1.0 Overview

A. The fire alarm system shall be a non-coded UL listed addressable fire alarm system with a voice evacuation/ mass notification annunciation system.

B. All components shall be UL listed for use with the fire alarm voice evacuation/ mass notification annunciation system.

C. The design of the fire alarm and mass notification system shall, at a minimum, comply with the following:
   1. International Building Code
   2. International Fire Code
   3. International Mechanical Code
   4. NFPA 72 National Fire Alarm Code
   5. NFPA 70- National Electrical Code
   The version/ year of these standards and codes shall be the most current version adopted by OSE and the State Fire Marshal.

D. Refer to the CCU Fire Alarm and Voice Evacuation/ Mass Notification Typical Riser for additional information.

E. Provide TVSS surge protection for the incoming power and for all devices that leave the building (AHU interfaces, antennas, duct mounted smoke detectors exterior strobes/ horns).

F. The engineer of record shall review these standards and modify as required to meet the requirements for the specific building or site designed. All modifications shall be reviewed and approved by the CCU Fire Marshal.

G. Design plans and specifications shall be submitted to the CCU Fire Marshal prior to the project going out to bid.

H. Device labels: Embossed adhesive tape, with 3/16 inch (5 mm) white letters on black background. Use only for identification of all fire alarm notification and activation devices. Label shall include loop and device number.

I. Fire alarm and mass notification power supplies and panels shall be accessible without the use of a ladder.

2.0 Fire Alarm
A. The basis of design for the fire alarm system is Firelite.

B. The fire alarm panel shall be installed in an electrical room.

C. Use class B with a minimum pathway survivability level of 1. All cabling shall be in conduit.

D. Provide dual action fire alarm pull stations. Basis of design is FireLite model BG-12LX. Key pull stations to common key with fire alarm panel.

E. The fire alarm system shall use two dedicated phone lines for reporting to the remote receiving station at CCU Department of Public Safety Dispatch Center.

F. Test and reset keys shall be provided for all for duct mounted smoke detectors. Install the test and reset units 48” AFF and label unit or damper served.

G. Provide a recessed remote annunciator at a location approved by the CCU Fire Marshal.

**NOTE:**

All manufacturers and components shall be “open source” or “non-proprietary” systems where the parts, supplies, programing, software and all other portions or aspects of the system are available from multiple independent competitive dealers or suppliers on the open market. The use of non-proprietary equipment and systems shall allow certified technicians to obtain parts, program, perform maintenance or subcontract repairs competitively.

### 2.1 Annunciation (Fire alarm and In-building Mass notification)

A. The mass notification system shall be an Eaton Safepath with Waves over IP voice evacuation and mass notification system.

B. The mass notification system shall be connected to CCU Department of Public Safety Dispatch Center’s ALERiTY mass notification system by ethernet and a backup radio communication system.

C. The mass notification and voice evacuation panel (and booster panels) shall be installed in electrical rooms.

D. The mass notification digital communicator shall be installed in a communication room on the top floor of the building.

E. There shall be a battery booster panel for strobes and an amplifier booster panel for speakers installed, at a minimum, on every floor. Provide 25% spare capacity in the
amplifier booster panel and the battery booster panel. Calculations shall assume that the speakers are at their maximum tap settings and strobes are at their designed candela level.

F. All annunciation devices shall be white and shall be marked with “ALERT” only. Basis of design is Cooper annunciation System Sensor devices.

G. Any location that requires a strobe for fire alarm notification shall be installed as a speaker strobe. The only exception to this is at the voice evacuation and mass notification panel or the remote microphone location; do not install speakers at these locations.

H. Speakers and strobes are not required in the stairwells unless the building height requires them per the applicable building code.

I. All pathways for annunciation shall have a minimum survivability level of 1 and shall be installed in conduit. The engineer of record shall review the project specific requirements to determine if a pathway survivability greater than 1 is required.

