

2.01 Fire Alarm and Signaling Systems Submittals (2019)

Reference: 2019 San Francisco Fire Code (SFFC), Section 907.1.1; 2016 NFPA 72, Chapter 7 & § 10.4.1

The San Francisco Building Code (SFBC), Section 1.11.1 requires that all fire alarm system installations, repairs, alterations, and upgrades of existing systems be approved by the San Francisco Fire Department. Detailed plans shall be submitted to the SFFD Plan Check Section. Effective 1/1/2020, the 2016 edition of NFPA 72 shall remain the applicable edition of this code, as adopted by the 2019 SFBC and SFFC.

Signaling systems are defined as all other Emergency/ Life-Safety Communication Systems indicated in NFPA 72 Chapter 24 and are not Fire-Alarm systems, such as Two-Way Emergency Communications System (ECS), Emergency Responders Radio Coverage System (ERRCS), Mass Notification System (MNS), etc.

Purpose: The following information shall be provided when plans are submitted for a building permit to install or modify a fire alarm system.

NOTE: Approved reference ARCHITECTURAL and MECHANICAL plans must be provided with NEW fire alarm system plan submittals. Approved reference MECHANICAL plans must be provided for fire alarm permits for tenant improvement having mechanical work such as fans and fire smoke dampers.

Fire alarm permit plans shall be drawn to an indicated scale (not smaller than 1/8" = 1') with all fonts on the plans not less than 1/8" in size, on sheets of uniform size (11" x 17" minimum), with a plan of each floor. Plans must be clear with legible text and symbols so they could be electronically scanned. The scope of work must be indicated in detail and the reason for providing the fire alarm system must be indicated (e.g. new system required by code, voluntary/non-required system at the owner's request, etc.). All applicable codes and standards used must be referenced (e.g. NFPA 72, SFBC, SFFC, SFEC). The Fire Alarm submittal plans must comply with all applicable sections of NFPA 72, Chapter 7 "Documentation".

The following notes shall be incorporated as verbatim notes on the plans:

1. *"The fire alarm system shall be designed and installed in accordance with the City and County of San Francisco Fire Department requirements, Specific SFFD applicable administrative bulletins, NFPA 72, and other applicable NFPA Standards as adopted in the SFBC and SFFC."*
2. *"The primary power source for the Fire Alarm Control Unit (FACU) and remote power supplies shall be from a dedicated circuit. This circuit shall be labeled at both the electrical sub panel and on the inside of the FACU/Power supply door, and be provided with a circuit lock (if it is not installed in a locked room)."*

I. THE FOLLOWING ITEMS MUST BE INCLUDED ON THE PLANS:

- A. Name(s) of owner and occupant/tenant;
- B. Address of building, including assessor's block and lot number;
- C. Contractor's name, address, telephone number, and license number;
- D. Two sets of plans with the wet signature and stamp of the engineer, or C-10 design-build contractor. (Reference DBI Information Sheet G-01). Designer's full name and all other applicable information per NFPA 72 Chapter 7, must be clearly indicated. New or replacement fire alarm systems for high-rise buildings require an engineer's stamp and signatures on all sheets;
- E. Engineers' signatures and stamps on Fire Alarm plans associated with **smoke control** shall comply with all requirements set forth in DBI AB-047. All Fire Alarm Plans including Smoke Control interface shall include the following features from the approved Mechanical permit plans:
 - Final Smoke Control report stamped by all required engineers,
 - Third party smoke control review letter signed and stamped by a SFFD approved third-party smoke control reviewer (if applicable),

- Smoke control sequence of operation matrix (could be a part of the final smoke control report),
 - Complete mechanical fans and dampers matrix for the entire building,
 - Layout of the Firefighters' Smoke Control Panel (stamped and signed by the mechanical engineer and coordinated with the Fire Alarm system designer).
 - All the required reference smoke control sheets from the approved mechanical permit plans shall be incorporated as "FOR REFERENCE ONLY" sheets within the Fire Alarm permit plans submittal.
 - All reference smoke control sheets shall have a review statement and/or stamp by the smoke control author for smoke control system compliance.
- F. Symbol list combined with equipment list specified in item "M" below;
- G. Point of compass, surrounding street names, location of main entrance/fire department response point to the building, and full-height cross section of the building, if required for clarity, include ceiling construction and height, with indication of ceiling beams and beam pockets;
- H. A readily visible sign shall identify the location of the FACU indicating: "Fire Alarm Control Unit". This sign shall be mounted on the door or other access means to the FACU area or space. In addition, another approved readily visible sign (or a key-map) identifying the location of the FACU within the building, shall be provided at the SFFD main response point to the building in an approved location. The owner shall be responsible for these required signs;
- I. Locations of partitions and walls, indicating which ones extend through concealed spaces;
- J. Use of each area or room on ALL floor plans: Specifically label ALL private offices as "Private Office" (a Private Office used by one person only, shall not be required to be provided with visual appliance/s protection). All other common use offices having two or more persons (based on number of computer work stations) shall be provided with visual appliance/s protection (strobes). All other (non-office) common/public use areas in the building, shall be provided with visual appliance/s protection. Any meeting, conference or huddle room in the building regardless its size, shall be provided with visual appliance/s protection. (CFC Sec. 907.5.2.3). Any other room/space which is not defined by code such as "Phone Room", "Wellness Room", etc. which is used by the general public and/or greater than 45 square feet in size, shall be provided with visual appliance/s protection (strobe/s). All medical exam rooms in any building shall be provided with visual appliance(s) protection (strobe/s).
- K. Location of each device/appliance and any system components such as control units, power supplies and remote annunciator/s.
- L. Mounting heights of manual fire alarm boxes, visual notification appliances and all other fire alarm system equipment and control units such as FACU, remote power supplies, annunciators, etc. Refer to NFPA 72-2019 regarding control units mounting height on a best practices basis.
- M. Equipment list showing quantity, make, model, and current CSFM listing number for each device; (differentiate between new and existing devices on the equipment list with "E" and "N" notations);
- N. Manufacturer's specification sheets and current CSFM listing sheets (may be loose leaf), highlight all specific proposed parts on those sheets;
- O. Type and size of wire, cable, and conduit (include conduit fill ratio); Specify wire types, sizes and number of conductors between all devices/components on all shop drawings floor plans; All Fire Alarm system wiring and all signaling systems specified in NFPA 72-2019 Chapter 24 – shall be installed in metallic raceways. Armored cables are not permitted.
- P. Single line riser diagram; The single line Riser Diagram shall show all wire types, sizes and number of conductors coordinated with the floor plans and comply with NFPA 72 chapter 7 requirements;
- Q. Point-to-point wiring diagram (on floor plans) between all panels, control units, communicators, and

typical devices, modules and appliances;

- R. Wiring diagram showing the connection to primary power source and system communicator/s;
- S. Standby battery calculation. For notification appliance circuits; all standby and alarm currents used in the calculation shall be supported by catalog cut sheets or documentation from the manufacturer. Highlight all values of all standby and alarm currents used in the calculations;
- T. Speaker power calculations for voice fire alarm systems (indicate wattage tap per speaker, power per audio circuit, and total power for each amplifier);
- U. Voltage drop calculations not to exceed 10% voltage drop per Notification Appliance Circuit (NAC); where the starting voltage is 85% of the nominal NAC voltage (20.4 VDC where nominal voltages 24 VDC); The use of nominal current (at 24 VDC) is acceptable for this 10% calculations where the voltage on the EOL resistor shall not be lower than 18.36 VDC. As an alternative – It would be acceptable to use UL Max current (at 16VDC) with a starting voltage of 20.4 VDC and maximum drop of 20% per NAC where the voltage on the EOL resistor shall not be lower than 16.32 VDC;
- V. Provide a Sequence of Operations Matrix (S.O.O.M) using the format of NFPA 72, Figure A.14.6.2.4. (Refer to Sample Matrix in Addendum “A” below); Other S.O.O.M formats may be approved on a case-by-case basis.
- W. Type of system such as: Supervising Station (Central, Remote or Proprietary) fire alarm system per NFPA 72 Chapter 26, Or Protected Premises (local) fire alarm system per NFPA 72 Chapter 23. Specifically indicate if the system is a Code required fire alarm system or a non-required/voluntary fire alarm system provided at the owner’s request. Or a replaced FA system on a like-for-like basis per CSFM Code interpretation 12-001 and information bulletin dated 9/4/2008.
- X. Assignment of class designation to device circuits and pathways per NFPA 72 Chapter 12; All new high-rise buildings shall comply with 2019 SFBC Section 907.6.1.1;
- Y. Description of annunciation zones or list of device locations and their addresses;
- If LED style annunciator panel is required in low rise buildings per San Francisco Administrative Bulletin 3.02, provide schematic layout of this panel on the plans.
 - All high-rise buildings shall be provided with LED Matrix style annunciators complying with SFFD AB 3.01.
 - All LED Annunciators and LED colors for both low and high rise buildings shall comply with SFFD AB 3.01;
 - Graphic style annunciators may be required by SFFD on case-by-case basis for buildings having large floor areas, unusual designs with area separation walls, or multiple buildings served by a single fire alarm system.
 - The location and configuration of the Graphic Annunciator shall be approved by the SFFD;
 - A key map/sign shall be required to be mounted adjacent all LCD and LED Matrix style annunciators with a “You Are Here” symbol and the following features: Location of FACU, Other buildings in the complex (if applicable), Egress Stairs, Elevators, Exits Doors, Horizontal Exits, FDCs, locations of other Emergency Systems control units and other required features on a case by case basis. The owner shall be responsible for providing this required key map.
- Z. Provide the script for the pre-recorded voice message content and languages used and all associated evacuation/relocation alert tones preceding and following the message per Addendum “B” and SFFD AB 3.05. (For example steady tone 1-3 sec, temporal-3 tone, in accordance with 2019 NFPA 72, Chapter 24);
- AA. Description of ancillary features and operations (e.g., type of smoke control system, fire/smoke

