

# FIRE STATION 13

## RADIO COMMUNICATIONS TOWER

4/7/2015

### Scope of Work

Location: 2215 West 43<sup>rd</sup> St.  
Houston, TX

Tower Type: 100' Monopole T-Mobile Tower

Contractor will provide all tools, materials, equipment, labor, and insurance necessary and required for the removal and disposal of all existing coaxial cables, seal all underground conduit from weather, and install three (3) new runs of coaxial cable and antennas. Contractor will also remove and dispose of any existing coaxial cable tray from antenna tower and leave the ice bridge in place. Contractor will use the ice bridge that is already in place. Contractor may need to mount new cable tray on side of building to support coaxial cables until building is penetrated. All work will conform to current Motorola R-56 Standards and Guidelines for Grounding as much as possible. Contractor will not alter or change location of the equipment installed by City of Houston Water Department.

### Coaxial Cables for Antennas

- A. Contractor will remove and dispose of all antennas and all old mounting hardware as directed by City of Houston Radio Communications Services personnel to reduce wind loading on tower.
- B. Contractor will provide Laird Technologies FG 8063 (806 – 866MHz), 2ea YS 4503 (450 – 470MHz). One of YS 4503 will be mounted at the top of the tower above the T-Mobile array and the other YS 4503 will be mounted at 80' just below the T-Mobile array. The FG 8063 at a height of not more than 20'. All antennas will be mounted on the downtown face with a 12" standoff. Each antenna will have a 3' jumper unless factory cabling allows easy connection.
- C. New coaxial cable, connectors, polyphasers and fittings shall connect all antennas on radio communications tower. Each antenna shall have separate cable.
- D. All mounting hardware, not otherwise supplied by manufacturer, shall be fabricated entirely of hot-dipped galvanized material. Plated or painted hardware of any kind shall not be accepted. A continuous cable ice bridge will support the cable from the antenna tower to the building.
- E. All antenna cable shall be Andrew #LDF5-50A. This is a neoprene jacketed, semi-rigid, thin walled copper tube. It has an overall exterior diameter of 1.1

inches, and a MINIMUM BENDING RADIUS OF TEN (10) INCHES. If this bending radius is not observed and cable is bent excessively, entire cable will be replaced by contractor. **Installation personnel will be made aware of the construction of such cable so proper safety precautions can be maintained.**

- F. Connection between the LDF5-50A coaxial cable and antennas that do not have a jumper will be with Andrews L4A-PNMNM. Length of jumper will not exceed three (3) feet. All cables will be equipped with proper matching connectors, as no connector adapters will be accepted.
- G. All cable connectors will be mated together in accordance to manufacturer specifications and sealed properly as to prevent water intrusion using current Motorola R-56 guidelines.
- H. All #LDF5-50A cable ends inside the radio communication room will be equipped with the Andrew L5PNF-RPC connectors. All coaxial cables will be tagged with antenna type inside radio communications room using proper cable labeling with the exception of the cable attached to FG-8063 antenna. This cable will extend to the new watch office located in the front of the building. Colored tape may be used.
- I. If the tower is an SST type tower, and if the tower is not so equipped, contractor will fabricate and install a waveguide lattice to support all coaxial cables. Coaxial cables on the antenna tower shall be supported at least every three (3) feet using proper coaxial hanger clamps. If the tower is a monopole, contractor will use proper coaxial hanger clamps designed for monopoles and attach coaxial cables every three (3) feet. All clamps should be stainless steel.
- J. If tower is not equipped, whether SST or monopole, a climbing safety will be added to the tower. The climbing safety will be tightened to proper tension with proper spacing from the tower. Proper care will be taken to prevent damage to the galvanize coating on the tower. If the galvanize coating is damaged, proper steps will be taken to repair damage and suitable gray coating will be applied to prevent any future damage.
- K. Each coaxial cable will be separately grounded to the tower using the highest and lowest points possible for each cable on the tower. The use of Andrew #40993A-5 grounding kit will be acceptable. Contractor will install a tower ground buss bar on the tower using current Motorola R-56 Standards for grounding. The coaxial cables will be grounded a third time as the cables enter the building through the Roxtec cable entry port system (supplied and mounted by contractor) that will be mounted at a point so the coaxial cables enter the building near the roof trusses, if possible, and terminated with the proper size and type connector for the proper type and frequency polyphasers that will be mounted, attached and grounded to current 2010 Motorola R-56 grounding standards. Polyphasers will be mounted within 2' of the cable entry port. All cables will be extended, supported properly and terminated in the Radio Equipment Room for an "N type" male. If the distance is over 75ft, additional grounding will be needed and applied according to current 2010 Motorola R-56 Grounding standards

- L. Contractor will install, as much as possible, a new grounding system around the base of the tower in accordance to current Motorola R-56 for this tower type. The ground leads will attach to the tower ground bus using exothermic welds. The Tower Ground Buss will attach to the new ground ring. The tower ground bus will be coated as to help prevent copper theft.

### **Cable Tray for Coaxial Cables (Outside)**

- A. The contractor will furnish and install a cable ice bridge for supporting all coaxial cables uninterrupted between the antenna tower and the outside wall of the radio communications building.
- B. The cable ice bridge shall be manufactured of aluminum and of sufficient size to contain all coaxial cables and capable of supporting a minimum of 320 pounds at its midpoint. If the cable ice bridge exceeds ten (10) ft in length, the ice bridge will be supported by whatever means needed to maintain minimum weight standards for the entire length of the cable ice bridge each ten (10) ft.
- C. All cable ice bridge fittings will be of the same manufacturer so all materials are compatible to the cable ice bridge. This is to prevent bi-metal corrosion. If any cable ice bridge fittings are used, a green jacketed ground connection will be used to bond this connection according to current 2010 Motorola R-56 grounding standards. The cable ice bridge and supports will also be grounded properly.
- D. All mounting hardware, including screws, bolts, washers, brackets, hangers, or any other hardware used in assembly or installation, will be hot-dipped galvanized or stainless steel. Plated or painted hardware will not be accepted. Contractor will follow NEMA VE-2 cable tray installation guidelines for spacing of support brackets to maintain support span integrity.
- E. The cable will be installed with a drip loop to prevent water intrusion.
- F. Wall entry for coaxial cable shall be a Roxtec building entry system. The wall entry system will contain proper size opening for the cable being used and grounded properly according to current Motorola R-56 standards
- G. Contractor will install and ground properly three (3) polyphasers for each coaxial cable on the inside wall entry port according to Motorola R-56. The polyphasers will be of the correct frequency for each line.

### **RF Certification and Acceptance**

All cables and antennas will be tested and certified for frequency response, time response, distance, connectivity and conductivity. The results of this testing will be compared and verified against all manufacture specifications and the results will be given to Radio Communications Services in a PDF file. If any cable or antenna does not pass specifications, the entire cable and antenna will be replaced by the contractor at contractor expense. **NO CABLING SPLICING WILL BE ACCEPTED.** Proof of grounding and testing to bring the tower as close as possible to current 2010 Motorola R-56 standards will be required before acceptance.