### **Attachment to Building Permit Application**

## Amateur Radio Antenna Support Structures

Submitted to the Storey County Building Department

August 13, 2008

## Attachment to Building Permit Application For Amateur Radio Antenna Support Structures

#### **Background**

This is a post-construction application for four amateur radio antenna support structures erected between 1997 and 2007.

Structure Name	Model	Erected	Height Above Base	Work	Photo
40 Meter Rohn 45G	Rohn 45G	1997	140′	Tower raised to 140' on July 17. Replace existing Yagi @70' and add second Yagi @ 140'.	
20 Meter Rohn 25G	Rohn 25G	1998	85'	Antenna work only. Replace 5 element 20M Yagi with 6 element 20M Yagi. Remove 440MHz repeater antenna.	
160 Meter Rohn 25G	Rohn 25G	2007	110′	One guy anchor on Blake property. New base and anchor in place.	

Rohn 45G	2007	140′	Remove	
			Yagı.	
	Rohn 45G	Rohn 45G   2007	Rohn 45G   2007   140'	Rohn 45G 2007 140' Remove C31XR and replace with third 6 el 20M Yagi.

Since moving to the Highlands in 1997, the Applicant has been repeatedly told by the Storey County Building Department and County Manager that amateur radio antenna support structures did not require building permits and, until 1999, were not considered "structures" per se. Prior to 1999, there was no height limit for amateur radio antenna support structures in then SCC §17.12.020 Building height, which was limited by its terms to "buildings and trailers." See **Exhibit G** of this document. The Applicant has also been told by the Building Department and County Manager, on more than one occasion, that the 1999 revision to the SCC with respect to building height, now found at SCC §17.12.044, was a direct result of the first two towers being erected on Lot 37 of Highland Ranches, but that the Applicant was "grandfathered," and that "he could do whatever he wanted to do" with amateur radio antenna support structures.

While the 1999 revision to the SCC expands the coverage of height restrictions, and purports to impose a firm, fixed and unvarying 45' height limitation on amateur radio antenna support structures, the fixed 45' height limit is void as a result of NRS 278.02085 <sup>1</sup>. This argument is extensively supported in the Applicant's Supplement to this Building Permit Application.

**Exhibit B** contains wording recommending a variance be applied for. Until a Stop Work Order (**Exhibit A**) was issued on July 17, 2008, however, the Applicant believed in good faith that he was in compliance with all ordinances, statues and regulations with regard to the then existing antenna support structures. Notwithstanding that belief, the Applicant now seeks a building permit for the existing structures exceeding 45 feet in height<sup>2</sup>.

**Exhibit E** shows the placement of these structures on Lot 37. These structures were designed and installed in accordance with TIA/EIA-222, as required by IBC §3108.4, and in compliance with the wind loading requirements of IBC §3108.6. All towers are permanently and effectively grounded (IBC §3108.7).

<sup>&</sup>lt;sup>1</sup> See the quotations, citations and argument in the accompanying Supplement.

<sup>&</sup>lt;sup>2</sup> The Applicant has separately filed, on July 25, 2008, an application for two antenna support structures below the height of 45', for which he sees, with or without the effect of NRS 278.02085, the grant of a building permit as a ministerial act.

**Exhibit F** is an Opinion on suitability from Lawrence M. Prater, P.E., Ltd., which he wrote for the VHF Trylon 1245and Rohn HBX-32 towers<sup>3</sup>. Mr. Prater is a Civil Engineer, not a Structural Engineer. As such, he declines to stamp an opinion on structures over 45'. During his visit, he did inspect ALL structures at the site and offered his view that the structures over 45' in height were adequate for their intended purposes. He has made himself available to discuss his inspection results with the County. As a long-time resident of the Highlands and a member of the Storey County Planning Commission, his observations and opinions should be given the weight due his expertise and experience.

The Highland Ranches Property Owner's Association (HRPOA) has also opined on numerous occasions that the CC&R's do not cover amateur radio antenna support structures. See letter exhibit in accompanying Supplement.

