

FIRE STATION 68

RADIO COMMUNICATIONS TOWER

March 31, 2016

Scope of Work

Fire Station 68 is located at 8602 Bissonnet near S. Gessner Rd. 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 install a new continuous cable tray from antenna tower to radio communications room for new coaxial cables. Length of new cable tray and new coaxial cable is to be determined by contractor. All work will conform to current Motorola R-56 Standards and Guidelines for Grounding as much as possible.

Coaxial Cables for Antennas

- A. Contractor will remove and dispose of all antennas and all old mounting hardware as directed by City of Houston Information Technology Radio Communications Services personnel to reduce wind loading on tower.
- B. Contractor will provide Laird Technologies FG8063 (806 – 866MHz), two YS4503 (450 – 470MHz). One of the YS4503 will be mounted at the top of the tower; and the second YS4503 will be mounted at 60'; and the FG8063 at a height of not more than 20'. All antennas will be adjusted for best signal either the Clodine or Reed Road radio sites and will be mounted 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 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. Colored tape may be used.
 - I. If the tower is a Self Supporting Tower (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 point and at the vertical transition 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 Roxel cable entry port system (supplied and mounted by contractor) that will be mounted at a point so the coaxial cables enter the building and are 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 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.