- damper operation, fan shutdown, special extinguishing systems etc.) The required operation and shutdown of the mechanical systems and its associated components such as AHUs and FSDs, etc. upon smoke detection, shall be specified by the Mechanical Engineer on the Mechanical permit plans;
- BB. Description of any special features such as detector cross zoning, positive alarm sequence, etc. Positive Alarm Sequence shall require a specific training description provided by the building owner;
- CC. Name of alarm Service Company (including UL No.) which will be responsible initially for inspection, testing, and maintenance of the system after it is accepted. New and existing Fire Alarm systems shall be UL certificated in accordance with SFFD AB 3.03;
- DD. If system is to be monitored by a Supervising Station (specify Central; Remote or Proprietary station); indicate name; address; contact information and UL listing number;
- EE. Describe the degree the building is protected by automatic sprinklers:
1. Not sprinklered
 2. Partially (Not Fully sprinklered)
 3. Fully (100%) Sprinklered
- FF. For high-rise buildings, indicate the fire alarm system evacuation/relocation method in conformance with SFFD AB 3.05 (full evacuation, partial evacuation, or relocation/evacuation). The fire alarm system sequence of operation shall be consistent with the facility emergency plan. If relocation of occupants is required provide a relocation/evacuation matrix on the plans (See example matrix in Addendum B). The facility emergency plan shall be current and shall include the relocation/evacuation procedure based on the approved fire alarm permit;
- GG. In partial evacuation and/or relocation of occupants is provided, demonstrate how pathway survivability is achieved per NFPA 72 Chapter 12 (via approved/listed 2-hour circuit integrity cable; 2-hour enclosure; etc.) Comply with NFPA 72, Chapter 12 & 24 requirements for pathway survivability. Provide a separate "Survivability Riser" on the plans showing the 2-hour pathways protection (See sample riser diagram in Addendum "C");
- HH. If only one manual fire alarm box is provided in a fully sprinklered building or for a sprinkler waterflow and supervisory system, the fire alarm box shall be installed adjacent to FACU. This manual fire alarm box shall generate full building general alarm (total evacuation) where a building fire alarm system is installed. For a sprinkler waterflow and supervisory system, the manual fire alarm box shall generate an alarm signal at the FACU and transmit an alarm signal to the supervising station and shall not activate the exterior audible device. This single manual fire alarm box shall be required to be connected to a separate zone or circuit on the FACU that shall not be placed on TEST mode when the building FA system or the sprinkler waterflow and supervisory system are placed on TEST mode;
- II. Dedicated function fire alarm systems (such as sprinkler waterflow and supervisory system; elevator recall and supervisory systems; etc.) are permitted to incorporate multiple functions. (For example, elevator recall smoke detectors and/or duct smoke detectors may be tied into a sprinkler waterflow and supervisory system control unit for supervision purposes, if an existing fire alarm system is not already installed in the building. A separate dedicated control panel for each function is not required in this case). A sign indicating all system functions shall be provided adjacent the FACU (For example: "Sprinkler waterflow and elevator recall and supervisory control unit"). See SFFD AB 4.11 for specific requirements for Sprinkler Waterflow and Supervisory systems. Dedicated function(s) fire alarm systems which are not required to be supervised off-site by a supervising station, such as an elevator recall and supervisory system, are not required to be provided with a smoke or heat detector at the FACU location;
- JJ. It is prohibited to provide the "Alarm Verification Feature" and/or the "Pre-signal Feature" for any fire alarm system (under SFFD jurisdiction). Reference NFPA 72 Sections 3.3.17 & 23.8.1.1.1.
- KK. Buildings with one or more elevator shall clearly show all elevator location(s) and must include on the plans all relevant associated elevator information per the "Elevator Checklist" (shown in Addendum

“F” below) for reference. All associated elevator information must be obtained from the elevator service company; building owner; and/or the elevator consultant associated with the project.

NOTE: Compliance with Addendum “E” below is required regarding the “Flashing Hat” feature for all new Group IV elevators and retro-actively for all existing Group IV* elevators upgrades. A copy of addendum “E” shall be incorporated on all fire alarm permit plans having Group IV elevators adjacent the fire alarm system sequence of operation matrix.

NOTE: Compliance with Addendum “E” will also be required when observed during annual fire alarm system inspections.

(*Any contract to install an elevator that was signed on or after May 1, 2008 mandates that the elevator comply with all Group IV Elevator requirements per California Title 8 (Elevator Safety Order, Chapter 4, Sub-Chapter 6 which adopts ASME A17.1- 2004 edition).

II. MODIFICATION OF FIRE ALARM SYSTEMS (FIRE ALARM SYSTEM TENANT IMPROVEMENTS)

- A. Indicate make, model number and current State Fire Marshal listing sheet of existing FACU;
- B. Indicate make, model number, and size of existing batteries, include battery calculations for new devices (provide larger capacity batteries if required);
- C. Indicate make and model number of existing initiating devices (to ensure California State Fire Marshal [CSFM] compatibility) with the new FACU if provided;
- D. Provide manufacturer's specification sheets and State Fire Marshal listing sheets for all new devices and components (may be loose leaf);
- E. Address all items for new submittal with regard for new or existing devices;
- F. With regard to minor alterations to a system (three or less new devices or appliances in general) voltage drop calculations may not be required if an existing NAC is maintaining building standards and is less than 200 feet from the FACU or remote power supply (following the path of the wire). Voltage drop calculations shall be provided for all new NACs;
- G. At a minimum, a detailed scope of work, an equipment list for all new and existing devices/components, a Sequence of Operations Matrix and a riser-diagram must be included with associated plans for each fire alarm and/or signaling system permit submittal. Provide a copy of the approved fire alarm system plans for reference as applicable. If a copy of the previously approved fire alarm/signaling system submittal is not available, the minimum submittal requirements in this section must be followed. Floor plans to scale will not be required in that case. This minimum submittal requirement shall also apply for like-for-like system replacement and/or emergency fire alarm control unit replacement permits;
- H. Central processing unit (CPU) and/or motherboard replacement require permit application and plans submittal. The plans shall indicate that a 100% test of all of the fire alarm system functions plus 10% of all existing devices is required per the approved S.O.O.M; this test (100% functions + 10% initiating devices) shall also be required for an FACU/CPU/ Motherboards replacement projects when the existing initiating devices are not replaced Compatibility listing between the new FACU and the existing initiating devices must be provided by the applicant and be placed on the permit plans. All new fire alarm system devices and components (if provided) must be tested. The minimum submittal requirements in item G above, must be followed.
- I. Any FACU/CPU or Motherboard replacement work shall require the new or modified FACU to be supervised off-site by an approved supervising station via a wireless communicator per item VIII of this document. Exception: If the fire alarm system is not required by current code and is installed on a non-required/voluntary basis, it shall not be required to be supervised off-site.
- J. Any FACU/CPU or Motherboard replacement work in buildings having more than 4 levels shall require to provide an approved LED annunciator per ABs # 3.01 and 3.02.

- K. Provide a reference copy of the approved architectural and mechanical plans associated with the fire alarm T.I. scope of work. (Note: At the discretion of the plan reviewer, reference plans can be waived.)

III. The use of a LOW-POWER RADIO (WIRELESS) FIRE ALARM SYSTEM (AKA: WIRELESS FIRE ALARM SYSTEM) shall be approved only under all of the following conditions:

- A. All Low-Power Radio (Wireless) fire alarm systems' components, design and installation, must be approved by SFFD as a "Fire Only" permit and must have associated Fire Inspection and Electrical Inspection per the approved permit.
- B. Low-Power Radio (Wireless) fire alarm systems shall be permitted to be installed in existing buildings only (low-rise and high-rise buildings).
- C. Low-Power Radio (Wireless) fire alarm systems shall not be permitted to be installed in existing buildings having an existing Emergency Voice Alarm Communications system (EVACS).
- D. Low-Power Radio (Wireless) fire alarm systems shall not be permitted to be installed in existing buildings having existing smoke control systems in accordance with CBC Section 909 (Section 905 for
- E. All Low-Power Radio (Wireless) fire alarm systems shall be UL certificated and shall meet SFFD AB 3.03 requirements for a new Fire Alarm system.
- F. The installation of Low-Power Radio (Wireless) fire alarm systems shall be monitored by an approved off-site supervising station with a runner service (Central or Proprietary service only). See Section VIII for the required means of communications between the Fire Alarm system and the off-site supervising station.
- G. The Low-Power Radio (Wireless) fire alarm System shall be designed, installed and maintained per 2016 NFPA 72: *National Fire Alarm and Signaling Code*.
- H. All Low-Power Radio (Wireless) fire alarm systems' components shall be listed for the purpose for which they are installed by Underwriters Laboratory Inc. (UL) or other approved listing and testing laboratory. They shall also have current California State Fire Marshal listing.
- I. Low-Power Radio (Wireless) fire alarm systems are permitted to serve as the only Fire Alarm system for the building or they could be connected or combined with the existing building Fire Alarm system as approved by SFFD on a case-by-case basis.
- J. Low-Power Radio (Wireless) fire alarm systems shall include on the fire alarm permit plans a "Site Survey Record Sheet" showing all required repeater and antennas signal readings and proposed locations. The site survey may not be required for a meshed-network Low-Power Radio (Wireless) CSFM listed system.

