directions. Structures located vertically on the lower half of a ridge shall be permitted to be considered as Topographic Category 1.	Y

The tower site is located on the upper half and southerly side of an east-west ridge. While the site is Category 4, the relative variation in terrain in a 2-mile radius is not large enough to trigger the use of wind speed-up factors (previous page and TIA 2.6.6.1). For wind velocity pressure calculations, the wind speed-up factor for topography does not apply ($K_{zt} = 1$).

Seismic Analysis Method

Pursuant to TIA-222-G Table 2-10, the following seismic considerations apply:

Tower Type	Analysis Method	Ignore vertical seismic forces?
Self-Supported Lattice < 100 ft	Equivalent Lateral Force	Yes

SOIL ASSUMPTIONS

Visually the topsoil is brown and loamy, consistent with the *Fiddletown* series in the Amador Soil Survey by the USDA (1965). Given that Fiddletown soil is gravelly/loamy, use of presumptive soil parameters in TIA-222-G is conservative.

Note the CBC typically prescribes a presumptive soil bearing strength of 1500 psf using the ASD method. However, TIA-222 requires the use of LFRD, including soil strength, and provides

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a presumptive *ultimate* soil strength of 3000 psf for sandy soils. The phi factor is 0.75. With a 1.6 live load factor, the LRFD 3000 psf strength is equivalent to (0.75)(3000 LRFD) / 1.6 = 1406 psf ASD.

ANALYSIS AND RESULTS

Analysis. The Tashjian LM470 is a standalone (unguyed) retractable steel lattice tower. A linear finite element analysis (FEA) was performed by accurately modeling the tower's dimensions, geometry and materials as an elastic three dimensional beam-column. Wind and gravity loads, with the safety factors as required by code, were applied to the model. The resulting tension, compression, bending moment and shear stresses in each tower component was compared to the yield strength of each tower component.

Load Factors. TIA-222-G provides a maximum credible wind event in Amador County to be a three-second gust at 85 mph. Load factors of 1.6 times the wind force and 1.2 times the weight of the tower and payload are used to provide a margin of safety to ensure the tower has strength in reserve to withstand the design wind gust.

Results. The analysis shows that the tower meets the TIA-222-G code standard (and by reference the California Building Code) when operated as intended and exposed to an 85 mph wind gust when in the retracted position.

The ability to lower the tower ahead of severe storms is an important safety feature. In the crouched position the tower is far stronger due to its lower profile and reduced overturning moment. It is recommended the Owner retract the tower when winds are forecast to exceed 50 mph, as intended by the manufacturer.

In the extended position, the tower as built can withstand a design wind speed of 80 mph. In the event the tower is inadvertently left in the extended position, it is highly likely the tower will survive an 85 mph wind due to the safety factors in the TIA-222-G standard. The 80 mph design wind equates to an ultimate survival wind speed of approximately 104 mph.

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Detailed Calculations

Solidity of Lattice Towers

(TIA 222 G 2.6.9.1.1)

$\varepsilon = Ar / Ag$ for one face — EXTENDED

	Section		Quan	Len (ft)	Dia (ft)	Ar
A	8	Legs	2	20	0.125	5.000
	8	Webs, diag	24	2.13	0.042	2.133
	8	Anchor Bar	2	1.92	0.104	0.399
	7 Nested	Legs	2	4.5	0.125	1.125
	7 Nested	Webs, diag	7.425	1.77	0.036	0.478
	7 Nested	Anchor Bar	1	1.65	0.104	0.172
					Section 8	9.307

		Width	Height	Gross Area
		1.917	20	38.333
8	Ag (area as if face was solid)		**Solidity, ε**	**0.243**

	Section		Quan	Len (ft)	Dia (ft)	Ar
B	7	Legs	2	15.5	0.125	3.875
	7	Webs, diag	25.575	1.77	0.036	1.646
	7	Anchor Bar	1	1.65	0.333	0.550
	6 Nested	Legs	2	3	0.104	0.625
	6 Nested	Webs, diag	4.80	1.51	0.031	0.227
	6 Nested	Anchor Bar	1	1.38	0.333	0.458
					Section 7	7.381

		Width	Height	Gross Area
		1.65	15.50	25.588
7	Ag (area as if face was solid)		**Solidity, ε**	**0.288**

	Section		Quan	Len (ft)	Dia (ft)	Ar
C	6	Legs	2	17	0.104	3.542
	6	Webs, diag	27.7	1.51	0.031	1.307
	6	Anchor Bar	1	1.38	0.333	0.458
	5 Nested	Legs	2	3	0.104	0.625
	5 Nested	Webs, diag	4.65	1.31	0.026	0.159
	5 Nested	Anchor Bar	1	1.16	0.333	0.385
					Section 6	6.477

		Width	Height	Gross Area
		1.38	17.00	23.375
6	Ag (area as if face was solid)		**Solidity, ε**	**0.277**

	Section		Quan	Len (ft)	Dia (ft)	Ar
D	5	Legs	2	17	0.104	3.542
	5	Webs, diag	26.35	1.31	0.026	0.902
	5	Anchor Bar	1	1.16	0.333	0.385
					Section 5	4.829

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Solidity continued...

RETRACTED

Section	Ar	Width	Height	Gross Area
A	9.307	1.917	23	44.083
B	7.381			
C	6.477			
D	4.829			
	27.994		Solidity, ε	0.635

Laminar Flow Test for Round Leg and Web Members
(TIA 222 G 2.6.9.1.1)

Section A

C = (sqrt[I Kz Kzt]) V D I = 0.87 Table 2.3, Class I, no ice V = 85 mph

Kz = 2.01 (z / zg) ^ (2 / α) z = 10 midpoint height above ground
zg = 1200 for Exposure B (TIA Table 2-4)
α = 7.0 (TIA Table 2-4)

Kz min 0.7 per Table 2-4
Kzt = 1 Suburban terrain per 2.6.6.4
Kz 0.51 Kz min applies, use Kz =0.70

I	Kz	Kzt	V	D (ft)	C
0.87	0.7	1	85	1.917	127.138
				C > 64	Supercritical

Section B

C = (sqrt[I Kz Kzt]) V D I = 0.87 Table 2.3, Class I, no ice V = 85 mph

Kz = 2.01 (z / zg) ^ (2 / α) z = 27.75 midpoint height above ground
zg = 1200 for Exposure B (TIA Table 2-4)
α = 7.0 (TIA Table 2-4)

Kz min 0.7 per Table 2-4
Kzt = 1 Suburban terrain per 2.6.6.4
Kz 0.69 Kz min applies, use Kz =0.70

I	Kz	Kzt	V	D (ft)	C
0.87	0.7	1	85	1.651	109.518
				C > 64	Supercritical

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Laminar Flow Test continued...

Section C

C = (sqrt[I Kz Kzt]) V D I = 0.87 Table 2.3, Class I, no ice V = 85 mph

Kz = 2.01 (z / zg) ^ (2 / α)			z = 44.0 midpoint height above ground
			zg = 1200 for Exposure B (TIA Table 2-4)
			α = 7.0 (TIA Table 2-4)
Kz min	0.7		per Table 2-4
Kzt = 1			Suburban terrain per 2.6.6.4
Kz	0.78	> Kz min	

I	Kz	Kzt	V	D (ft)	C
0.87	0.7	1	85	1.375	91.207
				C > 64	Supercritical

Section D

C = (sqrt[I Kz Kzt]) V D I = 0.87 Table 2.3, Class I, no ice V = 85 mph

Kz = 2.01 (z / zg) ^ (2 / α)			z = 61.0 midpoint height above ground
			zg = 1200 for Exposure B (TIA Table 2-4)
			α = 7.0 (TIA Table 2-4)
Kz min	0.7		per Table 2-4
Kzt = 1			Suburban terrain per 2.6.6.4
Kz	0.86	> Kz min	

I	Kz	Kzt	V	D (ft)	C
0.87	0.7	1	85	1.156	76.697
				C > 64	Supercritical

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Effective Projected Area

(TIA 222 G 2.6.9.1.1)

EXTENDED

EPA = Cf [Df ΣAf + Dr ΣArRr] no flat members, this becomes

EPA = Cf [Dr ΣArRr] when tower has all round members

Dr = 1.0 Table 2-6

Rr = 0.57 - 0.14ε + 0.86ε^2 - 0.24ε^3 < 1 Subcritical C<32

Rr = 0.36 + 0.26ε + 0.97ε^2 - 0.63ε^3 Supercritical C>64

Cf = 3.4ε^2 - 4.7ε +3.4 for triangular towers

Segment	ε	Rr	Ar	Cf	RrAr	EPA (sq ft)
A	0.243	0.471	9.307	2.459	4.387	**10.788**
B	0.288	0.501	7.381	2.327	3.695	**8.598**
C	0.277	0.493	6.477	2.359	3.194	**7.533**
D	0.246	0.473	4.829	2.451	2.284	**5.598**

EPA of Rotor, Antenna

	height (ft)	width (ft)	C	EPA (sq ft)
Rotor	1.25	0.51	1.2	**0.765**
JK Falcon			Mfr Supplied	**12.200**
JK Quattro			Mfr Supplied	**8.800**
JK65			Mfr Supplied	**1.370**
2-in Mast	14.167	0.167	1.2	**2.833**
Coax	83.000	0.033	1.2	**3.320**