**Exhibit A** was served by Dean Haymore on July 17, 2008. The Applicant complied, and completion of the structure, as well as erection of the antennas was discontinued pending resolution of the matter. This application is submitted for the purpose of complying with all laws.

#### Request

The Applicant hereby requests a building permit for these four structures, as they are amateur radio antenna support structures that are "as of right" construction, because NRS 278.020.85 makes the height restriction of SCC §17.12.044, as applied to these structures, void.

<sup>&</sup>lt;sup>3</sup> Included in the Building Permit Application of July 25, 2008.

#### **Description of Each Structure**

#### 40 Meter Rohn 25G - 140'

This support is footed in a concrete base and guyed at four levels. The construction follows the engineering drawings in the Rohn company (the manufacturer's) catalog. The engineering sheets provided in **Exhibits C-1 through C-3** have become the standard for safe tower installation around the world, because they have been proven to be safe in tens of thousands of installations, over decades of use. Most amateur radio installations of Rohn tower that require "wet stamped" engineering drawings are most often copies of the attached drawings with a PE stamp. This tower has been in use for 11 years, and has supported many different antenna arrays. This structure has withstood the all-time record winds in Northern Nevada<sup>4</sup>.

This structure is located 76′ from the nearest property line. The raised guy anchor on the Southeastern guy wire is 4′ tall, less than the 6′ height of a structure which could invoke the setback requirement of SCC §17.40.050⁵. The Applicant plans two 40 Meter Yagi antennas on this structure, installed at 65′ and 140′. These antennas are rated a 13 sq. ft. of total wind load, while the Rohn Specifications allow 12.7 sq. ft. of wind load *at the top*. To accommodate this minor variation, the structure is guyed at four places instead of the usual recommended three. The guys also include a "star guy" torque absorber on the second set, and torque-bar assemblies on the third and fourth sets -- for an extra safety margin.

Each time Building Inspectors Gardner or Haymore visited the site in June and July of 2008 to perform code compliance inspections, prior to the pouring of concrete for Building Permit No. 8354, the Applicant reminded them of the entire scope of the Applicant's plans for structure enhancements, including raising this tower from 70' to 140'. At no time did either Inspector make any statement or inference that a building permit was required for the existing towers, allowing the Applicant to believe, in good faith, the County's approval of the existing structures. As this structure had never been the object of a building permit, on July 17 it was raised in height from 70' to 140', consistent with the strategic plan for enhancement of the Taormina amateur radio station.

#### 20 Meter Rohn 25G - 85'

Rohn Model Rohn 25G, at heights between 50' and 90' is probably the most commonly used antenna support structure in the United States. It is a rugged, low profile support that has decades of history of reliability. This support is footed in a concrete base. The construction follows the engineering guidance in the Rohn Tower

8/13/2008 6:58:00 PM

<sup>&</sup>lt;sup>4</sup> Source – National Weather Service Web Site – All time record wind recorded at the Reno Tahoe International airport of 82 MPH.

<sup>&</sup>lt;sup>5</sup> SCC §17.40.050: The following minimum setbacks shall apply to **all structures over six feet in height** in the E estates zones. . . . E-10-HR 30 ft. 40 ft. 15 ft (Emphasis added).

Catalog. Instead of the recommended three guy levels, this tower has four sets of guys, and the Applicant intends to add torque bars for an extra margin of safety. See **Exhibits D-1 through D-3** for the engineering data. This structure is 81 feet from the nearest property line.

This tower has been in use for 10 years. It has supported many different antenna arrays, having withstood the all-time record winds in Northern Nevada<sup>6</sup>

The Stop Work Order of July 17 (**Exhibit A**) seems to apply to this structure. While there are no major changes planned for this support, it is scheduled for periodic maintenance of the guy wires, coaxial and control cables, and for replacement of the existing antenna with another similar antenna.