IV. ELEVATOR INTERFACE WITH FA SYSTEM WHEN A NEW OR REPLACEMENT FIRE ALARM SYSTEM IS INSTALLED

A. EXISTING BUILDINGS

- 1. A fire alarm system upgrade does not generate an existing elevator system (or controller) upgrade. If an elevator is upgraded, modernized, or altered (elevator modernization or controller replacement, etc.) the requirements of CA Title 8 Elevator Safety Orders, ASME A17.1-2004, NFPA 72, and items 2-4 below shall apply.
- 2. Low-rise buildings: If new sprinklers are installed in an elevator machine room/hoistway, a shunt trip function and all its associated components shall be provided.
- 3. High-rise buildings. Existing sprinklers shall not be removed from freight elevator hoistways and shunt trip function shall be provided.

(Items 4 through 6 pertain to elevator controller replacements or elevator group IV modernization projects)

4. High-rise buildings. If the existing elevator was provided with a shunt-trip function, the fire alarm system shall maintain this function unless the SFFD procedure for sprinklers removal was performed under separate permit. (Removal of sprinklers from elevator machine rooms/hoistways is permitted in high-rise buildings or in low-rise buildings on a case-by-case basis). See attached procedure for sprinkler removal in Addendum "D" below).
5. High-rise buildings. If the existing elevator was not provided with the shunt-trip function and existing sprinklers are located in the elevator machine room/hoistway, these sprinklers shall be removed per addendum "D" below, or shunt-trip function shall be provided.
6. Low-rise buildings. If the existing elevator was not provided with a shunt trip function and existing sprinklers are located in the elevator machine room/hoistway, these sprinklers shall not be removed, and a shunt-trip function shall be provided. Exception: On a case-by-case basis the sprinklers may be permitted to be removed.
7. New High-rise buildings provided with Fire Service Access Elevators (FSAEs) and/or Occupant Evacuation Elevators (OEE) having Occupant Evacuation Operation (OEO) shall comply with SFFD AB 5.08. Specific temperature monitoring system and FSAE/OEE status panel shall be provided in the Fire Command Center. Refer to NFPA 72-2019 Section 21.5, A.21.5 and 21.6 on a best practices basis.

B. NEW BUILDINGS

1. High-rise buildings: Sprinklers shall not be installed in all passenger traction (standard overhead and Machine Room Less – MRL elevators) associated spaces: machine rooms, control rooms, machinery spaces, hoistways' pits and top of hoistways, per SFFD AB 2.04. Shunt-trip function shall not be provided. Control spaces for new MRL elevators are prohibited per CEC-2016 & 2019. All MRL elevators having steel-coated-belts shall have FT-1 rated belts. Combustible belts (without FT-1 rating) are prohibited.
2. Low-rise buildings: Sprinklers shall not be installed in all passenger traction (standard overhead and Machine Room Less – MRL elevators) associated spaces: machine rooms, control rooms, machinery spaces, hoistways' pits and top of hoistways, per SFFD AB 2.04. Shunt-trip function shall not be provided.
3. All buildings: Sprinklers shall be installed in every hydraulic elevator machine room with associated shunt trip function. Sprinklers and associated fire alarm initiating devices (FAIDs) shall not be installed in hydraulic elevator pits, per SFFD AB 2.04 and this bulletin.

C. BUILDINGS with Machine-Room-Less (MRL) Elevators

1. All MRL elevators must be provided with smoke detection coverage at the top of their hoistways at their machinery space containing the driving machine & the smoke detection device/component must be accessible for repair testing and maintenance from outside the hoistway, in accordance with 2019 NFPA Section 21.3.7. This required smoke detection shall be either with an Air-Sampling type smoke detector installed outside the hoistway in an approved location, **or** a spot type smoke detector installed on a metal shelf within a metal protective cage combined with a 90-minute fire rated and listed (i.e., UL) access hatch door provided at the top (ceiling or wall) of the elevator hoistway. If an Air-Sampling type smoke detector is provided by the fire alarm vendor, it shall not require associated architectural plans. If the access hatch door option is proposed, an approved (by both DBI and SFFD) detailed architectural plan must be submitted showing the access hatch detail with an approval letter from the elevator contractor for compliance with all required hoistway clearances.

V. RESIDENTIAL OCCUPANCIES--SPECIFIC REQUIREMENTS

- A. Indicate on the plans the specific residential occupancy for the building (R-1, R-2, SRO, etc.);

- B. If the building is classified as R-1, the fire alarm plans shall show the required hearing-impaired devices and sequence of operation in specific units based on the number of units indicated in CFC Table 907.5.2.3.2. The specific hearing impaired unit numbers shall be specified by the owner and identified on the fire alarm plans as “hearing-impaired” units.
- C. If the building is classified as R-2, incorporate CFC Section 907.5.2.3.3 as a verbatim note onto the plans. (It is not required to provide all dwelling units with visual appliances). R-2 occupancies having hearing-impaired and/or communication units specified by the owner, shall have the specific unit numbers identified on the plans.
- D. Low frequency audible appliances must be provided in “R” occupancies per NFPA 72, Section 18.4.5.3.
- E. Compliance with the SFFC section 1103.7.6.1 and SFFD AB 3.08 is required for existing R occupancies as applicable.
- F. Per NFPA 72-2016 Section A.18.4.5.3, the SFFD requires Low Frequency audible appliances to be installed in all sleeping areas in residential occupancies. Sleeping areas shall include all areas intended for sleeping and also areas that could be potentially used for sleeping such as living room areas of an apartment or dwelling unit.
- G. Addressable fire alarm system smoke detectors with Low-Frequency sounder bases shall be permitted to be installed inside sleeping units in lieu of the required single or multiple stations smoke alarms. These system detectors shall be required to transmit supervisory signal to the FACU.
- H. Where visual notification is required inside a hearing-impaired unit in existing R occupancies, it shall be permitted to have a CSFM listed combination single or multiple stations smoke alarm combined with a strobe for a local in-room audible and visual alarm notification. The strobe portion of this listed combination appliance shall not be required to have battery backup power as permitted by NFPA 72 Chapter 29. Fire alarm system audible and visual or combination audio/visual appliances shall also be permitted to be installed for this purpose. When provided, all fire alarm system in-room smoke detectors having integral sounder bases, shall be required to produce low-frequency tone per NFPA 72 Section 18.4.5.3 if they are used to generate a general-building-evacuation alarm tone in addition to the local in-room audible alarm. When provided in lieu of single and multiple stations smoke alarms, all fire alarm system in-room smoke detectors with integral sounder bases, shall not be required to generate low-frequency tone if separate fire alarm system low-frequency audible appliances are installed in each sleeping area and generate general-building-evacuation alarm tone. All single and multiple stations in-room smoke alarms with integral sounder bases shall not be required to produce low-frequency tone.

VI. RADIO COVERAGE FOR EMERGENCY RESPONDER WITHIN BUILDINGS

(See ADDENDUM “G”)

VII: TWO-WAY COMMUNICATION SYSTEMS

(See ADDENDUM “H”)

VIII: MEANS OF COMMUNICATIONS BETWEEN FIRE ALARM SYSTEMS AND SUPERVISING STATIONS.

Due to the lack of support and service by the telephone industry for the existing Public Switched Telephone Network ('PSTN') and Plain-Old Telephone Service ('POTS') it is prohibited by the 2016 NFPA 72 section 26.6.4.1.4 to provide a Digital Alarm Communicator Transmitter (DACT) employing either POTS or cable telephone lines as single transmission means of communication between the protected premises Fire Alarm system and the off-site supervising station.

Since other transmission means of communication employing single technologies are permitted by the 2016 NFPA 72 Section 26.6.3.5, the SFFD is prohibiting the use of either POTS or cable telephone lines with a Digital Alarm Communicator Transmitter (DACT) for all new communicators installations.

New Fire Alarm systems:

All new Fire Alarm systems required by 2019 SFBC shall transmit the alarm, supervisory and trouble signals to an approved supervising station in accordance with the 2016 NFPA 72. The supervising station shall be listed as either UUFX (Central Station) or UUJS (remote & proprietary) by the Underwriters Laboratory Inc. (UL) or other approved listing and testing laboratory or shall comply with the requirements of FM 3011.

All new communicators shall employ either GSM (Cellular) or Mesh Radio (RF) technology as their required single technology communications means. If additional (Non-DACT) technology is requested to be provided on a non-required/voluntary basis, it may be approved by SFFD on a case-by-case basis.

The SFFD prohibits the use of IP-Based technology communicators as a single technology communications means due to their incompliance with the 2016 NFPA 72 Section 26.6.3.13 for the required 24 hours Secondary Power.

All new communicators shall be monitored for integrity at the FACU and at the supervising station for any communication or trouble condition.