RETRACTED

Segment	ε	Rr	Ar	Cf	RrAr	EPA (sq ft)
A - D	0.635	0.755	27.994	1.786	21.134	**37.754**

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Velocity Pressure

(TIA 222 G 2.6.9.1)

Fst = qz Gh (EPA)

qz = 0.00256 Kz Kzt Kd (V^2) I

Exposure B (Kzmin =0.70, zg=1200, a=7.0)
Gh = Gust factor, 0.85 for towers under 450 ft
Kd = 0.85 for lattice towers, Table 2-2
I = 0.87 importance factor, Table 2-3

Wind Force vs Height		85 mph
z (ft)	Kz	qz (psf)
0	0.700	9.800
5	0.700	9.800
10	0.700	9.800
15	0.700	9.800
20	0.700	9.800
25	0.700	9.800
30	0.701	9.808
35	0.732	10.250
40	0.761	10.648
45	0.787	11.013
50	0.811	11.349
55	0.833	11.663
60	0.854	11.956
65	0.874	12.233
70	0.892	12.494
75	0.910	12.743
80	0.927	12.980
85	0.943	13.207

Wind Force vs Height		80 mph
z (ft)	Kz	qz (psf)
0	0.700	8.681
5	0.700	8.681
10	0.700	8.681
15	0.700	8.681
20	0.700	8.681
25	0.700	8.681
30	0.701	8.688
35	0.732	9.079
40	0.761	9.432
45	0.787	9.755
50	0.811	10.053
55	0.833	10.331
60	0.854	10.591
65	0.874	10.836
70	0.892	11.068
75	0.910	11.288
80	0.927	11.498
85	0.943	11.699

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Forces on Structure

Tower Section	Midpoint height	EPA	85 MPH Gh	qz	EXTENDED Force (lbs)	LRFD 1.6W
A	10.0	10.788	0.85	9.800	89.9	143.8
B	27.5	8.598	0.85	9.808	71.7	114.7
C	44.0	7.533	0.85	11.013	70.5	112.8
D	61.0	5.598	0.85	11.956	56.9	91.0
Coax -- one 0.41" dia cable						
	41.5	3.320	0.85	10.648	30.0	48.1
Distribute coax load to tower sections						
			A	13.84	22.1	**165.9**
			B	10.72	17.2	**131.8**
			C	11.76	18.8	**131.6**
			D	11.78	18.9	**109.9**
						539.3
Rotor and Antenna						
Rotor	65.0	0.765	0.85	12.233	8.0	**12.7**
Antenna 1	70.75	12.20	0.85	12.494	129.6	**207.3**
Antenna 2	82.00	8.80	0.85	12.980	97.1	**155.3**
Antenna 3	76.58	1.37	0.85	12.743	14.8	**23.7**
Mast	76.58	2.83	0.85	12.743	30.7	**49.1**

Tower Section	Midpoint height	EPA	85 MPH Gh	qz	RETRACTED Force (lbs)	LRFD 1.6W
A - D	11.5	37.754	0.85	9.800	314.5	**503.2**
Rotor and Antenna						
Rotor	18.8	0.765	0.85	9.800	6.4	**10.2**
Antenna 1	24.25	12.20	0.85	9.800	101.6	**162.6**
Antenna 2	35.50	8.80	0.85	10.250	76.7	**122.7**
Antenna 3	30.08	1.37	0.85	9.808	11.4	**18.3**
Mast	30.08	2.83	0.85	9.808	23.6	**37.7**

Weight Load		lbs	slinch
	Antenna 1	139	0.3601
	Antenna 2	87	0.2254
	Antenna 3	14	0.0363
	Rotor	16	0.0414

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Axial Strength of Members

AXIAL

Design Axial Strength of Round Members — Radius of Gyration rg = sqrt((r^2+r^2)/2)

TIA 4.5.4.2

	O.D. (in.)	I.D. (in.)	rg (in.)	Gross Area Ag (sq in)
Leg Section A, B	1.5000	1.000	0.6374	0.982
Leg Section C	1.2500	0.750	0.5154	0.785
Leg Section D	1.2500	1.010	0.5682	0.426
Web Section A	0.5000	0.000	0.1768	0.196
Web Section B	0.4375	0.000	0.1547	0.150
Web Section C	0.3750	0.000	0.1326	0.110
Web Section D	0.3125	0.000	0.1105	0.077
Mast 2.0 x 0.25	2.0000	1.500	0.8839	1.374

Legs	Nominal Fy = 70 ksi, E = 29 e 6	
Webs	Nominal Fy = 36 ksi, E = 29 e 6	
Mast	Nominal Fy =80 k, E = 29.7 e 6	cromoly

Get F'y — if D/t < 0.114E / Fy then F'y = Fy

	Dia / thickness	Nom Fy	0.114E / Fy	F'y
Leg Section A, B	6.000	70000	47.23	70000
Leg Section C	5.000	70000	47.23	70000
Leg Section D	10.417	70000	47.23	70000
All Webs		36000		36000
Mast 2.0 x 0.25	8.000	80000	41.33	80000

Check Slenderness

Lambda	λ = (KL / rg * π) * sqrt (F'y / E)	K=1, L=unbraced length inches	K=1.1 web braces (Table 4-5)
Fcr	Fcr = (0.658 ^ lambda^2)F'y	<-- when λ < 1.5	
Fcr	Fcr = (0.877 / lambda^2)F'y	<-- when λ > 1.5	
Pn	Pn = Ag * Fcr		

	L	λ	Fcr	Pn
Leg Section A	11.375	0.2791	67,755	66,518
Leg Section B	7.5	0.1840	69,015	67,755
Leg Section C	7.625	0.2276	68,499	53,799
Leg Section D	7.6875	0.2116	68,700	29,266
Webs Section A	25.6	1.6241	11,969	2,350
Webs Section B	21.18	1.5357	13,388	2,013
Webs Section C	18.12	1.5328	13,439	1,484
Webs Section D	15.77	1.6008	12,321	945
Mast 2.0 x 0.25	170	3.2155	6,786	9,327

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Axial Strength of Materials continued...

LRFD φ =	0.85	compression
LRFD φ =	0.9	tension

Factored	Max Stress	Max Compression	Max Tension
Leg Section A	60,979	**56,540**	**59,866**
Leg Section B	62,113	**57,592**	**60,980**
Leg Section C	61,649	**45,729**	**48,419**
Leg Section D	61,830	**24,876**	**26,340**
Webs Section A	10,772	**1,998**	**2,115**
Webs Section B	12,049	**1,711**	**1,811**
Webs Section C	12,095	**1,262**	**1,336**
Webs Section D	11,089	**803**	**851**
Mast 2.0 x 0.25	6,107	**7,928**	**8,394**

Moment Strength of Members

MOMENT
Design Flexural Strength of Round Leg Members
TIA 4.7.2

Z is Plastic Section Modulus Z = (d^3 - d^3)/6

	O.D.	I.D.	Z
Leg Section A, B	1.5000	1.000	0.3958
Leg Section C	1.2500	0.750	0.2552
Leg Section D	1.2500	1.010	0.1538
Mast 2.0 x 0.25	2.0000	1.500	0.7708

Note: webs are trusses and are not subject to moments

if D/t < 0.0714E / Fy then M = ZFy LRFD φ = 0.90

Unfactored	Dia / thickness	0.0714E / Fy	M	(inch-pounds) Max Moment
Leg Section A, B	6.000	29.58	27,708	**24,938**
Leg Section C	5.000	29.58	17,865	**16,078**
Leg Section D	10.417	29.58	10,766	**9,690**
Mast 2.0 x 0.25	8.000	25.88	61,667	**55,500**

Note: Z-brace struts are considered truss members and therefore only carry tension and compression loads.

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Shear Strength of Members

AISC Steel Hollow Sections LRFD 5.2

Radius of Gyration rg = sqrt((r^2 + r^2) / 2)

	O.D. (in.)	I.D. (in.)	rg (in.)	Gross Area Ag (sq in)
Leg Section A, B	1.50	1.00	0.6374	0.9818
Leg Section C	1.25	0.75	0.5154	0.7854
Leg Section D	1.25	1.01	0.5682	0.4260
Mast 2.0 x 0.25	2.00	1.50	0.8839	1.3745

Vn = Fcr Ag / 2

Fcr larger of 1.6E /(sqrt [(Lv / D)] (D/t)^1.2) or 0.78E / (D/t)^1.5
neither shall exceed 0.6Fy

	L	sqrt Lv/D	(D/t)^1.2	Fcr (1)	
Leg Section A	11.375	1.95	8.59	2775373	<< larger
Leg Section B	7.5	1.58	8.59	3417956	<< larger
Leg Section C	7.625	1.75	6.90	3851271	<< larger
Leg Section D	7.6875	1.75	16.64	1589721	<< larger
Mast 2.0 x 0.25	24	2.45	12.13	1562192	<< larger

	0.78E	(D/t)^1.5	Fcr (2)	0.6Fy	
Leg Section A	22,620,000	14.70	1539096	42000	<< governs
Leg Section B	22,620,000	14.70	1539096	42000	<< governs
Leg Section C	22,620,000	11.18	2023194	42000	<< governs
Leg Section D	22,620,000	33.62	672821	42000	<< governs
Mast 2.0 x 0.25	22,620,000	22.63	999672	48000	<< governs

LRFD φ = 0.9 shear

	Vn	Vmax
Leg Section A	20617	**18,555**
Leg Section B	20617	**18,555**
Leg Section C	16493	**14,844**
Leg Section D	8946	**8,051**
Mast 2.0 x 0.25	32987	**29,688**

