TWO-WAY RADIO COMMUNICATION

ENHANCEMENT SYSTEMS

The following checklist is intended to assist in the preparation of one's drawings. This check sheet identifies the minimum requirements for the *initial plan review.* This check list in no way details all of the requirements that may be necessary for a complete code compliant system. Check with one's authority having jurisdiction (AHJ) to determine local requirements.

As per the currently adopted edition of the **Florida Fire Prevention Code, NFPA 1, 11.10* Two-Way Radio Communication Enhancement Systems** and **NFPA 1, 11.10.1** In all new and existing buildings, minimum radio signal strength for fire department communications shall be maintained at a level determined by the authority having jurisdiction.

Engineer and Contractor Qualifications

a. The system design shall be completed by a *qualified* Florida licensed professional engineer as outlined in Florida Engineering Standards Chapter 471. The drawings shall be sealed as outlined in Florida Engineering Standards Chapter 471.025.
b. The lead installation personnel and personnel conducting radio system test shall be qualified to perform such work and hold a current (FCC general license) and low voltage license as required by the scope of work being performed

Minimum Requirements for New Buildings *

a. All drawings, specifications, reports or documents prepared shall be signed by a Florida registered design professional. Any unrelated work shall be included with a note "work to be done by others".
b. The initial construction drawings shall include a radio communication enhancement drawing, heat map and statement on the life safety drawings that identifies the requirements for radio communication enhancement system testing for critical areas and non-critical areas. The final drawing will be approved and used as the minimum design requirement for obtaining a fire installation permit.
c. If a radio system is required based upon the initial survey test and or completeness test, the installing contractor shall use the approved communication drawings stated above that have been reviewed and approved during construction permitting to design and engineer the system. The drawings shall identify the signal test results for all areas of the building.
d. A separate fire radio communication review and permit are required of the installing company
e. A separate radio signal re-broadcast approval shall be approved along with plans submittal.

Initial and Final Survey Test

a. AHJ may offer DVRS (Digital Vehicular Repeater Systems) for existing buildings for signal strength and delivered audio quality (DAQ). Contact the AHJ for their requirements.
b. New construction as identified by the AHJ in compliance with stated stipulations conduct system planning and design. A qualified contractor integrator is consulted/hired to design, install, test and activate the two way radio communications enhancement system as part of the building project. Based on AHJ standard, a qualified contractor must demonstrate and conduct a signal baseline. Further action dependent on results meeting AHJ stipulations for code compliance.
c. AHJ reserves authority to determine a project compliant for purposes of certificate of occupancy.
d. A method shall be in place and identified on the plans for inspection, testing and maintenance on an annual basis approved by the AHJ per NFPA 72, chapter 14 and NFPA 1221 – 11.3.9.

Existing Building *

a. The AHJ may allow DVRS repeater coverage for signal strength and DAQ.
b. If a radio system is required based upon the initial survey test, the engineer shall submit a complete set of drawings that identifies all critical and non-critical areas. The final drawings will be approved and used as the minimum design requirements for obtaining a fire installation permit.
c. The drawings shall identify the signal test results for the building.
d. A separate fire radio communication review and permit are required of the installing company.
e. A separate radio signal re-broadcast approval shall be provided prior to plans submittal.

* Regarding broadcast approval – signal booster retransmission authorization; Lee County Permitting has made available an application that allows for necessary information at “no fee” unless the project is later implemented. Application is dormant and does not affect certificate of occupancy (c.o.) unless permits are pulled for installation of equipment. (leegov.com, building permitting services, trade permit application, distributed antennae system). If a system is implemented in Lee County – Lee County Public Safety Communications will become part of the c.o. process and sign off and fees will apply.

Plans Submittal and Review

1. ☐ Three sets of drawings minimum along with the required specifications and calculations. Plans shall be submitted in accordance with appropriate plans checklist as listed here. Maximum sheet size 30 x 42.

2. ☐ Project name, address, city and state shall be shown on each drawing.

3. ☐ Contractor name, license number, address, city and state shall be shown on each drawing.

4. ☐ Scope of work including notes.

5. ☐ Scale and graphic representation of scale used on all plans.

6. ☐ North arrow must appear on every sheet showing a portion of the site.

7. ☐ A key plan shall be required as needed.

8. ☐ Date of the plan and delta notes must be noted for subsequent revisions.

9. ☐ Each sheet must show a sheet number along with total number of sheets included as well as clearly labeled match lines to show where other sheets match or adjoin to each other.

10. ☐ Complete, current manufacturer's specifications and installation sheets are attached for all control units, components, appliances, devices, modules and relays listed on the legend.

11. ☐ The system must be capable of future upgrades as required by Lee County Radio Control or local jurisdiction changes in accordance with NFPA 1221, 9.6.10.2*.

12. ☐ All systems shall be designed in accordance with the currently adopted Florida Fire Prevention Code, NFPA 1221, NFPA 72, NEC 70, and all referenced codes and standards currently adopted.

13. ☐ A preliminary site survey test (if completed) shall be made to determine available signal strength.

14. ☐ The drawings shall identify all rooms and spaces by name and their use.