Existing Fire Alarm systems:

It is recommended that building owners and/or Fire Alarm service companies be proactive and convert their existing Fire Alarm systems' DACT communicators to a new Cellular or RF communicator prior to a potential catastrophic failure of the existing DACT telephone service. If an existing DACT communications means to the off-site supervising station is out of service due to a telephone service failure – a SFFD approved Fire Watch shall be provided until the required means of communications is restored.

The conversion process from an existing DACT to a new Cellular or RF communicator shall require a One-Dollar Over-The-Counter "FIRE only" permit and an associated fire inspection.

The permit application shall include, as a minimum:

1. A scope of work indicating: "Converting existing DACT to a new Cellular or RF communicator – ALL existing Fire Alarm system components and sequence of operation shall remain unchanged"
2. The existing previously approved Fire Alarm system sequence of operation matrix shall be provided with an indication: "The existing Fire Alarm system sequence of operation shall remain unchanged"
3. Current catalog cut sheets and CSFM listing sheets for the new proposed communicator.
4. Battery backup calculations for 24 hours standby plus 5 minutes of alarm (or 15 minutes of alarm for Voice Fire Alarm systems)
5. A floor plan or a diagram (not required to be to scale) showing the location of the new communicator as a NEW device and the existing DACT as "To be removed"
6. All new communicators are considered as "Control Equipment" and they shall have smoke detection at their installed location. If existing smoke detection does not exist at the installed location of the new communicator, a new smoke detection shall be provided.
7. All new communicators shall be monitored for integrity at the FACU and at the supervising station for any communication or power trouble condition.

IX: Wireless Zone Controller and NAC Extender shall be approved only under all of the following conditions:

- A. All Wireless Zone Controller and NAC Extender systems' components, design and installation, must be approved by SFFD on a "Fire Only" permit and must have associated Fire Inspection and Electrical Inspection per the approved permit.
- B. Wireless Zone Controller and NAC Extender systems shall be permitted to be installed in existing buildings only (low-rise and high-rise buildings).
- C. Wireless Zone Controller and NAC Extender systems shall not be permitted to be installed in existing buildings having an existing Emergency Voice Alarm Communications system (EVACS)
- D. Wireless Zone Controller and NAC Extender systems shall not be permitted to be installed in existing buildings having existing smoke control systems in accordance with CBC Section 905 or 909.
- E. Wireless Zone Controller and NAC Extender systems are only permitted to be connected or combined with the existing building Fire Alarm system as approved by SFFD on a case-by-case basis.
- F. Wireless Zone Controller and NAC Extender systems shall be only permitted for use with separately listed compatible Fire Alarm Control Unit that must be UL certificated and meet SFFD AB 3.03 requirements for a new Fire Alarm system.
- G. The installation of Wireless Zone Controller and NAC Extender shall be only permitted for use with separately listed compatible Fire Alarm Control Unit monitored by an approved off-site supervising station with a runner service (Central or Proprietary service only). See SFFD AB # 2.01 Section VII for the required means of communications between the Fire Alarm system and the off-site supervising station.
- H. Wireless Zone Controller and NAC Extender Systems System shall be designed, installed and maintained per the applicable Edition of NFPA 72: National Fire Alarm and Signaling Code.
- I. Wireless Zone Controller and NAC Extender systems' components shall be listed for the purpose for which they are installed by Underwriters Laboratory Inc. (UL) or other approved listing and testing laboratory. They shall also have current California State Fire Marshal listing.
- J. Wireless Zone Controller and NAC Extender systems shall include on the fire alarm permit plans a "Site Survey Record Sheet" showing all required equipment signal readings and proposed locations.
- K. The San Francisco Electrical Code (SFEC) requires that the Wireless Input/output units be powered by a 15 or 20 ampere branch circuit within the dwelling unit and shall not be supplied by an existing receptacle circuit. It is permissible to power these devices from a dedicated circuit or an existing 120 volt smoke detector circuit. Arc-Fault Circuit-Interrupter Protection shall be provided for the wiring per SFEC 210.12. An accurate panel directory is required to reflect the modification to the system or circuit.

ADDENDA BEGINS ON NEXT PAGE

ADDENDUM "A"
SEQUENCE OF OPERATIONS MATRIX (SAMPLE-FOR REFERENCE ONLY)
 (Note: The sample above is taken from NFPA 72, 2016 edition, Figure A.14.6.2.4)

System Inputs		System Outputs																																				
		Control Unit Annunciation										Notification										Required Fire Safety Control																
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	BB	CC	DD	EE	FF	GG				
1	Manual fire alarm boxes - 1st floor	●	●					●				●		●	●		●									●			●		●			●		1		
2	Manual fire alarm boxes - 2nd floor	●	●																																	2		
3	Manual fire alarm boxes - 3rd floor	●	●																																	3		
4	Smoke detectors - 1st floor	●	●					●				●		●	●		●						●													4		
5	Smoke detectors - 3rd floor	●	●																																	5		
6	Smoke detectors - 1st floor	●	●																																	6		
7	Smoke detectors - 1st floor elev. lobby	●	●																																	7		
8	2nd floor computer rm. smoke det.-zone 1	●	●																																	8		
9	2nd floor computer rm. smoke det.-zone 2	●	●																																	9		
10	In-duct smoke detector - supply fan 1	●	●																																	10		
11	In-duct smoke detector - supply fan 2	●	●																																		11	
12	In-duct smoke detector - 1st floor return	●	●																																		12	
13	In-duct smoke detector - 2nd floor return	●	●																																		13	
14	In-duct smoke detector - 3rd floor return	●	●																																		14	
15	Heat detectors - 1st floor mech. rm.	●	●																																		15	
16	Heat detectors - 2nd floor storage room	●	●																																		16	
17	Heat detectors - 3rd floor janitor's closet	●	●																																		17	
18	Waterflow - 1st floor	●	●																																		18	
19	Waterflow - 2nd floor	●	●																																		19	
20	Waterflow - 3rd floor	●	●																																		20	
21	Sprinkler control valve - 1st floor			●	●																																21	
22	Sprinkler control valve - 2nd floor			●	●																																	22
23	Sprinkler control valve - 3rd floor			●	●																																	23
24	Fire pump running	●	●																																		24	
25	Fire pump power failure/phase reversal			●	●																																	25
26	Fire alarm ac power failure					●	●																															26
27	Fire alarm system low battery					●	●																															27
28	Open circuit					●	●																															28
29	Ground fault					●	●																															29
30	Notification appliance circuit short					●	●																															30

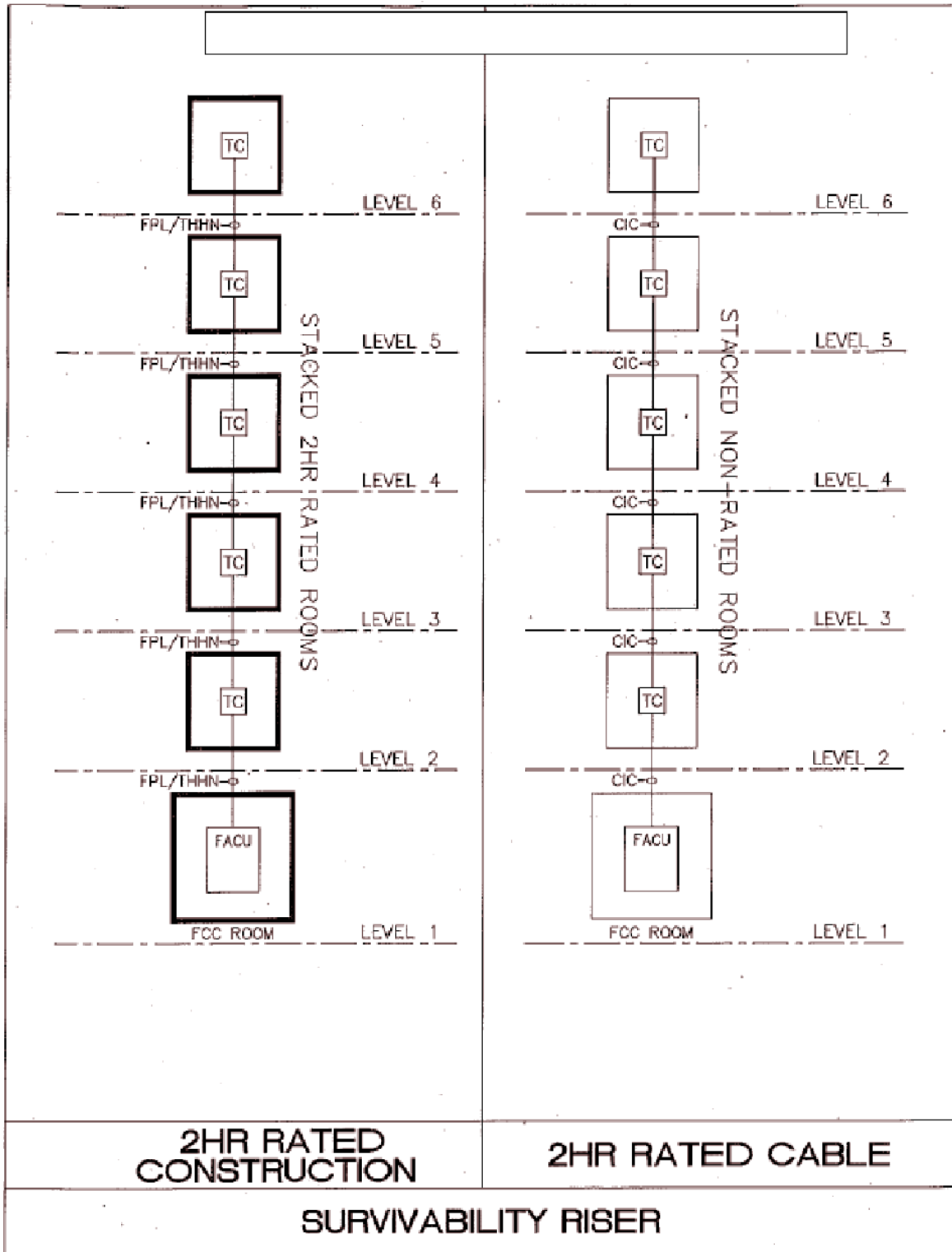
FIGURE A.14.6.2.4 Typical Input/Output Matrix.