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Torsion Resistance of Members

AISC LRFD Steel Hollow Sections 6.1

φT Tn Tn = Fcr C C = torsion constant

C = pi / 2 [R^4 - r^4] φ=0.90

L=unsupported length

Fcr larger of 1.23E / [sqrt(L/D) (D/t)^1.2] E

0.6E / [(D/t)^1.5] but not exceeding 0.6Fy 2.90E+07

	L	1.23E / [sqrt(L/D) (D/t)^1.2]	0.6E / [(D/t)^1.5]	0.6Fy	C	**Torsion Strength**
Leg Section A	11.375	1508661	1183920	42000	0.399	**15076**
Leg Section B	7.5	1857961	1183920	42000	0.399	**15076**
Leg Section C	7.625	2093506	1556303	42000	0.209	**7886**
Leg Section D	7.6875	864154	517555	42000	0.138	**5198**
Mast 2.0 x 0.25	24	849189	768979	48000	1.074	**46388**

(continued next page)

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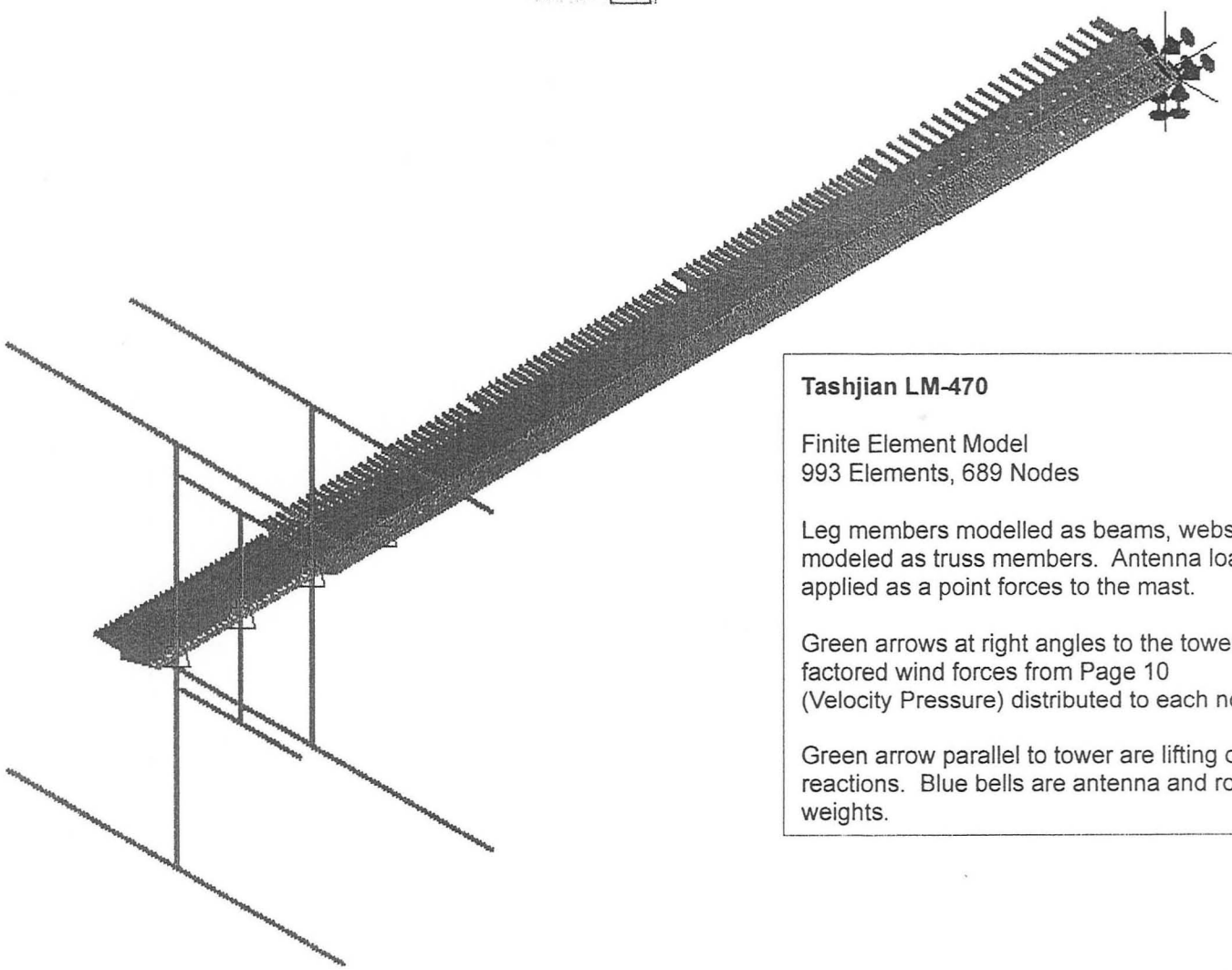
Finite Element Analysis Model and Results



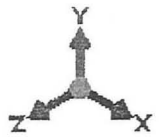
Tashjian LM-470

Finite Element Model
993 Elements, 689 Nodes

Leg members modelled as beams, webs modeled as truss members. Antenna load is applied as a point forces to the mast.

Green arrows at right angles to the tower = factored wind forces from Page 10 (Velocity Pressure) distributed to each node.

Green arrow parallel to tower are lifting cable reactions. Blue bells are antenna and rotor weights.



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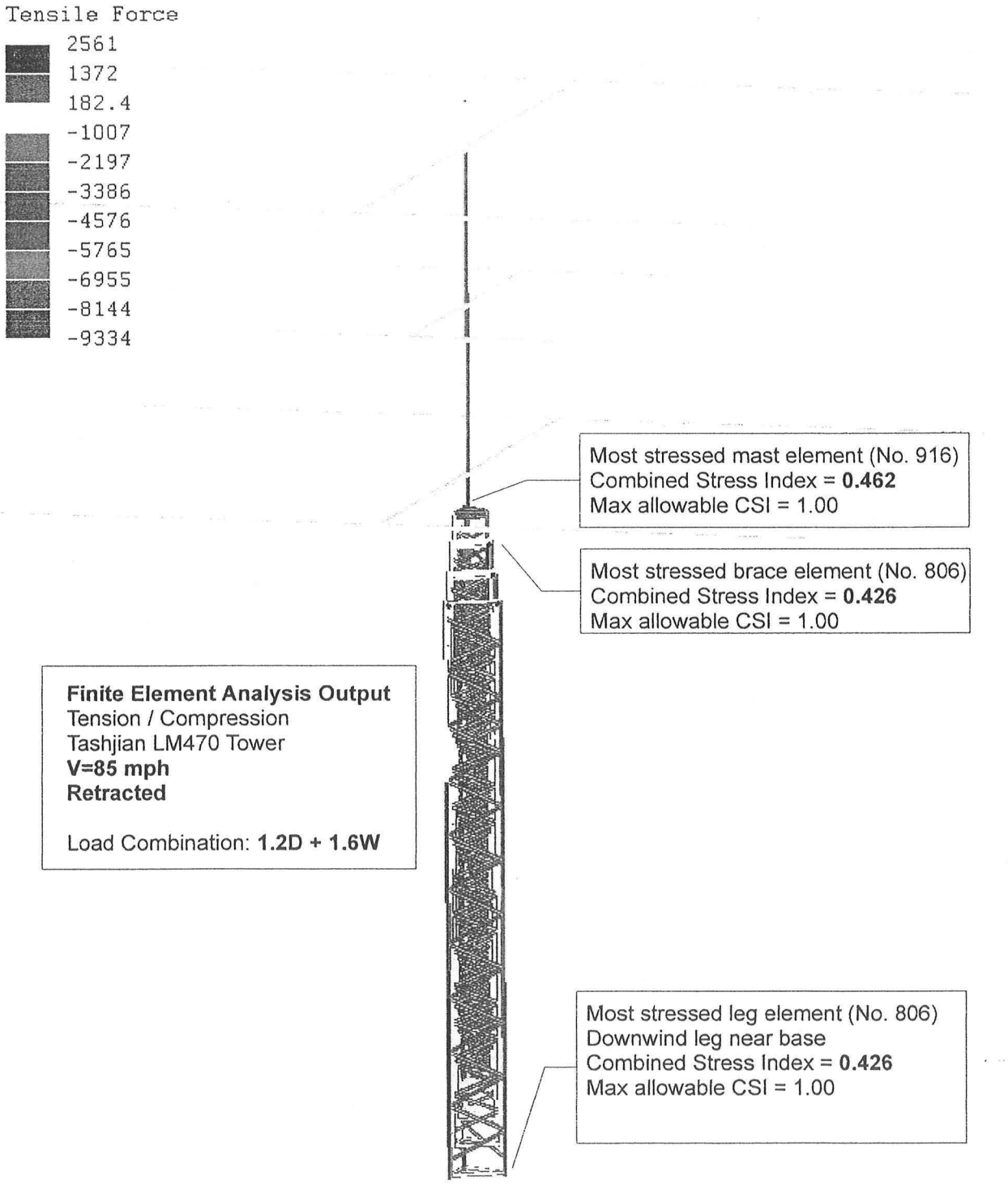

