SECTION 27 53 09
EMERGENCY SERVICES COMMUNICATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES
- A. Conduits, terminal cabinets, and boxes
- B. Power wiring

1.2 SYSTEM DESCRIPTION
- A. Emergency radio communications systems shall include the furnishing and installation of raceway systems and power feeds for the emergency broadcast receiver, radio communications repeater-station, hurricane shelter communications and wireless propagation enhancement systems.
- B. Raceways, cabinets, and power feeds for the emergency radio communication system shall be designed and installed to allow installation of future Bi Directional Amplifier Systems (BDA) and/or Distributed Antenna Systems (DAS) as required by NFPA 1, NFPA 72, and NFPA 1225.

1.3 SUBMITTALS
- A. Submit under the provisions of Section 01 33 00.
- B. Shop Drawings: Indicate layout, raceway diagrams, and equipment dimensions.
- C. Product Data: Provide data sheets for each item of equipment, depicting equipment capacity.

1.4 RECORD DRAWINGS
- A. Submit under the provisions of Section 01 77 00.
- B. Accurately indicate actual locations of power receptacles, boxes, and conduit runs.

1.5 REGULATORY REQUIREMENTS
- A. System: Listed by UL, ETL, or FM
- B. NFPA 1225

PART 2 PRODUCTS

2.1 DESIGN
- A. Design loads for structure and accessories, auxiliary and collateral loads shall comply with FBC and ASCE7.
  1. Use exposure category C, Risk Category III, for wind design.

2.2 CONDUIT AND BOXES
- A. ALL SITES
  1. Provide & install a 1½" raceway to the outside of building through the roof at the Emergency Broadcast Receiver/Repeater antenna location, terminate with a weather head.
  2. The penetrating portion of conduit shall be a contiguous 10' piece of rigid, with 6' firmly supported at two joist points below the roof penetration and 4 feet above the roof.
  3. Continue this raceway and terminate into a 6" x 6" x 4" box located just above the ceiling at the designated Emergency Broadcast Receiver/Repeater "head-end" room location.
  4. Provide and install two ¾" conduits run from the 6" x 6" x 4" box and terminate into two flush mounted 4-11/16" x 4-11/16" x 1½" boxes with single gang mud rings and single gang covers 48" AFF in their respective locations in the designated "head-end" room.
  5. Minimum conduit size shall be ¾".
- B. ALL BUILDINGS
  1. Provide & install a 1½" raceway to outside of building through the roof at the buildings Wireless Propagation Enhancement location and terminate with a weather head.

2. The penetrating portion of conduit shall be a contiguous 10' piece of rigid, with 6' firmly supported at two joist points below the roof penetration and 4' above the roof.
3. Continue this raceway and terminate into a 6" x 6" x 4" box located just above the ceiling at the designated Wireless Propagation Enhancement "head-end" room location.
4. For each floor of the respective building, provide and install one ¾" conduit run from the 6" x 6" x 4" box and terminate into one flush mounted 4-11/16" x 4-11/16" x 1 ½" box with single gang mud rings and single gang covers 48" AFF in their respective locations in the designated "head-end" room.

C. HURRICANE SHELTERS
1. Provide and install an antenna mounting structure located next to the Hurricane Shelter antenna stub-out location.
   a. Design the antenna mounting structure to support an antenna array of six 6-element Yagi 9dBd gain antennas model #460-6.
   b. Structure shall meet ASCE-78 requirements.
   c. Top of structure shall be at least 49' (15 Meters) above grade.
2. Provide & install a 2" raceway to outside of building at the designated Hurricane Shelter antenna mounting structure location and terminated with a weather head.
   a. Continue this raceway and terminate into a 6" x 6" x 4" box located just above the ceiling at the designated Hurricane Shelter "head-end" room location.
   b. Provide and install (2) ¾" conduits run from the 6" x 6" x 4" box and terminate into two flush mounted 4-11/16" x 4-11/16" x 1½" boxes with single gang mud rings and single gang covers.
   c. Locate these boxes 80" AFF, parallel with 4" between each in the designated "head-end" room.

2.2 POWER FEEDS
A. Provide and install a dedicated duplex 120-volt power receptacle fed from the life safety branch of emergency generator power source in each of the designated emergency broadcast receiver, radio communications repeater-station, hurricane shelter communications and wireless propagation enhancement systems "head-end" locations.
B. Locate adjacent to the "head-end" single gang boxes.

2.3 TESTING
A. Pre-Enhancement Testing Procedures/RF Survey:
1. The test/RF Survey must be conducted by a qualified and FCC GROL-licensed technician.
2. Testing time and date must be approved by the Building Code Services Department (BCS). Notification must be made to the department a minimum of 72 hours before the test. A representative of the department may be on site to witness the test.
3. Upon completion of all testing, a final report shall be submitted to BCS for review. At a minimum, this report shall include a floor plan identifying each tested area, the location of the test point within the area, dBm reading of each area, uplink and downlink signal Strength with a minimum DAQ = 3.0 or greater voice communication (NFPA 1225-18.9.1 & 2), whether the area Passed or Failed, and a complete spreadsheet with all testing information, including testing method, testing equipment, and weather conditions during testing.

B. Testing Criteria

1. In all new and existing buildings and structures, a minimum radio signal strength of –95 dBm in the frequency band of 806-821/851-866 MHz is required. Before RF survey, the testing contractor shall verify the frequency band with the local fire department.

2.4 DESIGN AND INSTALLATION

A. Design and installation of Two-Way Radio Communication Enhancement Systems, components, cabling, and other equipment, shall comply with NFPA 70, NFPA 72, NFPA 1221, and NFPA 1225.

B. Two-way Radio Communication Enhancement Systems shall be monitored by the building fire alarm panel and a dedicated annunciator shall be provided.

C. Systems shall have lightning protection that complies with NFPA 780.

D. A construction permit for the installation of, or modification to, Two-Way Radio Communication Enhancement Systems and related equipment is required. The installation must be performed by either a Certified Electrical Contractor, Certified or Registered Alarm Contractor I, or a Two-Way Radio Enhancement Systems Specialty Contractor.

2.5 ACCEPTANCE TEST PROCEDURE AND CERTIFICATION

A. A report shall be submitted to BCS at the conclusion of acceptance testing, containing a floor plan, the signal strength at each location tested, and other relevant information, including as-built drawings.

2.6 ANNUAL TEST REPORT

A. The annual test report shall be maintained with the fire alarm logbook and copies shall be submitted to BCS.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install systems in accordance with NECA "Standard of Installation" and Section 26 05 33.

B. Obtain a detail book from the S.D.P.B.C. School Police Department Security Section for system specifics.

C. Install a 200 lb strength pull string throughout the raceway systems.

D. Mount all junction boxes located above ceiling with the opening facing down, and with a reasonable immediate access pathway provided.

1. Note: The requiring of the removing of a light fixture or other similar ceiling equipment is not a reasonable access pathway).

E. Antenna raceways shall not exceed 100' from the weather head to the designated "head-end" locations.

3.2 DEMONSTRATION AND TRAINING

A. Training of the Owner’s operation and maintenance personnel is required in cooperation with the Owner's Representative.

1. Provide competent, factory authorized personnel to provide instruction to operation and maintenance personnel concerning the location, operation, and troubleshooting of the installed systems.
2. Schedule the instruction in coordination with the Owner's Representative after submission and approval of formal training plans.
3. Refer to Section 01 91 00, Commissioning, for further contractor training requirements.

B. Provide demonstration and training for all types of emergency communications systems installed in this project.

END OF SECTION