ADDENDUM "B"
RELOCATION/EVACUATION MATRIX (See SFFD AB 3.05 for more information)
(SAMPLE-FOR REFERENCE ONLY)

EXAMPLE: SFFD Relocation - Evacuation Matrix 12/8/2019
 Used only For: Full Life-Safety High-Rise Office Buildings
 Specific Buildings may be evaluated on a Case-By-Case Basis

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
ROOF										RELOC	RELOC	RELOC	RELOC	RELOC	RELOC
Lvl 24										RELOC	RELOC	RELOC	RELOC	RELOC	Lvl 24
Lvl 23										RELOC	RELOC	RELOC	RELOC	RELOC	Lvl 23
Lvl 22										RELOC	RELOC	RELOC	RELOC	RELOC	Lvl 22
Lvl 21										RELOC	RELOC	RELOC	RELOC	RELOC	Lvl 21
Lvl 20										RELOC	RELOC	RELOC	RELOC	RELOC	Lvl 20
Lvl 19										RELOC	RELOC	RELOC	RELOC	RELOC	Lvl 19
Lvl 18										RELOC	RELOC	RELOC	RELOC	RELOC	Lvl 18
Lvl 17										RELOC	RELOC	RELOC	RELOC	RELOC	Lvl 17
Lvl 16										RELOC	RELOC	RELOC	RELOC	RELOC	Lvl 16
Lvl 15										RELOC	RELOC	RELOC	RELOC	RELOC	Lvl 15
Lvl 14										RELOC	RELOC	RELOC	RELOC	RELOC	Lvl 14
Lvl 13										RELOC	RELOC	RELOC	RELOC	RELOC	Lvl 13
Lvl 12										RELOC	RELOC	RELOC	RELOC	RELOC	Lvl 12
Lvl 11										RELOC	RELOC	RELOC	RELOC	RELOC	Lvl 11
Lvl 10										RELOC	RELOC	RELOC	RELOC	RELOC	Lvl 10
Lvl 9										RELOC	RELOC	RELOC	RELOC	RELOC	Lvl 9
Lvl 8										RELOC	RELOC	RELOC	RELOC	RELOC	Lvl 8
Lvl 7										RELOC	RELOC	RELOC	RELOC	RELOC	Lvl 7
Lvl 6										RELOC	RELOC	RELOC	RELOC	RELOC	Lvl 6
Lvl 5										RELOC	RELOC	RELOC	RELOC	RELOC	Lvl 5
Lvl 4										RELOC	RELOC	RELOC	RELOC	RELOC	Lvl 4
Lvl 3										RELOC	RELOC	RELOC	RELOC	RELOC	Lvl 3
Lvl 2										RELOC	RELOC	RELOC	RELOC	RELOC	Lvl 2
Lvl 1										RELOC	RELOC	RELOC	RELOC	RELOC	Lvl 1
Bsm't										RELOC	RELOC	RELOC	RELOC	RELOC	Bsm't
F.FLEV															
F.FLOOR															
E/VAC															
RELOC															
RECV															
Stay in Place Floor - Does not receive any Message															
Proposed symbols for Relocating and Receiving Floors at the Stairwell															
Evacuation Voice Pre-Recorded Message: Two rounds of Temporal 3 Alert-Tone shall precede and follow the message - "May I have your attention, please? May I have your attention, please? A FIRE alarm has been activated in the building. Proceed to the nearest exit and exit the building. Do not use the elevators." The message and Alert-Tone sequence shall repeat until the FA system is silenced or reset by responding Firefighters															
Relocation Voice Pre-Recorded Message: A Steady Alert-Tone of 1 to 3 seconds in duration shall precede and follow the message - "May I have your attention, please? May I have your attention, please? A FIRE alarm has been activated on your floor. Proceed to the nearest stairwell and walk down to your pre-assigned floor and re-enter the building. Do not use the elevators. The message and Alert-Tone sequence shall repeat until the FA system is silenced or reset by responding Firefighters															
Receiving Voice Pre-Recorded Message: A Steady Alert-Tone of 1 to 3 seconds in duration shall precede and follow the message - "May I have your attention, please? May I have your attention, please? A FIRE alarm has been activated on a floor above yours. Please stay in place and be prepared to receive personnel relocating to your floor." The message and Alert-Tone shall repeat until the FA system is silenced or reset by responding Firefighters.															

ADDENDUM "C"
SURVIVABILITY RISER (SAMPLE-FOR REFERENCE ONLY)



ADDENDUM "D"

Procedures for Removing Automatic Sprinklers

From Elevator Machine Rooms and Hoistways in Existing High Rise Buildings

1. Provide a letter to the San Francisco Fire Department requesting removal of automatic sprinklers from existing High-Rise elevator's associated spaces. Address the letter to:

**San Francisco Fire Department
ATTN: Captain, Plan Review Section
1660 Mission Street, 4th Floor
San Francisco, CA 94103**

2. Provide the required fee (check or credit card) made out to San Francisco Fire Department for the review and process time of the request. Verify the required fee with the Plan Review Section.

3. The letter shall describe the following features of the elevators in the building. These features must be verified and provided by the elevator service company:

- a. Elevator Group indication for each elevator per CA Title 8 Elevator Safety Orders (Group II, III or IV)
- b. Elevator rise in feet
- c. Specific levels served by each elevator/group
- d. Location of the machine room for each elevator/group
- e. Indicate if each elevator /group is provided with Phase I Emergency Recall Operation to designated level and/or alternate level
- f. Indicate if each elevator is provided with a Phase II in car Fire Key switch
- g. Indicate if each elevator/group is provided with Shunt Trip function **(Yes/No)**
- h. Sprinkler coverage in the machine room **(Yes/No)**
- i. Sprinkler coverage at the top of each elevator hoistway **(Yes/No)**
- j. Sprinkler coverage in the elevator pit of each elevator **(Yes/No)** – If yes, indicate height of sprinklers in inches above the pit floor),
- k. Smoke detection at the machine room **(Yes/No)** – If yes indicate if the smoke detection generate Phase I Emergency Recall Operation
- l. Smoke detection at the top of each elevator hoistway **(Yes/No)** – If yes, indicate if the smoke detection generate Phase I Emergency Recall Operation
- m. Smoke detection at the pit **(Yes/No)** – If yes indicate if the smoke detection generate Phase I Emergency Recall Operation
- n. Heat detection in the machine room **(Yes/No)** – If yes indicate if the heat detection generate Phase I Emergency Recall Operation or Shunt Trip function
- o. Heat detection at the top of each elevator hoistway **(Yes/No)** – If yes indicate if the heat detection generate Phase I Emergency Recall Operation or Shunt Trip function.
- p. Heat detection in the pit **(Yes/No)** – If yes indicate if the heat detection generate Phase I Emergency Recall Operation or Shunt Trip function.

4. Requirements for removing sprinklers from Elevator Machine Rooms:

(Include confirmation of the following in the letter):

- a. The C-16 applicant must bring a copy of this approved letter to DBI at 1660 Mission St. and obtain a permit to remove the sprinklers. Plans are recommended but not required. A description of the work to be done must be included on the permit application.

- b. Indicate that the elevator machine room must not be used for any type of storage.
 - c. A durable sign must be placed in the room stating:
NO COMBUSTIBLE STORAGE ALLOWED IN ELEVATOR MACHINE ROOM
 - d. The room must have a full coverage smoke detection installed and connected to the building fire alarm system.
 - e. The room must be of minimum 1-hour construction with a 1-hour self-closing door.
 - f. All piping, hangers, bracing, and all other components of the automatic sprinkler system in the machine room must be removed by the C-16 contractor.
 - g. A job card will be issued which must be signed off by the Building Department and the SFFD.
 - h. The work must be performed by a licensed C-16 contractor as appropriate for the scope of work.
 - i. Additional Fire Alarm permit may be required by a C-10 Contractor to remove the shunt trip function, its associated components and heat detection (If shunt trip function is provided)
5. Requirements for removing sprinklers from the Top of passenger elevator hoistways:
- a. The hoistway must be constructed of non-combustible materials.
 - b. The elevator car enclosure materials must meet the requirements of ASME A17.1, the Safety Code for Elevators and Escalators.
 - c. All components of the sprinkler system must be removed from the hoistway by the C-16 Contractor.
 - d. Sprinkler removal is not permitted from top of Freight elevator's hoistway.
 - e. If sprinklers are located at the pit below 24" above the pit floor, they shall remain and shall not be removed.
 - f. If sprinklers are located at the pit above 24" of the pit floor, they shall be lowered by the C-16 Contractor, to be below 24" above the pit floor. They shall not be removed.
 - g. If provided, the smoke and heat detection must be removed from the hoistway (upon the hoistway sprinklers removal) – smoke and or heat detection removal must be performed by a C-10 Contractor under separate Fire Alarm permit.