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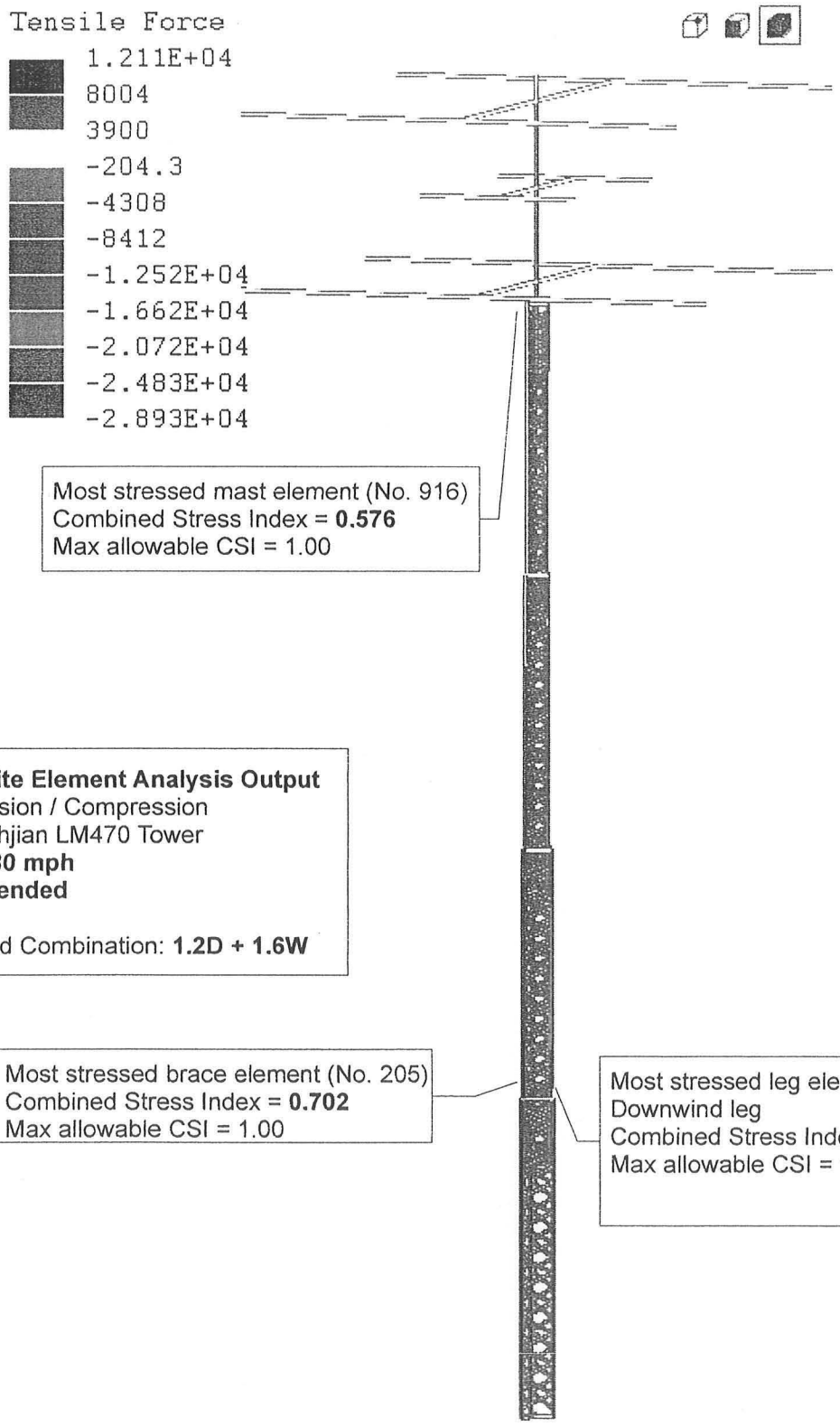

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FEA Results Summary

Client	K6SCA

Model file name: K6SCA LM470 Retracted.liml
Tower: Tashjian LM-470
LRFD Loads: 1.6(wind force) + 1.2(dead weight).
TIA-222-G Factors: 85 mph 3-sec gust, no ice load, Structure class 1, exposure class=C, Topo class=1
Guys: None
Antenna Loading: 3 Ants: JK Falcon, JK65, JK Quattro
Mast: 20 ft 2.0 in x 0.25 in 80k

85 MPH

23 FT UNGUYED
RETRACTED

Description	Material	Most Stressed Element	Tension+ Compression-	Tension Capacity	Compression Capacity	Shear	Shear Capacity	Moment (in-lbs)	Moment Capacity	CSI *	Pass/ Exceed
Leg Sect A 8	1.5 x 0.25 70k Tube	127	-9333.8	59866.3	56540.4	355.4	18555.1	2197.7	24937.5	0.273	OK
Leg Sect B 7	1.5 x 0.25 70k Tube	338	-3251.8	60979.8	57592.0	290.3	18555.1	2166.3	24937.5	0.166	OK
Leg Sect C 6	1.25 x 0.25 70k Tube	402	-3277.5	48419.2	45729.2	181.8	14844.1	936.1	16078.1	0.148	OK
Leg Sect D 5	1.25 x 0.12 70k Tube	629	-1319.0	26339.8	24876.5	1363.1	8051.4	2309.5	9689.7	0.461	OK
Brace Sect A 8	1/2 36k Round	12	498.9	2115.2	1997.6					0.236	OK
Brace Sect B 7	7/16 36k Round	346	178.2	1811.4	1710.7					0.098	OK
Brace Sect C 6	3/8 36k Round	575	-182.3	1335.8	1261.6					0.136	OK
Brace Sect D 5	5/16 36k Round	806	-361.9	850.5	803.3					0.426	OK
Mast	2.0 x 0.25 80k Tube	916	-365.7	8393.9	7927.6	302.4	29688.1	22786.8	55500.0	0.462	OK

* CSI = Combined Stress Index = Stress-to-capacity ratio summed for each type. Shall not exceed 1.00.
Leg elements are modeled as beams/columns. Web elements are truss elements with tension or compression only.
Capacity is reduced by ϕ per code. Resistance = ϕFy.

Base Reactions

(Extended reactions govern for footing design)

					No Wind
Element	Tension	Shear	Moment Arm (ft)	Moment (ft-lbs)	P Force
1	-2326.2	88.0	-0.553	1287.2	646.3
3	9334.0	355.4	1.107	10329.6	646.4
2	-2339.0	361.4	-0.553	1294.2	370.1
		804.8		12911.0	1662.8

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FEA Results Summary

Client	K6SCA

Model file name: Wilson RB61 45ft 85mph.liml
Tower: Wilson RB61A
LRFD Loads: 1.6(wind force) + 1.2(dead weight).
TIA-222-G Factors: 80 mph 3-sec gust, no ice load, Structure class 1, exposure class=C, Topo class=1
Guys: None
Antenna Loading: 3 Ants: JK Falcon, JK65, JK Quattro
Mast: 20 ft 2.0 in x 0.25 in 80k

80 MPH

70 FT UNGUYED EXTENDED

Description	Material	Most Stressed Element	Tension+ Compression-	Tension Capacity	Compression Capacity	Shear	Shear Capacity	Moment (in-lbs)	Moment Capacity	CSI *	Pass/ Exceed
Leg Sect A 8	1.5 x 0.25 70k Tube	125	-18375.5	59866.3	56540.4	1411.8	18555.1	9931.7	24937.5	0.810	OK
Leg Sect B 7	1.5 x 0.25 70k Tube	205	-20360.8	60979.8	57592.0	1961.5	18555.1	13273.2	24937.5	1.002	OK
Leg Sect C 6	1.25 x 0.25 70k Tube	424	-15747.5	48419.2	45729.2	1139.1	14844.1	7402.5	16078.1	0.893	OK
Leg Sect D 5	1.25 x 0.12 70k Tube	655	-9423.4	26339.8	24876.5	627.7	8051.4	4201.7	9689.7	0.898	OK
Brace Sect A 8	1/2 36k Round	12	615.7	2115.2	1997.6					0.291	OK
Brace Sect B 7	7/16 36k Round	216	1272.1	1811.4	1710.7					0.702	OK
Brace Sect C 6	3/8 36k Round	420	701.4	1335.8	1261.6					0.525	OK
Brace Sect D 5	5/16 36k Round	808	-594.6	850.5	803.3					0.699	OK
Mast	2.0 x 0.25 80k Tube	916	-365.7	8393.9	7927.6	385.7	29688.1	29002.8	55500.0	0.576	OK

* CSI = Combined Stress Index = Stress-to-capacity ratio summed for each type. Shall not exceed 1.00.
Leg elements are modeled as beams/columns. Web elements are truss elements with tension or compression only.
Capacity is reduced by ϕ per code. Resistance = ϕFy.