J. Provide a remote microphone station installed in a recessed locked enclosure (with a window) at the fire alarm remote annunciator location. Enclosure shall be keyed to the campus best key system.

K. Program the mass notification and voice evacuation panel with CCU's standard 8 pre-recorded messages.

L. All antennas installed shall be secured to the building structure to resist a 130 MPH wind load with a gust factor of 1.3.

M. All strobes must be synced.

N. All speakers shall have field selectable taps to adjust volume.

O. Speaker design and spacing shall take into consideration the acoustics of a space. Speakers should never be pointed at each other.

P. Speakers should be located near the center of rooms, not near the edges of a space.

Q. Space speakers as required for intelligibility and NFPA coverage requirements.

R. Provide voltage drop calculations that show a 1.5db or less power loss on the speaker circuits.

S. Radio communication system operating frequency shall be 5.2GHz.
2.2 Area Wide Mass Notification

A. Any projects that add outdoor space or have outdoor venues shall expand the existing wide area mass notification system installed on campus.

B. The area wide mass notification system shall be connected to CCU Department of Public Safety Dispatch Center’s ALERiTY mass notification system.

2.3 Mass Notification Risk Assessment

A. CCU has four layers of mass notification:
   1. Layer one is the in-building mass notification system.
   2. Layer two is the area wide mass notification system.
   3. Layer three is text messages and emails.
   4. Layer four is public broadcast measures, information posted on social media, and CCU’s website.

B. An NFPA 72 risk assessment for layer one and two of the mass notification system was performed over June-August of 2016. This assessment was done with representatives of CCU facilities, CCU public safety, CCU Fire marshal, CCU Information Technology, and CCU Emergency Management. The engineer of record shall update the risk assessment and provide this risk assessment to OSE for review and approval for each new construction or renovation project.

C. The NFPA 72 risk assessment reference CCU’s continually evolving campus Risk Assessment and Emergency Operations Plan. This plan and assessment was reviewed in relation to the mass notification system standards included in this document. Copies of a current version of this plan are available at CCU Department of Public Safety.

D. The result of the NFPA 72 risk assessment was:
   1. Pathway survivability: The in building mass notification systems at CCU do not employ relocation or partial evacuation during a fire alarm event. Pathway survivability shall be at a minimum a level 1.
   2. Location of equipment: The mass notification panel shall be located in a 1st Floor electrical room nearest to the front entrance of the building to limit access by public. Fire alarm panel shall also be installed in this room. Responders will be trained in the location of the panel and provided with access to the room in which it is located. The remote microphone shall be installed in a locked recessed enclosure near the fire alarm remote annunciator.
   3. Occupancy type: The following occupancy types were considered during the risk assessment.
      a. Student Housing
      b. Sports Venues
4. Message priority:
   a. The in-building mass notification system is allowed to override a fire alarm evacuation notification for the brief time that the mass notification signal is broadcast. Once the mass notification signal is complete the fire alarm signal will continue.
   b. The mass notification system will only be used when there is an imminent threat to life and safety.
   c. If at any time a first responder needs to communicate with the building occupants the local microphone in the building will override all fire alarm and mass notification signals. Once the local microphone is no longer in use the building fire alarm and/or mass notification system will continue to alarm.
   d. If the building uses the mass notification system for paging or music or non-mass notification signals these signals shall not override any fire alarm, mass-notification, or local microphone signal.

5. Notification Zones: Each building on campus will be a notification zone. CCU’s head end system can be used to send mass notification signals to all buildings or just select buildings as required by CCU’s Emergency Operations Plan process for dealing with emergencies.

6. CCU’s dispatch center is located at the public safety building emergency command center. A redundant mass notification control panel is located at CCU IT building.

7. CCU Public Safety Officials will have the ability to use pre-recorded messages broadcast from the CCU Dispatch Center or custom messages dependent on the Emergency Operations Plan.

8. Refer to table 28 00 00 2.1 for the Mass Notification Risk Assessment.

### 3.0 Installation

A. All circuit breakers supplying power to the fire alarm voice evacuation/ mass notification annunciation system shall be painted red and locked in the on position.