**ADDENDUM “E”
FLASHING HELMET FOR GROUP IV ELEVATORS**

**ASME A17.1, 2004, Rule 2.27.3.2.6 (“Flashing Helmet”)
SFFD Requirements for Fire Alarm Permit Plans**

1. This supersedes the previous SFFD “Flashing Helmet” directive (Memorandum dated October 7, 2013).
2. All Fire Alarm permit plans having interface with GROUP IV elevators (contracted on or after May 1st, 2008) must have this memo scanned on the plans.
3. Flashing helmet requirements for GROUP IV Elevators shall comply with ASME A17.1-2004 Section 2.27.3.2.6 as adopted by CCR Title 8 –Elevator Safety Orders.
4. The three Fire Alarm control relays shall be installed within three (3) feet of the elevator controller(s) and shall be labeled as follows:
 - a. **“Designated (primary) Level Recall - FA Control Relay”**
 - b. **“Alternate Level Recall - FA Control Relay”**
 - c. If the elevator is a standard overhead traction elevator or an hydraulic elevator with an Elevator Machine Room (EMR) - the FA control relay shall be labeled: **“EMR Smoke Detector - FA Control Relay”**
 - d. If the elevator is a Machine-Room-Less (MRL) elevator with an Elevator Control Room (ECR) or an Elevator Control Space (ECS) – the FA control relay shall be labeled: **“ECR/Hoistway Smoke Detector - FA Control Relay”** or **“ECS/Hoistway Smoke Detector FA Control Relay”**
5. The Fire Alarm system sequence of operation matrix shall have corresponding inputs and output conforming to ASME A17.1-2004 Section 2.27.3.2.6.
6. A SFFD field inspection is required to verify this required operation, based on the approved Fire Alarm permit.
7. NOTE: Per 2016 and 2019 California Electrical Code: Elevator Control Spaces are prohibited for MRL Elevators. Only Elevator Control Rooms are acceptable.

**ADDENDUM “F”
ELEVATOR CHECKLIST (Only applicable information is required to be provided)**

Required Information	Example	Fill in required information per Example or indicate N/A
Building Address	1660 Mission St.	
Building Height (Top of Mech. PH Floor)	457 feet	
Low Rise (LR) or High Rise (HR) and number of stories	HR 45 Stories	
New (N) or Existing (E) building	New	
Building Occupancy(ies) Based on CBC	R-2, S-2, A-3	
Elevator I.D.	A, B, C or 1,2,3 etc.	
Levels Served by Elevator	B1-15	
Passenger Elevator (Yes/No)	Yes	
Freight Elevator (Yes/No)	No	
Elevator Rise (Feet)	50 feet	
Elevator Speed (Feet/Minute)	40 ft./min	
Elevator Car Platform dimensions L” X W” / Platform area in sq. ft.	80”X54”/30sqft	
Elevator car can accommodate Ambulance stretcher 24” X84” (Yes/No)	No	
Elevator Hoistway Construction: Combustible/NC 1-HR/ NC 2-HR	NC 2-HR	
Elevator Machine Room Construction: Combustible/NC 1-HR/ NC 2-HR	NC 2-HR	
Elevator Control Room Construction: Combustible/NC 1-HR/ NC 2-HR	NC 1-HR	
New or Existing Elevator (New/Existing)	New	
Date when Elevator Contract was signed	4/30/2008	
Elevator brand/Model	Otis Gen-2	
Elevator Group per CA Title 8 ESO	Group II, III, or IV	
Fire Service Access Elevator (Yes/No)	No	
Occupant Evacuation Elevator (Yes/No)	No	
Service Elevator (Yes/No)	Yes	
Limited Use Limited Application Elevator (Yes/No)	No	
Limited Use Limited Access Elevator (Yes/No)	No	
Private Residence Elevator (Yes/No)	No	
Shuttle Elevator (Yes/No) --- Indicate Service PASSENGER Elevator	No	
Hydraulic Drive (Yes/No)	No	
Traction Drive (Yes/No)	Yes	
Traction Suspension Means – Steel Ropes (Yes/No)	Yes	
Traction Suspension Means – Steel Coated Belts (Yes/No)	No	
Elevator Has Machine Room (Yes/No)	No	
Elevator Has Control Room (Yes/No)	Yes	
Elevator Has Control Space (Yes/No) --- New ECS are prohibited	No	

Elevator Has machinery space (Yes/No) --- Where?	No	
Elevator is Machine Room-less (MRL) – Type (Yes/No)	Yes, Top of:	
Machine Room Has Sprinklers protection (Yes/No)	Yes	
Control Room Has Sprinklers protection (Yes/No)	Yes	
Control Space Has Sprinkler protection (Yes/No)	Yes	
Top of Hoistway Has Sprinkler Protection (Yes/No)	No	
Elevator Pit Has sprinkler protection Below 24” of pit floor (Yes/No)	No	
Elevator Pit Has sprinkler protection At or Above 24” of pit floor (Yes/No)	No	
Machine Room Has Smoke detection protection (Yes/No)	Yes	
Control Room Has Smoke detection protection (Yes/No)	No	
Control Space Has Smoke detection protection (Yes/No)	No	
Top of Hoistway Has Smoke detection Protection (Yes/No)	No	
Elevator Pit Has Smoke detection protection Below 24” of pit floor (Yes/No)	Yes	
Elevator Pit Has Smoke detection protection Below 24” of pit floor (Yes/No)	No	
Top of Hoistway Has Heat detection Protection (Yes/No)	No	
Elevator Pit Has Heat detection protection Below 24” of pit floor (Yes/No)	No	
Elevator Pit Has Heat detection protection Below 24” of pit floor (Yes/No)	No	
Elevator is Provided with Shunt Trip function (Yes/No)	No	
Elevator is provided with Phase 1 Automatic Recall function (Yes/No)	Yes	
Elevator is provided with Phase 1 Recall keyed switch (Yes/No)	No	
Location of Elevator Machine Room (Identify specific Location or N/A)	1 st Floor adjacent room 100	
Location of Elevator Control Room (Identify specific Location or N/A)	NA	
Location of Elevator Control Space (Identify specific Location or N/A)	5 th floor corridor	
Identify location of the elevator controller: Floor/ Location on Floor/ Machine Room/Control Room /Control Space/Inside the Elevator Hoistway)	Floor 17/adjacent room 175/in Control Room	
Elevator Cab is provided with Phase 2 keyed switch (inside Cab) (Yes/No)	No	
Elevator Cab is provided with Firefighter’s light symbol (Inside Cab) (Yes/No)	Yes	
Identify the location of Phase 1 Recall Keyed switch	First floor elevator Lobby	
Identify writing on Phase 1 Recall Keyed switch (Bypass/Off/On OR Reset/Off/On)	Reset/Off/On	
Identify writing on Phase 2 keyed switch (inside cab) (Off/On or Hold/Off/On)	Hold/Off/On	
Elevator Cab keyed switch is behind locked door inside the cab (Yes/No)	Yes	
Elevator is provided with Phase 1 Automatic Recall to designated Primary level (Yes/No) --- Indicate the destination level floor	Yes, 1 st floor	
Elevator is provided with Phase 1 Automatic Recall to Alternate level (Yes/No) --- Indicate the alternate level floor	Yes, 2 nd floor	

ADDENDUM "G"

RADIO COVERAGE FOR EMERGENCY RESPONDERS WITHIN BUILDINGS

- A. Per the SFFC-2019 Section 510.1 and 510.1.1: All new buildings shall have approved radio coverage for emergency responders within the building. Upon completion of the building construction, a radio coverage test shall be conducted per the specific requirements of SFFC, NFPA 72, and NFPA 1221-2016 and if the test fails an Emergency Responders Radio Coverage System (ERRCS) shall be installed.
- B. All new high-rise buildings must be provided with an Emergency Responder Radio Coverage System (ERRCS). A wired phone-jack two-way communication systems shall not be permitted to be installed in new high-rise buildings in lieu of the required ERRCS.
- C. All successful Radio Coverage tests for new low-rise buildings shall be certified by a licensed FCC General Radio Operator or an approved third party testing agency. The radio coverage test certificate and test results must be documented either on the FA permit plans (if it has not been issued yet) or on a separate permit dedicated to the radio test documentation. A SFFD associated inspection shall be required to verify the results of the test. All radio tests shall include a grid test per CFC requirements with both signal strength and DAQ indications in each test grid.
- D. Existing buildings which require to have building permits for change of occupancy shall be required to have radio coverage per CFC Section 510.2 and Section 1103.2. A radio coverage test shall be required to be conducted per the requirements in item C above.
- E. All ERRCS must be designed, installed and tested in accordance with 2016 NFPA-1221 Sections 9.6, 5.5 and 5.10 and 2019 SFFC. Specific requirements are listed below.
- F. All ERRCS wires and cables (coax, fiber optic, etc.) shall comply with the required pathway survivability level based on the building's type of construction. In all building's portions/areas having 2-HR construction (such as Type IA or IB construction AND 2-HR rated vertical enclosures such as stairways or shafts in Type III and Type V buildings or portions of buildings) pathway survivability level-2 (or 3) shall be required. In all building's portions/areas having less than 2-HR construction (such as Type III or V construction) pathway survivability Level 1 shall be permitted.
- G. The signal strength shall meet the requirements of both 2019 CFC Section 510.4.1 and 2016 NFPA 1221 Section 9.6.8
- H. The ERRCS shall be monitored by the building fire alarm system if installed or by the dedicated function fire alarm system if installed (where building fire alarm system is not provided) in accordance with 2016 NFPA 1221 Section 9.6.13.
- I. In all buildings provided with a building fire alarm system or a dedicated function(s) fire alarm system, a dedicated monitoring panel (LED fire alarm annunciator) shall be provided by the fire alarm contractor in accordance with the requirements of 2016 NFPA 1221 section 9.6.13.2 and shall monitor all ERRCS conditions (a) through (g) listed in 2016 NFPA 1221 Section 9.6.13.2 (1). This dedicated monitoring panel shall be installed in the fire command center in new high-rise buildings or adjacent the FACU in low-rise buildings.
- J. If the building is not provided with a building fire alarm system or a dedicated function(s) fire alarm system, an approved dedicated monitoring panel shall be provided by the ERRCS contractor on the ERRCS permit plans. This dedicated monitoring panel shall meet the requirements of 2016 NFPA 1221 Sections 9.6.13.2 (1) and (2).