Base Reactions (these results for 85 mph)

Element	Tension	Shear	Moment Arm (ft)	Moment (ft-lbs)	No Wind P Force
1	-14504.2	103.4	-0.553	8025.6	646.3
3	30957.1	473.7	1.107	34259.2	646.4
2	-14790.1	477.8	-0.553	8183.8	370.1
		1054.9		50468.6	1662.8

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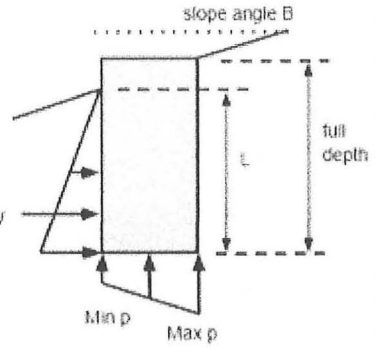
Footing: Check for Adequacy As Built

K6SCA Tashjian LM470

V = shear =	1055	lbs
M = moment =	50469	ft-lbs

Footing Design
Jaky Equation, Modified by USACE for Slopes
From TIA-222-G Annex F, Presumptive Soil Parameters



φ = 30 degrees
γ = 110 lbs per cu ft

Beta = slope =6 in rise over 24 in run
Beta = invtan (1/6) = 0.000 deg

Ko = 0.5000 $K_o = (1 - \sin\varphi')(1 + \sin\beta)$

As-built dimensions per Owner: 4.5 x 5.5 x 8.0
Use average width = 5.0 feet

Footing width = 60 inches

L (ft) depth	W per unit ft	W for full width	Mr (soil)	Mr (gravity)	Mr (total)
8	1,760.00	8,800.00	22,000.00	77,539.06	99,539.06
	8.00				
	96.00 inches		7.4	cu yds	

Check base for bearing capacity	96.00	Full depth inches	
Dead load of tower and antennas:	1663		
Dead load of concrete:	30,000	lbs	
Total DL	31,663	lbs	
1.2D	37,996	lbs	
Static soil pressure	1,520	psf	**Results**
TIA soil bearing, 3500psf x 0.75 factor	2,625	psf	OK
Calif Bldg Code 1806 Class SM	2,000	psf	OK
Check eccentricity P/A < M/S?			
S=bd^2/6	160.000		
P/A	1,519.82		
M/S	315		
therefore	Not Eccentric		
Max pressure,			
P/A + M/S	1,835	psf	OK
Min pressure,			
P/A - M/S	1,204	psf	OK

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Seismic Analysis

Per TIA-222-G, may use the Equivalent Lateral Force method (shear at the base).

Veq = (Sds) W (I) / R

Sds is short period spectral response
W is total weight of structure
I is Importance Factor = 1.0
R is Response Mod factor = 3.0
for self-supporting lattice towers (TIA 2.7.7.1)

From Annex B, seismic factors for Amador Co. are: 0.38 Ssmin
1.17 Ssmax

Sds = 0.425g USGS Report
Weight 1663 lbs

V = (0.431*32.17g)*(1663)/(3.0)
V = 7,686 lbs

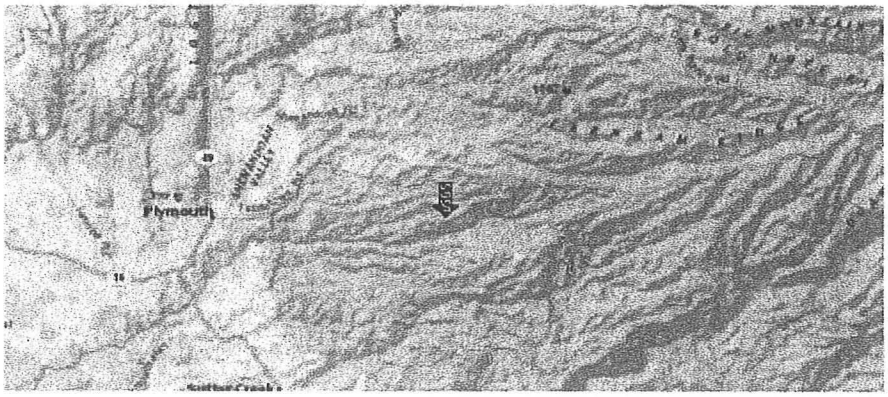
At base, tower supported by three #10 rebar
Shear strength = (3 bars)(0.5)(86ksi each) = 129ksi

7,686 lbs seismic force << 126,000 lbs capacity

USGS Design Maps Summary Report

User-Specified Input

Building Code Reference Document	2012 International Building Code (which utilizes USGS hazard data available in 2008)
Site Coordinates	38.492°N, 120.698°W
Site Soil Classification	Site Class D – "Stiff Soil"
Risk Category	I/II/III



USGS-Provided Output

S_s = 0.441 g S_{MS} = 0.638 g S_{DS} = 0.425 g

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Footing Reinforcement

Owner states the footing rebar was placed pursuant to Tashjian Tower's standard plans. The footing bars consist of 3 vertical No. 10 bars beneath each tower leg, overlapping with a vertical No. 5 bar for a total embedment of 7 ft 2 in in the concrete.

CHECK MINIMUM EMBEDMENT LENGTH OF REBAR PER ACI 318R-08 12.2.2

MINIMUM LENGTH FOR #10 BAR

$L_{dMIN} = d_b*(f_y*\Psi_t*\Psi_e)/(20\lambda\sqrt{f'_c})$ in.

$L_{dMIN} = 1.27*(60000psi*1*1)/(20*1*\sqrt{2500psi})$ in.

$L_{dMIN} =$ 76.2 in.

$\Psi_t =$ 1.0

$\Psi_e =$ 1.0

$\lambda =$ 1.0

$d_b =$ 1.270 in.

ALLOWABLE EMBEDMENT LENGTH REDUCTION

Unfactored load = Pu/1.67 = 26.40 k

As_{REQ} = Unfactored Load/(f_y/Ω) = 0.73 in^2

Embedment Reduction = 76.2in.*(0.73sqin/1.27sqin)= 43.8 in. = Required Embedment Length

46.5 in. = Provided Embedment Length

∴ 46.5 in. > 43.8 in. OK

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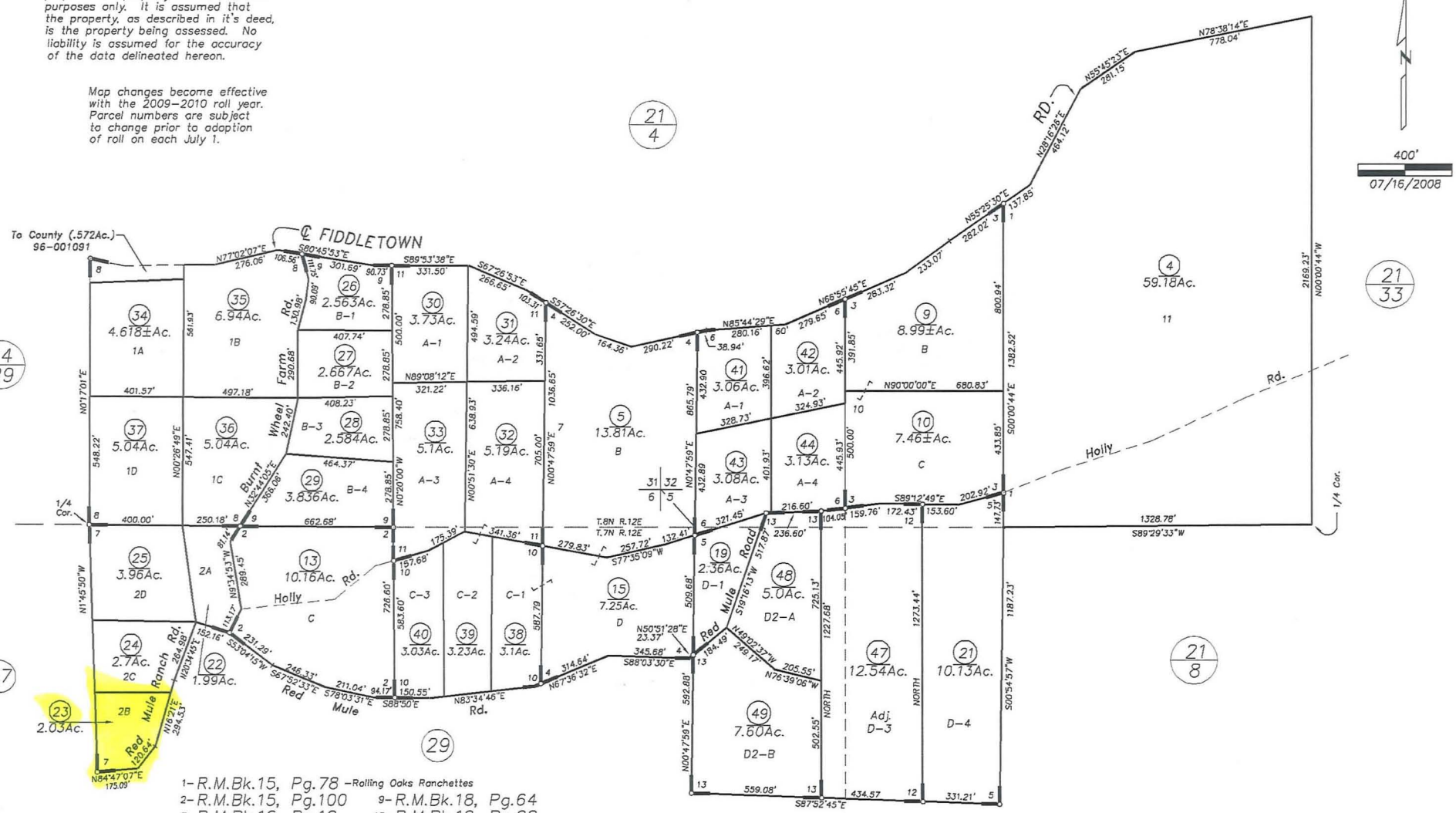
POR. SEC. 5&6, T.7N, R.12E, POR. SEC. 31&32, T.8N, R12E, M.D.B.&M.