B. The conduit system used for this system shall be red or shall have red covered junction boxes. In areas with exposed conduit in finished spaces, pending approval of the CCU Fire Marshal, the conduit and junction boxes can be painted to match the exposed ceiling spaces if the junction boxes are labeled “Fire Alarm”.

C. Contractor shall provide a minimum of 2% additional fire alarm/mass notification devices including but not limited to pull stations, horn/strobes, speakers, etc. at end of project.

### 3.1 Testing
A. The fire alarm contractor shall contract with an independent testing agency to conduct a STI/STIPA test per NFPA 72-2013 Annex D. The testing shall be a quantitative test that uses a signal generator and a testing device that provides a speech intelligibility score for each Acoustically Distinguishable Space (ADS).

B. Submit a testing plan identifying the proposed ADS’s to the Architect/ Engineer and CCU Fire Marshal on a marked up floor plan for review and approval prior to testing.

C. Adjust speaker taps to improve intelligibility and audibility of the system during this test.

D. Submit all test reports to the Architect/ Engineer and CCU Fire Marshal.
Table 28 00 00 2.1 CCU Mass Notification Risk Assessment
### Table 28 00 00 2.1 CCU Mass Notification Risk Assessment

<table>
<thead>
<tr>
<th>Identified Hazards per Campus Risk Assessment</th>
<th>Will the in-building mass notification system be used to communicate for this hazard?</th>
<th>Will the alert be sent to all buildings or targeted buildings only?</th>
<th>Will the area wide mass notification system be used to communicate for this hazard?</th>
<th>Shelter in place or evacuate?</th>
<th>If Sheltering in Place, Will the Mass Notification Override Fire Alarm Evacuation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earthquake</td>
<td>Yes</td>
<td>All</td>
<td>Yes</td>
<td>Evacuate</td>
<td>No</td>
</tr>
<tr>
<td>Extreme Heat/ Heat Wave</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flood (flash)</td>
<td>Yes</td>
<td>All</td>
<td>Yes</td>
<td>Situationally Dependent</td>
<td>No</td>
</tr>
<tr>
<td>Hurricane and Tropical Storm</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infectious Disease Outbreak</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe Thunderstorm</td>
<td>Yes**</td>
<td>Targeted**</td>
<td>Yes**</td>
<td>Seek Shelter**</td>
<td>No**</td>
</tr>
<tr>
<td>Severe Winter Storm</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tornado</td>
<td>Yes</td>
<td>All</td>
<td>Yes</td>
<td>Shelter in Place</td>
<td>No</td>
</tr>
<tr>
<td>Hazardous Materials Incident</td>
<td>Yes</td>
<td>All</td>
<td>Situationally Dependent</td>
<td>Situationally Dependent</td>
<td>No</td>
</tr>
<tr>
<td>Utility Failure</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Airplane Crash</td>
<td>Yes</td>
<td>All</td>
<td>Yes</td>
<td>Situationally Dependent</td>
<td>No</td>
</tr>
<tr>
<td>Fire/Wildfire (not in building)</td>
<td>Yes</td>
<td>Situationally Dependent</td>
<td>Situationally Dependent</td>
<td>Situationally Dependent</td>
<td>No</td>
</tr>
<tr>
<td>Active Shooter</td>
<td>Yes</td>
<td>All</td>
<td>Yes</td>
<td>Situationally Dependent</td>
<td>No</td>
</tr>
<tr>
<td>Civil Unrest</td>
<td>Yes</td>
<td>All</td>
<td>Yes</td>
<td>Situationally Dependent</td>
<td>No</td>
</tr>
<tr>
<td>Cyber Attack</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bomb Threat/ Explosion</td>
<td>Yes</td>
<td>All</td>
<td>Yes</td>
<td>Situationally Dependent</td>
<td>No</td>
</tr>
<tr>
<td>Chemical/ Biological/ Radiological Attack</td>
<td>Yes</td>
<td>Situationally Dependent</td>
<td>Situationally Dependent</td>
<td>Situationally Dependent</td>
<td>No</td>
</tr>
</tbody>
</table>