#### 20 Meter Rohn 45G - 140'

This support is footed in a concrete base and guyed at three levels. The construction follows the guidance in the Rohn Tower Catalog. The engineering sheets provided in **Exhibits C-1 through C-3** have become the standard for safe tower installation around the world because they have been proven to be safe in tens of thousands of installations, over decades of use. Most amateur radio installations of Rohn tower that require "wet stamped" engineering drawings use copies of the attached drawings. In this instance, the Applicant has been erecting such Rohn towers for nearly 50 years. There was and is no need for individual drawings or PE approval, as the Rohn drawings were used for design and wind-loading guidance.

This tower has been in use for one year. It supports substantial antenna arrays, but they are well within the design limits of the structure. This structure withstood the winter of 2007, including radial icing in January of 2008, with no damage. It is 170' from the nearest property line. The antennas at the top represent a distributed-combined wind-load of 12 sq. ft., well within the conservative 12.7 sq.ft. (at the top) rating of the manufacturer.

#### 160 Meter Rohn 25G - 110'

Rohn Model 25G, at heights between 50 and 90' is probably the most commonly used antenna support structure in the United States. It is a rugged, low profile support that has decades of history of reliability. This support is footed in a concrete base. The construction follows the guidance in the Rohn Tower Catalog. See **Exhibits D-1 through D-3** for the engineering data. This support has been in use for one year. The entire tower is a vertical radiator (antenna). It is identical in design to most AM Radio Broadcast Towers. There is no wind-load to the tower, other than the American Flag. This structure withstood the winter of 2007, including radial icing in January of 2008, with no damage. It is 40' from the nearest property line, and meets the setback requirements of SCC §17.40.050.

<sup>&</sup>lt;sup>6</sup> Source – National Weather Service Web Site – All time record wind recorded at the Reno Tahoe International airport of 82 MPH.

#### **Exhibit A**

# Storey County Bull Department

P O Box 526 ~ Virginia City NV 89440 ~ (775) 847-0966 ~ Fax (775) 847-0935 ~ scbd@storeycounty.org

## STOP WORK ORDER

by Storey County Building Official

Issued to: Tom Taormina

July 17, 2008

370 Panamint Road

Virginia City Highlands, NV 89521

Project #1: CONSTRUCTION OF AND ALTERATION OF HAM RADIO TOWER(S)

The stop work order is hereby issued for failure to comply with Storey County Ordinance 15.12.010.

15.12.010 Building Permit Required. It is unlawful for any person, corporation, municipal corporation, association, club, business trust, estate, or any group or combination thereof to erect, construct, relocate, or alter any sign, building, or structure within the county without first obtaining a building permit from the building official.

Violation 1: Owner is altering existing tower and has not secured the appropriate application, plans, engineering and/or obtained a Building Permit for said work.

Violation 2: Owner has not submitted an application to the Storey County Planning Department for a variance or received an approval for the height of the radio tower(s) that exceed(s) 45 feet.

Violation 3: Owner has failed to comply with the following Storey County Ordinance:

17.12.044 Height of buildings. In the R-1, R-2, E, A, PUD, and F zones, no building, manufactured building or manufactured home shall exceed a height of three stories or thirty-five feet, whichever is higher, except as may be allowed by special use permit. The requirements of this section shall not apply to church spires, belfries, cupolas, domes, chimneys or flagpoles. Radio, television and other communication masts may extend not more than forty-five feet above grade level, provided that the same may be safely erected and maintained at such height in view of surrounding conditions and circumstances.

Project #2: CONSTRUCTION OF TWO HAM RADIO TOWERS OVER 45 FT

Violation 4: Owner has not submitted an application to the Storey County Planning Department for a variance or received an approval for the height of the radio tower that exceeds 45 feet.