15-28

IMPORTANT NOTE: This map was prepared for property tax assessment purposes only. It is assumed that the property, as described in it's deed, is the property being assessed. No liability is assumed for the accuracy of the data delineated hereon.

Map changes become effective with the 2009-2010 roll year. Parcel numbers are subject to change prior to adoption of roll on each July 1.



1- R.M.Bk.15, Pg.78 -Rolling Oaks Ranchettes
2- R.M.Bk.15, Pg.100
3- R.M.Bk.16, Pg.12
4- R.M.Bk.17, Pg.29
5- R.M.Bk.17, Pg.37
6- R.M.Bk.19, Pg.13
7- R.M.Bk.19, Pg.20
8- R.M.Bk.18, Pg.39
9- R.M.Bk.18, Pg.64
10- R.M.Bk.19, Pg.92
11- R.M.Bk.19, Pg.91
R.M.Bk.51, Pg.78 (8/4/1998)
12- R.M.Bk.55, Pg.27 (12/31/2002)
R.M.Bk.59, Pg.81 (7/10/2007)
13- P.M.Bk.60, Pg.56 (4/7/2008)

NOTE-Assessor's Block Numbers Shown in Ellipses.
Assessor's Parcel Numbers Shown in Circles.

Assessor's Map Bk.15, Pg.28
County of Amador, Calif.

17610 Red Mule Rd. — Fiddletown

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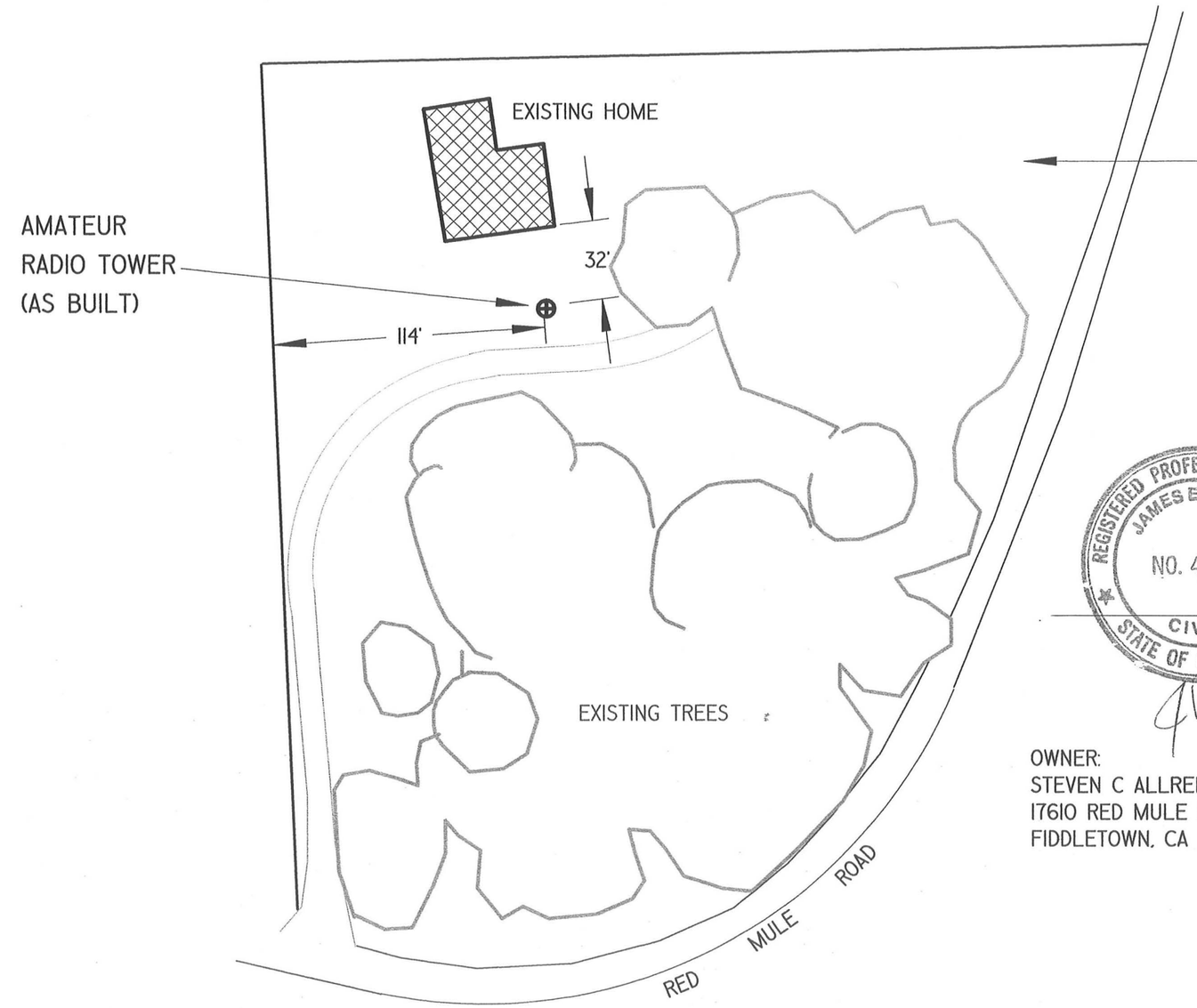

REGISTERED PROFESSIONAL ENGINEER
JAMES E. VARNEY
NO. 43113
CIVIL
STATE OF CALIFORNIA

NOTICE

ALWAYS RETRACT TOWER WHEN HIGH WINDS (50 MPH OR GREATER) ARE EXPECTED. WIND SPEEDS ABOVE 50 MPH MAY DAMAGE THE TOWER IF LEFT IN EXTENDED POSITION.

TOWER MEETS TIA-222-G
85 MPH STANDARD WHEN RETRACTED.

OWNER:
STEVEN C ALLRED
17610 RED MULE RD
FIDDLETOWN, CA 95629

PROJECT	AMATEUR RADIO TOWER (AS BUILT)
OWNER	STEVEN C ALLRED
ENGINEER	JAMES VARNEY, P.E.
DESCRIPTION	TITLE
DATE	
SCALE	
SHEET	1 OF 4

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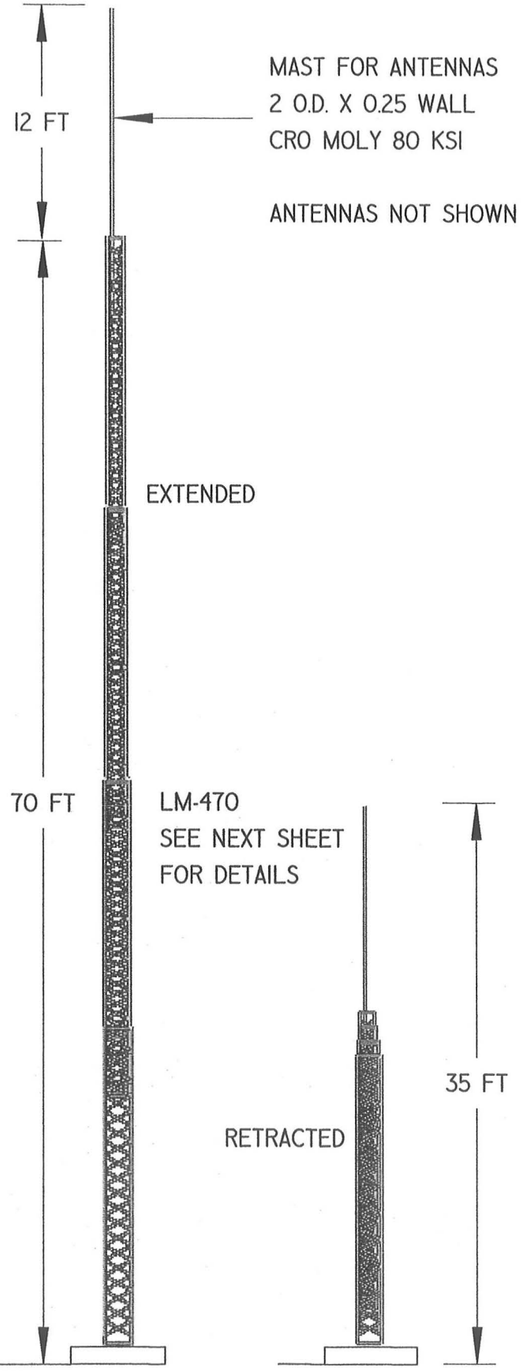