15. ☐ If fire command room is present with dedicated monitoring panel, status of signal booster locations shall annunciate per NFPA 1221, 9.6.13.2 items 1-2 inclusive.

16. ☐ Radio coverage throughout the building shall have a minimum of:

    a. Critical areas radio coverage 99%:
       All critical areas such as the fire commend center(s), fire pump room, exit stairs, exit passageways, elevator, lobbies, standpipe cabinets, fire sprinkler sectional valve locations, and other areas deemed critical by the AHJ shall have a minimum of 99% floor coverage in accordance with NFPA 1221 – 9.6.7.4.
    b. Non-critical areas radio coverage 90%:
       Shall have a minimum of 90% floor area radio coverage in accordance with NFPA 1221 – 9.6.7.5 stated on plans.

17. ☐ A minimum inbound signal strength – DAQ of 3 or -95 DBM/other signal strength as required by the AHJ shown throughout the coverage area in accordance with NFPA 1221 – 9.6.8.1 as stated on plans.

18. ☐ A minimum outbound signal strength at the donor site DAQ of 3 or -95 DBM. Other signal strength as required by the AHJ shall be provided from the coverage area in accordance with NFPA 1221 – 9.6.8.2 stated on plans.

19. ☐ Radio enhancement system shall be equipped with an FCC complaint Class B signal booster, BDA or system otherwise approved.

20. ☐ Components such as repeaters, transmitters, receivers, signal booster components, and battery systems shall be properly enclosed in NEMA 4- or 4X-Type enclosures.

21. ☐ Are the radio enhancement system and all active controls located in a place that meets all environmental requirements in regards to heating, ventilation, cooling, and humidity requirements of manufacturer specifications?

22. ☐ Are the radio enhancement system and all active controls located in an area free from hazards?

23. ☐ If a signal booster has been installed, is it FCC certified and compatible with both analog and digital as per NFPA 1221 – 9.6.11.3?

24. ☐ All wiring shall be installed at the same or greater level of survivability pathway and class as the fire alarm system. See NFPA 1221 – 9.6 and 5.10 and NFPA 72 – 24.3.13.8.

25. ☐ Department of Business and Professional Regulations (DBPR), Division of Elevator Safety: The installing contractor shall submit a letter to DBPR for approval allowing for penetrations into the elevator shaft. Approval letter shall be provided to the AHJ.

Monitoring Signals

26. ☐ Fire alarm system monitoring shall be in compliance with NFPA 72 – 10.6.9 and section 12.6 and include automatic supervisory and trouble signals booster(s) and power supply(s) that are annunciated by the fire alarm system and comply with the following:
    a. Antenna malfunction
    b. Signal booster failure
    c. Low-battery capacity indication when 70% of the 12-hour operating capacity has been deleted
    d. Normal a/c power
    e. Signal booster trouble
    f. Loss of normal a/c power
    g. Failure of battery charger

h. Low-battery capacity

27. ☐ Power supply signals shall include the following for each signal booster:
    a. Loss of normal a/c power
    b. Failure of battery charger

28. ☐ A dedicated monitoring panel shall be provided within the fire command center and shall provide visual and labeled indication for each signal booster.

29. ☐ If donor antenna exists, is there isolation between the donor antenna and all inside antennas at a minimum of 20 DB above the signal booster gain under all operating conditions as per NFPA 1221 – 9.6.9?

30. ☐ Are all exterior antenna directional, high gain, vertical polarized and specified for the operating frequencies? (Yagi or corner reflector type antennas are recommended).

32. ☐ Are all antennas protected from lightening in accordance with NFPA 1221 – 9.6.3?

33. ☐ Provide a grid system overlay including all floors to identify areas of deficiency.

Power Supply & Booster

34. ☐ All control panels must be connected to a dedicated circuit breaker marked "BDA control circuit per NFPA 1221 – 9.6.12.1.

35. ☐ Primary source shall be supplied from a dedicated 20 ampere branch circuit.

36. ☐ Provide at least two independent and reliable power supplies for all repeater transmitter and signal booster components per NFPA 1221 – 9.6.12.

37. ☐ Backup batteries should be the same size as those required on the approved plan and marked with date of installation.

38. ☐ Secondary power source shall consist of one of the following:

    a. A storage battery dedicated to the system with at least 12 hours of 100% system operation capacity and arranged in accordance with 10.6.10
    b. An automatic starting engine driven generator serving the dedicated branch circuit arranged in accordance with 10.6.11.3

Final and Testing Documents

39. ☐ Include this check off sheet as part of submittal for a fire permit.

40. ☐ A second test shall be completed at final that identifies the building has met the minimum

requirements of the building signal strength for both critical and non-critical areas.

41. ☐ A completed test report shall be submitted prior to final inspection to the AHJ.

42. ☐ An identifier placard or label including date of acceptance shall be posted next to the BDA/DAS upon final system test, initialed or verified by the AHJ.

43. ☐ Final approval subject to field inspection, corrections may be required for code compliance.

44. ☐ Verify radio registration: This radio system shall be registered through the Lee County Public Safety Communication (LCPSC).

45. ☐ In accordance with FCC guidelines, the radio system shall not be turned on without approval from LCPSC, CFR 47, FCC Part 90.219(c) including meeting their minimum requirements to retransmit.