- K. Per 2016 NFPA 1221 Section 9.6.13.2 (1) (g), all ERRCS components including the donor antenna and the in-building distributed antennas and all system wiring and cables shall be monitored for integrity for trouble conditions at the building fire alarm control unit or at the dedicated function(s) fire alarm control unit, if provided, and on the required dedicated monitoring panel.
- L. The ERRCS backup power requirement shall be in accordance with 2016 NFPA 1221 Section 9.6.12.2.
- M. An approved Emergency Power-Off (EPO) means shall be provided for all ERRCS (Systems). In High Rise buildings with a Fire Command Center (FCC), the required EPO means shall be installed inside the FCC. In Low Rise buildings, not provided with a FCC, the required EPO means shall be installed adjacent to the Bi-Directional Amplifier (BDA or Signal Booster) in an approved location.
- N. In addition to the specific critical coverage areas indicated in 2016 NFPA 1221 Section 9.6.7.4, all elevator cars in the building provided with Phase II in-car firefighter emergency operation, shall be required to meet the critical areas radio coverage.
- O. The BDA and its associated UPS shall be installed in a 2-HR rated room in all low-rise or high-rise buildings, within the building, regardless the type of construction. The BDA and its associated UPS are permitted to be installed in a NEMA-4 weatherproof rated enclosure on the roof of low-rise or high-rise buildings. The BDA and its associated UPS shall not be installed inside the FCC of high-rise buildings.
- P. A CCSF approved radio frequencies and BDA management form shall be obtained (and completed) from the CCSF Department of Technology and provided on all ERRCS permit plans.
- Q. The following general notes shall be provided as verbatim notes on all ERRCS permit plans:

THIS SYSTEM SHALL COMPLY WITH THE APPLICABLE ERRCS REQUIRMENTS IN SFFC, 2016 NFPA 1221, NFPA 72 AND SFFD AB # 2.01 ADDENDUM G.

SECONDARY POWER SUPPLY TO BE PROVIDED BY INTEGRAL BATTERIES. THE SYSTEM SHALL PROVIDE AT LEAST 12 HOURS OF 100 PERCENT SYSTEM OPERATION CAPACITY, PER 2016 NFPA 1221 SECTION 9.6.12.2

THE EMERGENCY RESPONDER RADIO COVERAGE SYSTEM SHALL BE MONITORED BY A DEDICATED FIRE ALARM LED MONITORING PANEL THAT SHALL BE CONNECTED TO THE BUILDING FIRE ALARM CONTROL UNIT. THIS ANNUNCIATOR SHALL BE PROVIDED ON A SEPARATE FIRE ALARM SYSTEM PERMIT*. THE EMERGENCY RESPONDER RADIO COVERAGE SYSTEM SHALL BE MONITORED FOR THE FOLLOWING CONDITIONS:

- (a) Normal ac power ON – Green LED
- (b) Loss of normal ac power – Yellow LED
- (c) Battery charger failure – Yellow LED
- (d) Low battery capacity (to 70 percent depletion) – Yellow LED
- (e) Donor antenna malfunction – Yellow LED
- (f) Active RF emitting device malfunction – Yellow LED
- (g) System component malfunction, including the in-building distributed antennas and all ERRCS wires and cables – Yellow LED

***If a building fire alarm system or a dedicated function(s) fire alarm system is not provided in the building, an approved dedicated monitoring panel shall be provided by the ERRCS contractor on the ERRCS permit plans and be connected directly to the ERRCS.**

THE OWNER OF THE FACILITY SHALL BE RESPONSIBLE FOR MAINTAINING REQUIRED UTILITIES SO AS TO PROVIDE FOR THE CONTINUOUS OPERATION OF THE PROTECTION SYSTEM. THIS SHALL INCLUDE DEDICATED PRIMARY POWER SUPPLY BY MEANS OF DEDICATED BRANCH CIRCUIT.

THE DEVICES AND CONDUIT LOCATIONS SHOWN ON THESE DRAWINGS ARE APPROXIMATE. LOCATIONS MAY NEED TO BE ADJUSTED SLIGHTLY DURING INSTALLATION TO ACCOMMODATE BUILDING CONSTRUCTION FEATURES.

**THIS SYSTEM WAS DESIGNED BY AND SHALL BE INSTALLED BY:
FCC GENERAL RADIO/TELEPHONE OPERATORS LICENSE # _____
(Contact Info for FCC Contractor)_____**

THE ERRCS CONTRACTOR SHALL CONTACT THE SF CITY RADIO SERVICE DIVISION AT THE START OF THE ERRCS WORK PRIOR TO THE DONOR ANTENNA POSITIONING AND ERRCS INSTALLATION.

CONTACT INFORMATION:

Department of Technology,
City and County of San Francisco
Radio Engineer Manager
Office - (415) 558-3828
radio@sfgov.org

THE ERRCS CONTRACTOR SHALL PROVIDE A COPY OF THE APPROVED ERRCS PERMIT PLANS TO THE SF CITY RADIO SERVICE DIVISION FOR THEIR RECORDS via radio@sfgov.org email.

THE ERRCS CONTRACTOR SHALL PROVIDE AN FCC TEST CERTIFICATE AND A RADIO TEST REPORT TO THE FIRE DISTRICT INSPECTOR AT TIME OF SYSTEM INSPECTION via radio@sfgov.org email.

THE ERRCS CONTRACTOR SHALL COORDINATE THE ERRCS TESTING WITH THE RADIO SERVICE DIVISION AND THE SFFD FIRE INSPECTOR AT: 415-558-3300.

THE TWO-WAY EMERGENCY COMMUNICATIONS RADIO SIGNAL (STRENGTH AND DAQ) IS REQUIRED IN ALL ELEVATOR CARS IN THE BUILDING PROVIDED WITH PHASE II IN-CAR FIREFIGHTER'S EMERGENCY OPERATION IT MUST PASS THE SAME TESTS AS OTHER CRITICAL AREAS LISTED IN 2016 NFPA 1221 SECTION 9.6.7.4

ADDENDUM “H”

TWO-WAY COMMUNICATION SYSTEMS REQUIREMENTS FOR PLAN SUBMITTAL, DESIGN, AND INSTALLATION

1.0 REQUIREMENTS

1.1 The provisions contained in the California Building Code Sections 403.5.3.1, 1009.6.5 & 1009.8, 1010.1.9.12 and 3008.6.6 are to be followed. Installation and performance requirements shall comply with the currently published standard: NFPA 72-2019 Section 24.10 on best practices basis.

2.0 PERMITS

2.1 Two-way communications systems for stairway communication, areas of refuge and/or elevator landings require a plan submittal. They may be submitted as part of the site permit addenda schedule as a separate addendum, or combined with the fire alarm system addendum, or as a deferred submittal. This plan submittal shall be a SFFD permit only and shall not require DBI review.

The information required herein shall be provided without regard to the method of permit obtained.

2.1.1 A reference copy of the approved architectural permit plans showing the required 2-Way Communication System (location of control unit/s and call boxes).

2.1.1.1 If the building contains a horizontal exit, the architectural plans shall include call boxes on both sides of the horizontal exits in approved locations. Exception: Call boxes are not required at the discharge level (ground floor)

2.1.1.2 If elevators are provided on both sides of the horizontal exit, call boxes shall be installed at each elevator landing on every floor except on the discharge level

2.1.1.3 If only one elevator is provided on one side of the horizontal exit, call boxes shall be installed at the elevator landings on that side of the horizontal exist. An additional call box shall be required to be installed at the other side of the horizontal exit, in an approved location, on each floor, except on the discharge level.

2.1.1.4 In High-Rise buildings, the Master Control Unit (MCU) must be installed in the Fire Command Center and be monitored off-site by an approved supervising station. Additional remote control stations are permitted to be installed in other approved locations in the building.

2.1.2 A signed copy of any approved “Local Equivalency” (AB-005) or “Alternate Methods” or Pre-Application meeting minutes if it is relevant to the system – check with the Architect or General Contractor if a “Local Equivalency” (AB-005) form, or pre-application meeting minutes, was submitted to and approved by the City of San Francisco.

2.1.3 Two sets of submittal plans and one materials (“cut-sheets”) packet for the proposed Two-Way communications system.