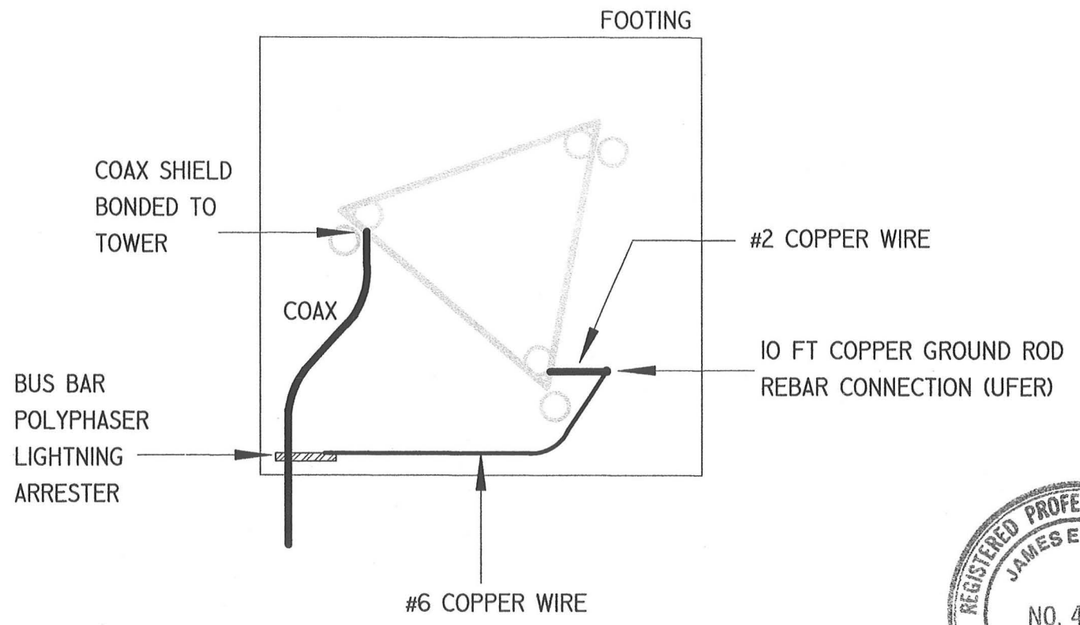

TOWER GROUNDING DETAIL
PLAN VIEW
(NO SCALE)

REGISTERED PROFESSIONAL ENGINEER
JAMES E. VARNEY
NO. 43113
CIVIL
STATE OF CALIFORNIA

PROJECT	AMATEUR RADIO TOWER (AS BUILT)
OWNER	STEVEN C ALLRED
ENGINEER	JAMES VARNEY, P.E.
DESCRIPTION	DETAILS
DATE	SCALE / SHEET 2 OF 4

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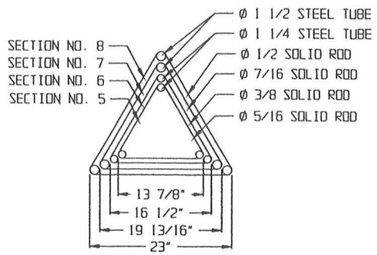
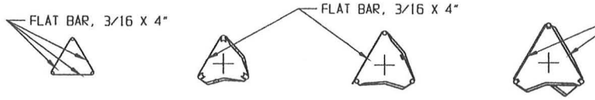
REVISIONS					
ZONE	LTR	ECO	DESCRIPTION	DATE	APPROVED

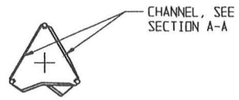


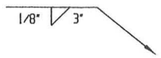
TOWER CROSS SECTION

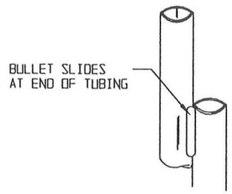
TABLE 1

SECTION	SECTION LEG SIZE	SECTION BRACE SIZE	1/2 LOOPS (TOTAL)	DIM "A"	WELD SCHEDULE SIZE	WELD SCHEDULE LENGTH	WELD SCHEDULE TYPE
(5)	1 1/4 X .083 WALL, STL TUBE	Ø5/16 STL ROD	3 (BOTTOM ONLY)	15"	.125"	.64"	V-TYPE
(6)	1 1/4 X .083 WALL, STL TUBE	Ø3/8 STL ROD	6 (TOP & BOTTOM)			.91"	
(7)	1 1/2 X .120 WALL, STL TUBE	Ø7/16 STL ROD				1.24"	
(8)	1 1/2 X .219 WALL, STL TUBE	Ø1/2 STL ROD	3 (TOP ONLY)	22 1/2"	.156"	1.29"	

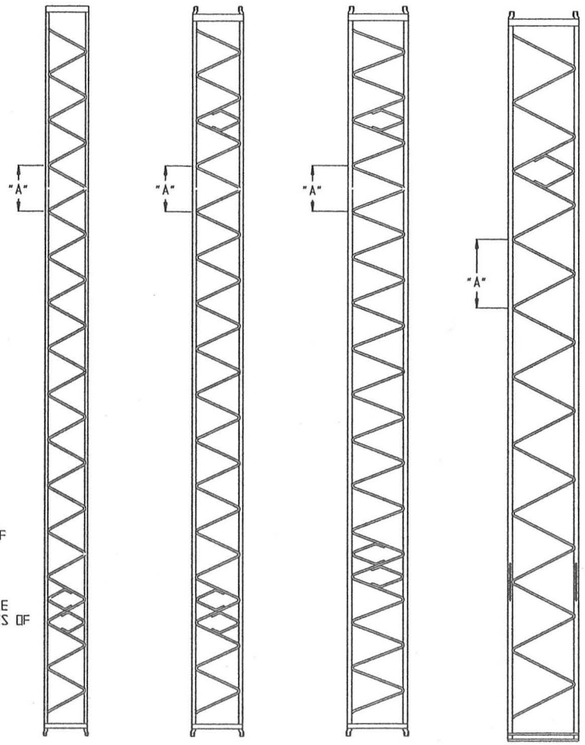


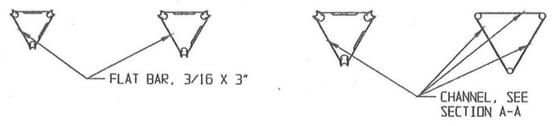


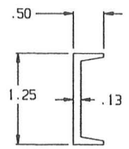




TYPICAL SECTION GUIDES

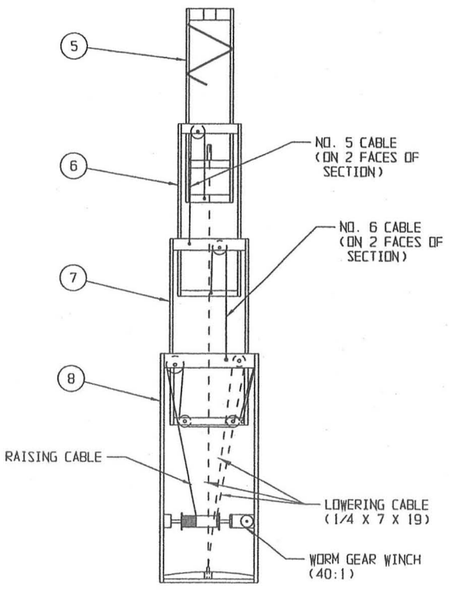




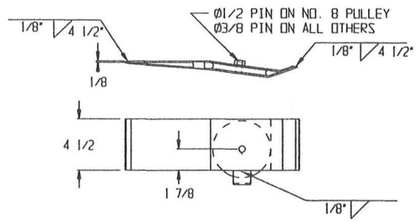


SECTION A-A

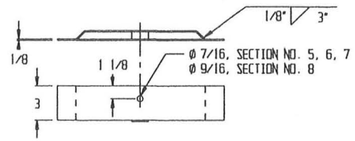
CHANNEL, 1/8 X 1/2 X 1 1/4



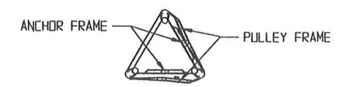
RAISING SYSTEM

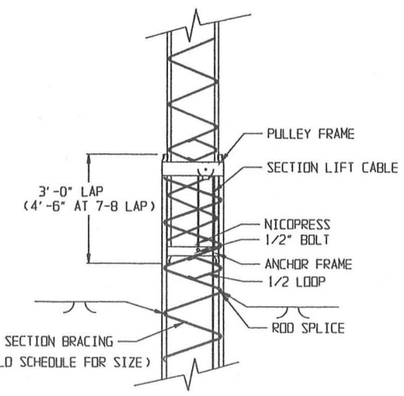


TYPICAL PULLEY FRAME



TYPICAL ANCHOR FRAME





TYPICAL LAP DETAIL

REGISTERED PROFESSIONAL ENGINEER
JAMES E. VARNEY
NO. 43113
CIVIL
STATE OF CALIFORNIA

NOT ORIGINAL EOR
PERFORMED INDEPENDENT
PLAN REVIEW & CALCS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: DECIMALS .XX±.05 .XXX±.01 ANGLES ± 1/2 STRAIGHT EDGE .003	PART NO.		
	APPROVALS	DATE	
MATERIAL	DRAWN	09/13/12	
	CHECKED		
FINISH	ENG. APPD.		
DO NOT SCALE DRAWING			