** Sports and outdoor assembly venues only.
CCU Fire Alarm and Mass Notification
Typical Riser Diagram
28 23 00 – Video Surveillance

1.0 General

A. Video camera basis of design shall be:
   1. Interior cameras: Flir IP
   2. Exterior cameras: Panasonic Business

28 32 00 – Two-Way Communication

1.0 General

A. Provide a two-way communication system at all elevator landings above the first floor. Basis of design is Housing Devices Inc. ADA 1000 System.

28 83 06 – Radio Enhancement System

1.0 General

A. Provide an in-building public safety radio enhancement system (RES) per IFC 510 (2015) and install per NFPA 1 (2015) annex o. Coordinate radio frequency bandwidth requirements with the AHJ. Prior to installation, test radio coverage in building per NFPA 1, annex o. If inbound/outbound radio signal strength meets the criteria of NFPA 1 annex o, do not install radio enhancements and provide credit to the owner.

B. The RES shall be capable of integrating into Coastal Carolina University’s fiber optic RES network.

C. All coaxial cabling shall be installed in conduit.

28 10 00 – Electronic Access Control and Intrusion Detection

The following is a compilation of documents which highlight Coastal Carolina University’s Electronic Access Control and Intrusion Detection standards. These standards summarize the requirements of CCU’s ITS Department and Environmental Health and Safety Department. Basis of design shall be CBORD.

Basis of design shall be CBORD.
Typical Card Reader Door with Electric Strike Using Hibred Cable

COLOR  TYPE
ORANGE  1
WHITE   2
BLUE    3
GRAY    4
<table>
<thead>
<tr>
<th>TYPE</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>5388C</td>
<td>8 Conductor #18awg, Stranded, Shielded w/ drain, Color Coded</td>
</tr>
<tr>
<td></td>
<td>Belden 5306FE</td>
<td>Or equivalent</td>
</tr>
<tr>
<td></td>
<td>Carol E2038S</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>YR15950</td>
<td>4 Conductor #22awg, Stranded, Shielded w/ drain, Color Coded</td>
</tr>
<tr>
<td>C</td>
<td>82760</td>
<td>2 Conductor #18awg, Stranded, No Shielded</td>
</tr>
<tr>
<td>D</td>
<td></td>
<td>CAT 5/6E – 8 Conductor Twisted Paired, 568B Network Cable</td>
</tr>
<tr>
<td>H</td>
<td>538AFS</td>
<td>1 - 6 Conductor #18awg, Stranded, Shielded w/ Drain (White, Green, Orange, Brown, Red, Black)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 - 4 Conductor #16awg, Stranded, Shielded w/ Drain (White, Black, Red, Green)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 - 4 Conductor #18awg, Stranded, Shielded w/ Drain (White, Black, Red, Green)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 - 2 Conductor #18awg, Stranded, Shielded w/ Drain (Red, Black)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DEVICE</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hid Prox</td>
<td>5388C</td>
<td>8 Conductor #18awg, Stranded, Shielded w/ drain, Color Coded</td>
</tr>
<tr>
<td>Combo Prox / Magnetic Stripe</td>
<td>Belden 5306FE</td>
<td>Hibred</td>
</tr>
<tr>
<td>Dorado</td>
<td>Carol E2038S</td>
<td></td>
</tr>
<tr>
<td>A1005WR</td>
<td>538AFS</td>
<td>1 - 6 Conductor #18awg, Stranded, Shielded w/ Drain</td>
</tr>
<tr>
<td>A2005</td>
<td>538AFS</td>
<td>1 - 4 Conductor #16awg, Stranded, Shielded w/ Drain</td>
</tr>
<tr>
<td>Biometric</td>
<td>538AFS</td>
<td></td>
</tr>
<tr>
<td>Exit Request</td>
<td>YR15950</td>
<td>4 Conductor #22awg, Stranded, Shielded w/ drain, Color Coded</td>
</tr>
<tr>
<td>Door Strike</td>
<td>82760</td>
<td>2 Conductor #18awg, Stranded, No Shielded</td>
</tr>
<tr>
<td>Exit Request PIR</td>
<td>YR15950</td>
<td>4 Conductor #22awg, Stranded, Shielded w/ drain, Color Coded</td>
</tr>
<tr>
<td>Door Contact</td>
<td>YR15950</td>
<td>2 Conductor #18awg, Stranded, No Shielded</td>
</tr>
<tr>
<td></td>
<td>YR15950 / 82760</td>
<td>4 Conductor #22awg, Stranded, Shielded w/ drain, Color Coded</td>
</tr>
<tr>
<td></td>
<td>YR15950</td>
<td>4 Conductor #22awg, Stranded, Shielded w/ drain, Color Coded</td>
</tr>
</tbody>
</table>
Coastal Carolina University Design Guidelines