Dean Haymore, Building Official

#### **Exhibit B**

PO BOX 526 ~ VIRGINIA CI	Building Depai 14, NV 89440 ~ (702) 8	tment 47-0966	Pern	nit #:	8354
0000			Reques	sted:	7/15/08
CODE COMPLIANCI		REPORT	Re	ady:	7/16/08
Site Address: 370 Panamint	APN #003-431-18			Area:	Lot / Blk
Owner: Taormina		Contractor: OB		HR	37
4.00	INSPECTION(s	) REQUESTED:			
1. Footing Stemwall	Ready to Pour	Concrete - Forms in, L	IFER Ground, I	Reinf. Stl.	In-Place
2. Tloor Joists - Mud Sill, J-Bo	lts and Blocking In as Req	uired; Rough Plumbing	Installed		
3. Roof Sheet Nailing - Nail Sp					
4. Framed Complete - Plumbing	thru roof, Elect. Boxes in, W	fire Pulled, Heating, Gas	Pipina. Roof Shir	naled Sidir	ag On Day In
5. 🗌 Insulation a. 🗌 Batts	b. Blown - CERTIF	ICATION Required	, 0,	igiou, olali	ig On, Dry III
6. Sheet Rock Nailing		7			
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#### **Exhibit C-1 Rohn 45G Catalog Sheet**



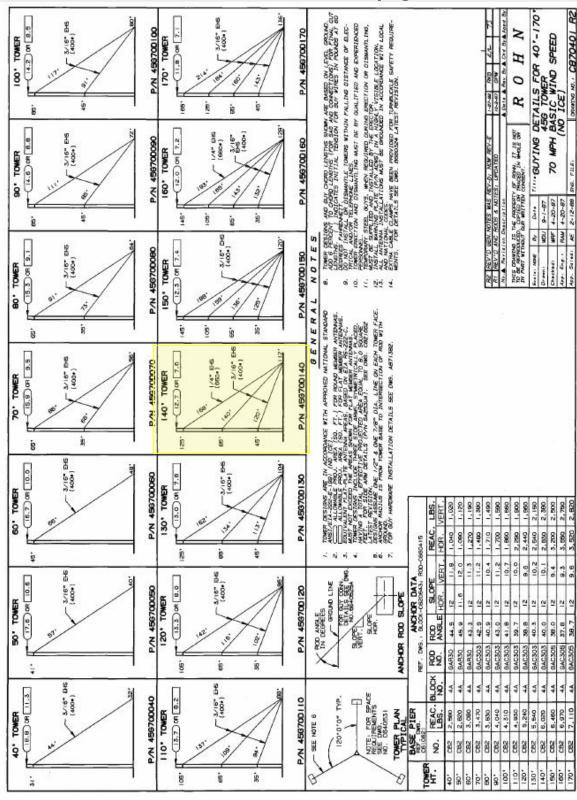
### 45G COMMUNICATIONS TOWER

The 45G is a true multi-use structure that provides excellent strength for applications up to 300 feet. It's offered with either heavy steel tube or solid steel rod legs to satisfy a wide variety of needs under varied conditions. When properly installed, the standard tower will support loads as shown on various guyed and self-supporting information sheets in the ROHN catalog.

#### FEATURES:

- . Completely Hot Dip Galvanized after fabrication
- · Heavy steel tube or solid steel rad side rails
- Built on 18" equilateral triangle design
- Utilizes 1 1/4" outside diameter, 14 gauge, special quality steel tubing or solid steel rod legs
- Zig-Zag® cross broding is formed from a continuous 7/16" solid steel rad electrically welded every 15 3/4" on the side rads
- Each 10' sleeve is joined to the other and double botted for extra strength

Exhibit C-2 - Rohn 45G Base and Guying Detail



C630645 R 10 456 SECTION ASSEMBLY ROHN 45AG2 45AG5 100 CAPACITIES SHOWN ARE BASED ON ANSIMILA-222-E-1991. 11/1 45AG1 NOMENCL ATURE SECTION 45AG4 7 BAYS AT 15 3/4 EACH 456 - -5 - -01 PX SECTION PROPERTIES NOTE: SPECIFICATIONS OF TOP SECTIONS ARE THE SAME AS SECTION NO. 459 EXCEPT AS NOTED ABOVE. 45AG RACH 0 - 10 -# BAYS AT 15 3/4" 45G TOWER 00 2/1