NEXT ASSY	USED ON
APPLICATION	

ASHJIAN TOWERS CORPORATION
2765 S. TEMPERANCE AVENUE, FOWLER, CA 93625

TITLE: TRI-EX LM-470 CRANK UP TOWER

SIZE	CAGE CODE	DRAWING NO.	REV.
D		S-2	

SCALE 1/1 SHEET 4 OF 4

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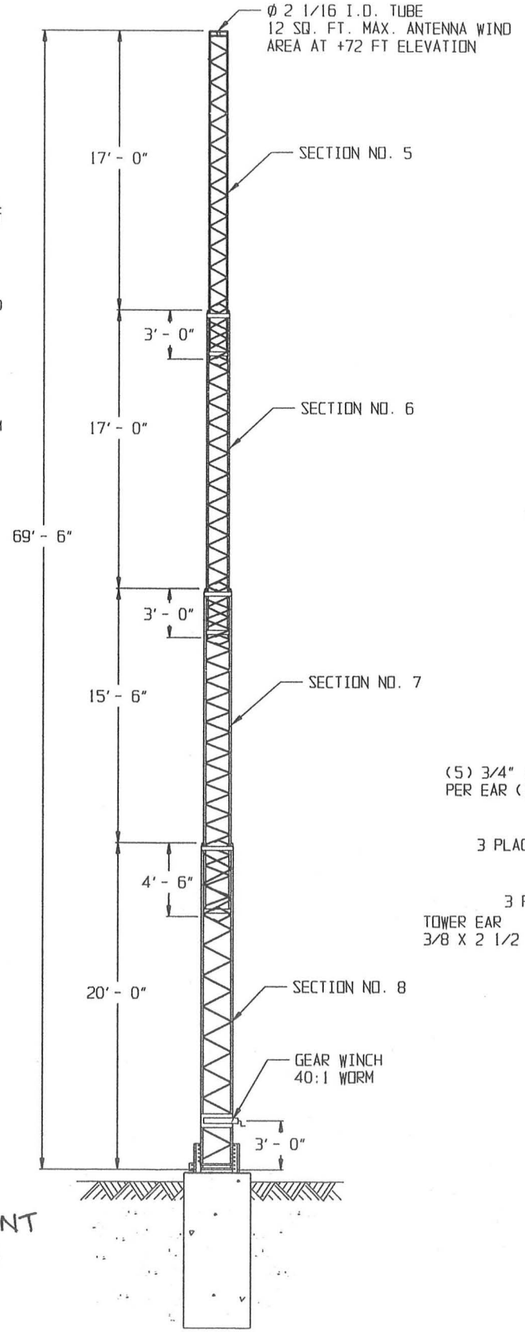
NOTES: UNLESS OTHERWISE SPECIFIED

1. THE TOWER SHALL BE FABRICATED AND ASSEMBLED IN CONFORMANCE WITH THE UNIFORM BUILDING CODE.
2. THE TOWER SHALL BE COMPLETELY HOT DIPPED GALVANIZED AFTER FABRICATION.
3. FLEXIBLE GALVANIZED AIRCRAFT CABLES OF 7 X 19 TYPE SHALL CONFORM TO A DESIGN LOAD EQUAL TO 1400 POUNDS FOR 1/4 INCH SIZE. THE MANUFACTURER'S CERTIFICATE OF GUARANTEE FOR MINIMUM BREAKING STRENGTH SHALL SHOW A BREAKING STRENGTH OF THREE TIMES THE DESIGN LOAD OF 1400 POUNDS FOR EACH FOLL OF CABLE AND SHALL BE SUBMITTED FOR EACH JOB TO THE BUILDING DEPARTMENT UPON REQUEST.
4. THE CONCRETE SHALL CONSIST OF CEMENT(5 1/2 SACKS OF CEMENT PER CUBIC YARD OF CONCRETE), AGGREGATE(3/4" SIZE), SAND, AND WATER(WATER TO CEMENT RATIO SHALL NOT EXCEED 0.50, AND CONCRETE SLUMP SHALL NOT EXCEED 4 1/2 INCHES) TO YIELD A MINIMUM COMPRESSIVE STRENGTH OF 2500 PSI AT 28 DAYS.
5. ALL FOOTINGS SHALL PENETRATE INTO AND BEAR UPON UNDISTURBED SOIL OR COMPACTED SOIL - EACH SOIL WITH A MINIMUM IN-PLACE-DENSITY, AS DETERMINED BY ASTM D1556-70, OF 92% OF MAXIMUM DENSITY AT OPTIMUM MOISTURE CONTENT ESTABLISHED IN ACCORDANCE WITH ASTM D1557-70, FOR THE SOIL OF THE TOWER SITE. ALL BACKFILL SOIL SHALL CONFORM WITH THE IN-PLACE-DENSITY AND OPTIMUM MOISTURE CONTENT REQUIREMENTS OF THIS PARAGRAPH.
6. THE FOUNDATION DESIGN IS ADEQUATE FOR SOILS MEETING OR EXCEED CLASS 5 SOIL,1000 PSF BEARING SPECIFICATIONS PER 2007 CBC.
7. ALL REINFORCING STEEL SHALL CONFORM TO ASTM A-615-76A AND AWS D1.1-90 STRUCTURAL WELDING CODE-REINFORCING STEEL.
8. TOWER IS DESIGNED TO BE USED IN A FULLY EXTENDED POSITION.

MATERIAL SPECIFICATION:

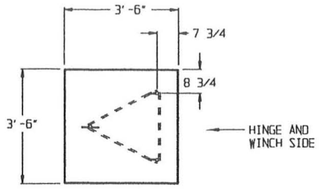
SHAPES	ASTM A36
PLATES	ASTM A36
PIPE	ASTM A-53 GRADE B
TUBE	ASTM A513 TYPE 5 DOM Fy=60 KSI (TOWER LEGS)

GALVINIZED PER ASTM A123 AND 153

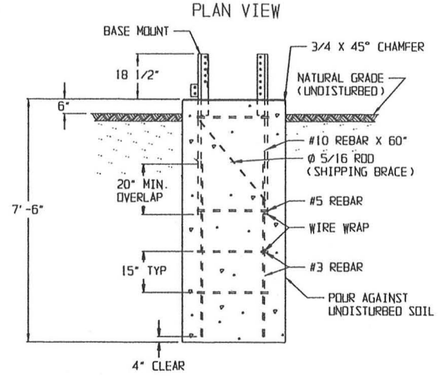


TOWER DESIGN LOADING

WIND LOAD: 85 MPH W/ 3 SECOND GUST, EXPOSURE C, CLASS II, PER ANSI/TIA- 222 REV G

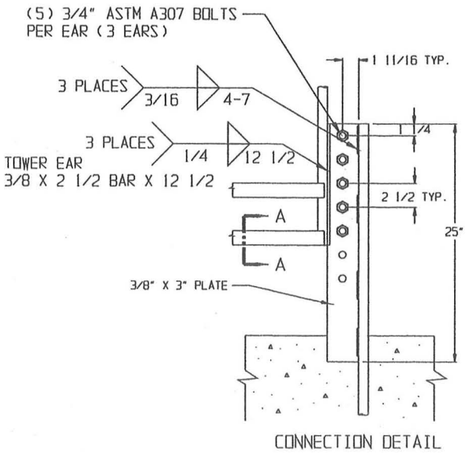


PLAN VIEW



ELEVATION

(REQUIRED CONCRETE= 3.4 CU. YDS)



CONNECTION DETAIL

REGISTERED PROFESSIONAL ENGINEER
JAMES E. VARNEY
NO. 43113
CIVIL
STATE OF CALIFORNIA

NOT ORIGINAL EOR
PERFORMED INDEPENDENT
PLAN REVIEW & CALCS

REVISIONS

ZONE	LTR	ECO	DESCRIPTION	DATE	APPROVED

ITEM	QTY REQD	PART NO. IDENTFYING NO.	NOMENCLATURE OR DESCRIPTION	DWG NO.
30	1		INSTRUCTION MANUAL, LM-470	
29	1		CONCRETE BASE ASSEMBLY, RCB-70	
28	4		SPRING, 12", CENTURY	
27	1		PULL-DOWN ROD, .500 X 17"	
26	10		PULLEY ASSEMBLY W/ KB	
25	1		5/8" MOUNTING HUB	
24	1		V-BELT	
23	1		SINGLE GROOVE PULLEY, Ø 10 3/4" #AK109H	
22	1		SINGLE GROOVE PULLEY, Ø 1 1/2"	
21	1		BELT GUARD WELDMENT	
20	1		AIR VENT FOR GEAR BOX	
19	1		ELECTRICAL BOX ASSEMBLY	
18	1		EMERGENCY HANDLE ASSY	
17	1		LIMIT SWITCH ASSEMBLY - LOWER	
16	1		LIMIT SWITCH ASSEMBLY - UPPER	
15	1		WINCH PLATE, MOTOR SIDE	
14	1		WINCH PLATE, BEARING SIDE	
13	1		BEARING FLANGE 2H FAFNIR YCJT-1	
12	1		PLUG, PIPE, .125 NPT, BLACK	
11	1		GEARBOX 40:1 W300 STYLE A	
10	1		WINCH DRUM WELDMENT	
9	1		ELECTRIC MOTOR, 1/2 HP WASHDOWN	
8	1		PULLDOWN CABLE, 1/4" 7 X 19 GALVANIZED	
7	1		#5 LIFT CABLE, 1/4" 7 X 19 GALVANIZED	
6	1		#6 LIFT CABLE, 1/4" 7 X 19 GALVANIZED	
5	1		LIFT CABLE, 1/4" 7 X 19 GALVANIZED	
4	1		LM-470 #5 SECTION WELDMENT	
3	1		LM-470 #6 SECTION WELDMENT	
2	1		LM-470 #7 SECTION WELDMENT	
1	1		LM-470 #8 SECTION WELDMENT	

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: DECIMALS .XX±.05 .XXX±.1 ANGLES ± 1/2 STRAIGHT EDGE .009	PART NO.	ASHJIAN TOWERS CORPORATION 2765 S. TEMPERANCE AVENUE, FOWLER, CA 93625	
MATERIAL	APPROVALS / DRAWN 08/18/10	TITLE	LM-470 CRANK UP TOWER
FINISH	CHECKED	SIZE D / CAGE CODE / DRAWING NO. S-1 / REV.	
	ENG. APPD.	SCALE 1/1	SHEET 1 OF 1
NEXT ASSY / USED ON	APPLICATION	DO NOT SCALE DRAWING	

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