Fire Detection, Alarm, and Mass Notification – May 5th, 2017

DEVICES

HIBRED CABLE / BANANA PEEL

SQUADRON PANEL

+ 12VDC
GROUND
DATA 0 / DATA
DATA 1 / CLOCK
DATA RETURN
GREEN LED
RED LED
BEEPER
HOLD / CARD PRES
SHIELD

TO SQUADRON POWER SUPPLY

MR5

DOOR CONTACT

REQUEST TO EXIT PIR

ELECTRIC STRIKE

STRIKE POWER
SUPPLIED BY
PROVIDER OF
STRIKE

SquadronTypicalDrawingsRev4 - JEL
Coastal Carolina University Design Guidelines

Fire Detection, Alarm, and Mass Notification

May 5th, 2017

Diagram of a security system with various components labeled:
- Door 1, Door 2, Door 3, Door 4
- Egress
- Door Contact
- ALTRONIX Power Supply
- Von Duprin w/o REX
- Von Duprin Power Supply
- Reader #1 and Reader #2
- V200 and V300

Diagram includes wiring connections and labels for each component.
Coastal Carolina University Design Guidelines
Fire Detection, Alarm, and Mass Notification – May 5th, 2017

Mercury Security MR-5
Mag. Stripe Reader, 12V

V100 or V2000

SquadronTypicalDrawingsRev4 - JEL
Coastal Carolina University Design Guidelines

Fire Detection, Alarm, and Mass Notification – May 5th, 2017

V100 or V2000

READER #1

P1

+12VDC Out
Ground
Data 0 / Data 1 / Clock
Data Return
Green LED
Red LED
Beeper
Hold/Card Photo
Shield

P2

(Pin 1) Door Monitor

(Pin 2) LED

NOT

NC

NO

Aux Relay (Out 1)
Strike Relay (Out 1)

P3

P4

P5

P6

P7

P8

P9

READER #2

12VDC Out
Ground
Data 0 / Data 1 / Clock
Data Return
Green LED
Red LED
Beeper
Hold/Card Photo
Shield

Door Monitor

REX

Strike Relay (Out 5)

Aux Relay (Out 5)

 TERM Resistor

RS-485 In

RS-485 Out

12VDC In

A

B Shield

A

B Shield

SquadronTypicalDrawingsRev4 - JEL
Coastal Carolina University Design Guidelines

Fire Detection, Alarm, and Mass Notification

May 5th, 2017

Card Reader 2

To 12V DC Power Supply

iCLASS PROX
RED
BLACK
GREEN
WHITE
ORANGE
BROWN
YELLOW
BLUE
SHIELD

+ 12VDC
GROUND
DATA 0 / DATA
DATA 1 / CLOCK
DATA RETURN
GREEN LED
RED LED
BEEPER
HOLD / CARD PRES
SHIELD

SQUADRON PANEL

SquadronTypicalDrawingsRev4 - JEL