2.2 For two-way communications systems submitted with a Fire Alarm System permit, the same C-10 contractor will be responsible for the design and installation of both systems.

2.3 Fees, when submitted under the Site Permit addenda schedule, will be included in the total site permit fee. If a separate permit (deferred submittal with a “pink” application form) is submitted for the 2-way ECS, the fee will be obtained from the SF-DBI Cost schedule located on the SF-DBI website.

2.4 It is recommended that the applicant be the installing contractor. All installing contractors shall have a current California Electrical (C-10) Contractor’s License and be familiar with the design and installation of these systems.

When the design and plans are produced by a party other than contractor, the plans shall be stamped by a Professional Engineer.

2.5 Installation, alteration, or demolition of a system shall not commence prior to the approval of plans and the issuance of a FIRE permit.

2.6 The entire permit card and a San Francisco Fire Department approved set of plans shall be kept at the project site until final approval of the permit, after which they shall remain in the possession of the owner.

3.0 PLANS

Note: Failure to provide any of the information required in sections 3.1 through 3.8 will result in the plans being disapproved.

3.1 General Requirements for All two-way communications system projects:

3.1.1 Plans and attachments shall be clearly labeled and legible. All fonts on all plans shall be minimum 1/8" font size.

3.1.2 Plans and all revisions to the plans shall be dated. If utilizing an existing drawing or portion of a drawing, the area of work shall be highlighted and clouded with an appropriate symbol (delta). Provide a revision list with a symbol, date, description, and initials.

3.1.3 When making alterations, additions, or deletions to an existing system, all existing devices and equipment shall be shown and properly identified on the floor plan and system riser (single-line) diagram.

3.1.4 Plans shall include a title sheet, an equipment list, a sequence of operation matrix, a floor plan, a system riser diagram, and secondary power & voltage drop calculations (see paragraphs 3.2 through 3.7).

3.1.5 Attachments for all products and equipment shall include the manufacturer's specification sheets indicating the products proposed are IBC, NFPA and ADAAG Code Compliant. California State Fire Marshal (CSFM) listing sheets, as applicable, shall also be provided. See paragraph 3.8.

3.2 Title Sheet

3.2.1 The front sheet shall contain the following information:

(a) Project name and address of the project.

(b) The designer's full name (no initials, pseudonyms, acronyms, or aliases) and signature. The designer of record shall be responsible for the entire system being installed.

(c) Business name, address, and California Contractor's License number of the installing contractor. If the designer of the system is not the installing contractor, the following shall be clearly indicated/printed on the plans:

(i) **DESIGNED BY** - followed by the designer's business name, address, designer of record's full name and wet signature.

(ii) **INSTALLING CONTRACTOR** - followed by the installing contractor's business name, address and California Contractor's License number.

(d) Type of system provided.

(e) The supervising station and UL number.

(f) Occupancy group(s) of building or area as defined by the California Building Code. Number of stories, building height, and construction type. (Provide architectural plans for reference)

(g) Scope of work and why the system is being installed, i.e., required by the San Francisco Building Code or San Francisco Fire Code, required due to a variance, or a voluntary/ Non-Required system at the owner's request.

(h) A note stating that the design and installation complies with all currently adopted codes and standards.

(i) All other pertinent notes.

3.2.2 A key plan of the building and/or complex indicating the street location and the area of work within the building shall be provided.

3.3 Equipment List

3.3.1 Provide the model number, manufacturer's name, description, quantity, CSFM listing number (if applicable), and symbols to be used (legend) for each device, equipment, and conductors proposed to be installed (*Note: The Fire Department reserves the right to disallow any listed product due to past performance*).

3.3.2 The symbols used on the plans shall match the legend. Strike out any "typical" symbols that do not pertain.

3.4 Sequence of Operation – a written description in a matrix format shall be provided to define the events that occur when initiating the Two-way communication system. The description shall include details relating to annunciation, remote signaling, and activation of control functions, as applicable. Also provide programming description.

3.5 Floor Plan

3.5.1 Scale used and a graphical representation of the scale. The minimum scale for plans is 1/8" = 1'-0". Metric scale shall not be accepted.

3.5.3 The location of all system components.

3.6 Riser Diagram – provide the following:

3.6.1 Single-line wiring diagram (riser diagram) that shows the interconnection of each device and equipment of the whole system.

3.6.2 Number of conductors in each wiring segment and the type and size of wire or conductor to be used.

3.6.3 The class for initiating, signaling line and notification device circuits. Including circuit number or identification.

3.6.3.4 Survivability Riser diagram showing the specific protection of the system wiring.

3.7 Calculations

3.7.1 The means of two-way communications normally connected to the building power supply shall automatically transfer to a source of emergency power within (10) seconds after the normal supply fails. The power source shall be capable of providing for the operation of the system (including annunciators) and the means of two-way conversation for (4) hours.

3.7.2 Secondary power calculation - provide calculations to verify that standby batteries or other approved secondary power source has 24 hours of battery backup plus (4) hours of talk time at full system capacity. If an emergency generator is provided as a backup power source, stamped calculations by a CA silenced Electrical Engineer showing sufficient power and fuel capacity of the generator to support all emergency loads combined for 24 Hours standby + 4 Hours of talk time (when all call stations are calculated in talk mode). In that case the required standby batteries capacity shall be permitted to be reduced to 4-Hours of standby plus 2-Hours of Talk time.

3.7.3 Voltage drop calculation - calculations shall be provided to verify that the voltage drop in the Two-way communication system circuits do not exceed **10 percent of the starting voltage power per circuit (use 85% of nominal voltage as the starting voltage per circuit)**. Provide voltage drop calculations for each circuit.

3.8 Attachments (Materials-Submittal)

3.8.1 Manufacturer's specification sheets for all equipment and materials to be used shall be submitted, including the transponder to the supervising station. The device or equipment is being used, the listing information, and the application per listing.

3.8.2 Submit copies of the CSFM listing number sheets for all devices and equipment requiring listing.

4.0 DESIGN AND INSTALLATION

4.1 Two-way communication systems shall be designed and installed in accordance with NFPA 72-2019 Section 24.10 – ECS, as a best practices basis. (All 2-Way Communication Systems, Including Elevator-Landings and Stairway Communication systems shall comply with the currently adopted requirements for Areas of Refuge 2-Way communication system listed in NFPA 72-2016 Chapter 24-ECS).

4.2 Two-way communication systems shall have a pathway survivability of Level 2 or 3 per NFPA 72, section 24.3.13.7 which is further explained in Section 12.4 for the required elements. *Exception: Level 1 survivability shall be permitted only in building's area(s) having less than 2-hour fire-rated construction. (Must provide approved architectural plans for reference)*

4.3 Refer to the California Building Code, Sections 403.5.3.1, 1009.6.5 & 1009.8, 1010.1.9.12 or 3008.6.6 to determine when a two-way communication system is required.

4.4 Two-way communication systems shall provide communication between each required location and the fire command center (FCC) in high-rise buildings, or a central control point (CCP) location as approved by the fire department for low rise buildings. Where the central control point is not constantly attended (24/7/365), a two-way communication system shall have an automatic voice dial-out capability to a central monitoring location providing 24 hour service. An approved central, proprietary or remote service, which will provide effective means of conversation for immediately summoning assistance at all times in case of emergency, shall monitor the Two-way communication system.

4.5 The two-way communication system shall include both audible and visible signals. A button complying with the California Building Code Section 1138A or 11-B-205 and 11B-308 in the area of refuge and/or elevator landings/ or stairway shall activate both a light in the area of refuge and/or elevator landings/ or stairway indicating that rescue has been requested and a light at the central control point indicating that rescue is being requested. A button at the central control point shall activate both a light at the central control point and a light in the area of refuge and/or elevator landings/ or the stairway communication system call box indicating that the request has been received.

4.6 Each two-way communication system initiating device (Call Box) shall indicate its location on the MCU. It shall indicate the building address to the central monitoring service via a pre-recorded message or Caller ID feature or other approved means. It is not required to indicate the specific call box location to the off-site monitoring service. The pre-recorded message verbiage shall be included on the permit plans.

4.7 Directions for the use of the two-way communication system, instructions for summoning assistance via the two-way communication system and written identification of the location shall be posted adjacent to the two-way communication system MCU. Adjacent to each call box the signage shall be 12" wide by 16" tall sign with font size of minimum 5/8" letters.

4.8 Comply with CBC Section 1009.9 for the required signage.

4.9 Supervising Station Service shall provide all the services and comply with all the requirements delineated in Section 26.3 of NFPA 72 edition.

4.10 Monitoring the Integrity of all system components and wiring shall comply with NFPA 72-2019 edition. All system components shall be monitored for integrity and shall be supervised by the building Fire Alarm system. The building Fire Alarm system shall supervise the two-way communication system via two addressable monitor-modules. One address shall be indicated as a “general two-way communication system trouble” (open, short, communication trouble, etc.). The other address shall be indicated as “Power two-way communication system Trouble” (Loss of AC power, Battery charger trouble, power supply trouble, low-battery trouble, etc.).

Monitoring the integrity of the two-way communication system by an off-site supervising station, via the building Fire Alarm system, shall not be required if the central control unit is located in an approved constantly attended location within low-rise buildings.

4.11 Protective covers for call boxes – All call boxes may be provided with approved clear protective covers to prevent unwanted activation of the two-way communication system.