**Exhibit C-3 Rohn 45G Construction Detail** 

#### Exhibit D-1 - Rohn 25G Catalog Sheet



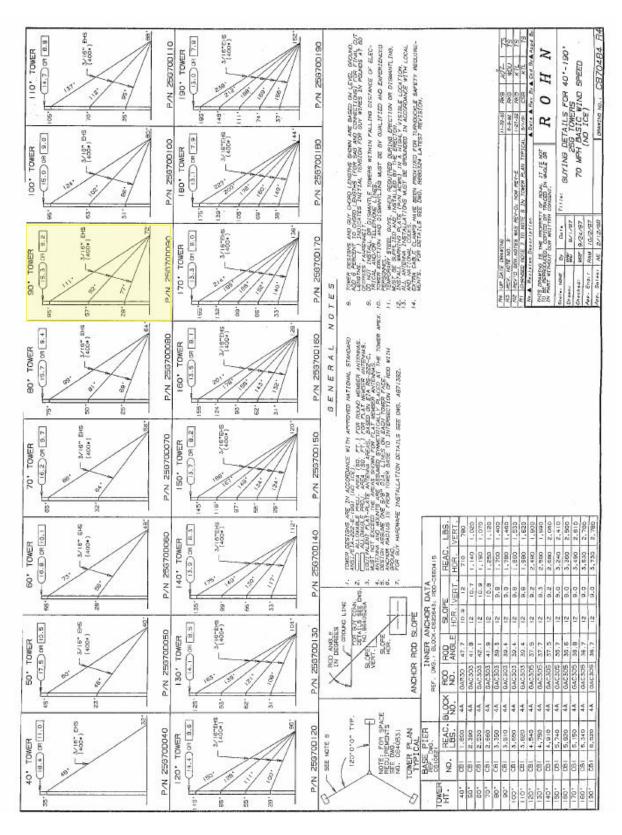
#### 25 G

The 25G is available in the standard 10' section length and a 7' length which is UPS shippable. The 25G uses double bolted joints, proven to be the best method of joining tower sections for sturdiness and dependability. The 25G tower can be used in guyed, self-supporting or bracketed configurations according to specifications in the ROHN catalog. As a guyed structure, the 25G can rise to a maximum of 190 feet. Self supporting and bracketed heights depend on loading and are also specified in the ROHN catalog.

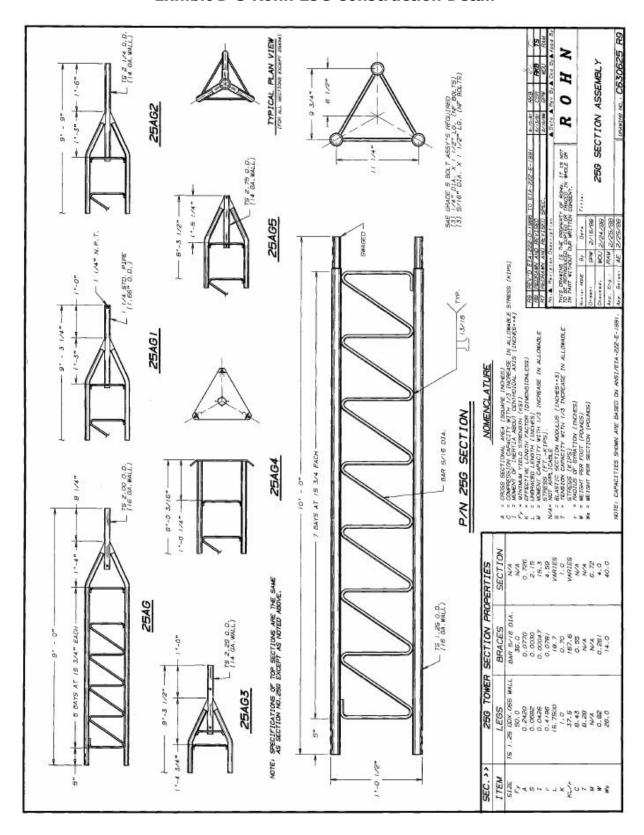
#### FEATURES:

- Completely Hot Dip Galvanized after fabrication
- Accessories for 20G are same as the 25G and completely interchangeable
- Built on 12 1/2" equilateral triangle design
- High strength tubular legs joined by Zig-Zag® cross members
- Each 10' section contains all required nuts and bolts inside one leg
- Entirely welded and fabricated with precision equipment
- Extra heavy-duty 1 1/4" steel tubing side rails
- Continuous solid steel rod bracing

Exhibit D-2 - Rohn 25G Base and Guying Detail



**Exhibit D-3 Rohn 25G Construction Detail** 



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**Exhibit E: Locations on Lot 37** 



#### **Exhibit F: PE Opinion**

## Lawrence M. Prater, PE, Ltd. 235 W. Pueblo Street Reno, NV 89509 (775) 829-9819

July 24, 2008

To: Whom it may concern

Re: Antenna Support Structures 370 Panamint Road Virginia City Highlands, Storey County, NV

At the request of Mr. Tom Taormina I have conducted a post-construction inspection of a Rohn HBX-32 (32 ft. high) and a U.S. Military (40 ft. high) antenna support structure located on his property at 370 Panamint Road, Virginia City Highlands, NV. I have also examined the available information from the structure manufacturers. I was not present at the time of installation, but a physical inspection conducted on July 24, 2008 showed all components of the structures (towers, bases, anchors and guys) to be in viable condition with no apparent signs of deterioration. The 32 ft. structure has been in service for 9 years and the 40 ft. structure for 5 years, and both have survived the harsh winters in the Highlands with no apparent damage.

I could find no apparent structural issues, and in my professional opinion the structures are adequate for their intended purposes.

Please call if you have any questions or need any additional information.

Lawrence M. Prater, P.E.

NV Lic. No. 3935

#### Exhibit G - SCC Prior to 1999

17.12.010--17.12.070

17.12.050 Visibility at intersections.

17.12.060 Corner lot setbacks.

17.12.070 Off-street parking.

17.12.080 Open storage prohibited.

17.12.090 Access ways.

17.12.100 General provisions for C, I and O zones.

17.12.010 Applicability. The following general provisions set out in this chapter shall apply to A, F, R-1, R-2, P and E zones. §C(3)(part), 1972)\* (Ord. 54F §2, 1982: Ord. 54 Ch. 1

17.12.020 Building height. No building or trailer shall exceed a height of two and one-half stories or thirty-five feet, whichever is higher, except as may be allowed by special use permit. The requirements of this section shall not apply to church spires, belfries, cupolas, domes, chimneys or flagpoles. (Ord. 54 Ch. 1 §C(3)(a), 1972)

#### Chapter 17.40

#### E ESTATES ZONE\*

#### Sections:

17.40.010 Applicability.

17.40.020 17.40.030 Permitted uses and uses subject to permit.

Minimum lot size.

17.40.040 Lot dimensions.

17.40.050 Setbacks.

17.40.060 Home occupations.

17.40.070 Generator restrictions.

17.40.080 Effect of conditions, covenants and restrictions.

 $\underline{17.40.010}$  Applicability. Zone E or the estates zone shall be governed by the usages and regulations set forth in this chapter. (Ord. 54F §3(part), 1982)

17.40.020 Permitted uses and uses subject to permit. Permitted uses and uses subject to special use permit in the E zone are as set out in this section:

A. Single-family dwellings of a permanent nature. In the ETO zone the following additional restrictions shall apply:

1. A single residence shall consist of a dwelling of a permanent nature, and where not otherwise prohibited, a site-built modular or mobile home (manufactured home). No permanent site built structure shall be less than seven hundred square feet. Minimum mobile home, (manufactured home) not to be less than forty feet in length and no less than twelve feet wide. No residence shall be higher than two stories in height. Mobile homes (manufactured homes) must be skirted within six months from date of delivery at site. This includes new and used homes.

B. One detached guest building, defined as a structure occupying an accessory position on a lot and used exclusively for housing members of a single family or their nonpaying quests.

Editor's Note: Ord. 54, passed April 4, 1982, is designated Ord. 54F.

250 (Storey County 11/89)