1. GENERAL

1.01 SECTION INCLUDES

.1 Fire alarm signalling speakers.

.1 Speaker tap settings.

.2 Boosters.

1.02 RELATED REQUIREMENTS

.1 Section 26 05 00 – Common Work Results for Electrical.

.2 Section 28 46 13 – Fire-Alarm Systems.

.3 Section 28 46 21.41 – In-Building Fire Emergency Voice/Alarm Communications System (EVACS) Equipment: Firefighter handsets (Emergency telephones).

1.03 UNIT PRICES

.1 Refer to Document 00 43 00.26.

.2 Submit with Tender unit prices to provide the following. Include installation and verification in the unit price:

.1 Speaker complete with wiring and conduit, based on 10 metre distance.

.2 Fire alarm strobe complete with wiring and conduit, based on 10 metre distance.

.3 Combination speaker/strobe complete with wiring and conduit, based on 10 metre distance.

.4 Unit cost of additional conduit and wire for the above items.

1.04 REFERENCES

.1 CAN/ULC-S526:2016, Visible signaling devices for fire alarm and signaling systems, including accessories.

.2 CAN/ULC-S541:2016, Speakers for fire alarm and signaling systems, including accessories.

1.05 SUBMITTALS

.1 Booster battery calculations, booster power supply voltage drop calculations.

1.06 MAINTENANCE MATERIAL SUBMITTALS

.1 Extra Stock Materials

.1 Supply the following additional equipment as spare parts in a proper metal enclosure sized to accept the equipment as listed herein. Label the enclosure fire alarm spare parts. Enclosure shall be placed in the same room as the FACP.

.1 Supply three of each type of signalling device used on the project.

.2 Spare Parts

.1 Provide (supply and install) an additional [five] of each of the following devices as directed during construction. Turn over unused surplus in addition to those devices listed above:

.1 Fire alarm speakers.

.2 Fire alarm strobes.

.3 Combination speaker/strobes.

.3 Tools

.1 Supply three of each type of any special tools required for system use and maintenance.

1.07 CERTIFICATIONS

.1 All appliances which are supplied for the requirements of this specification shall be ULC Listed.

.2 All appliances shall be of the same manufacturer as the Fire Alarm Control Panel specified to ensure absolute compatibility between the appliances and the control panels, and to ensure that the application of the appliances are done in accordance with the single manufacturer's instructions.

.3 Any appliances that do not meet the above requirements, and are submitted for use must show written proof of their compatibility for the purpose intended. Such proof shall be in the form of documentation from all manufacturers that clearly states that their equipment (as submitted) is 100% compatible with each other for the purpose intended.

2. PRODUCTS

2.01 AUDIO

.1 The system shall be capable of delivering up to eight audio messages simultaneously over a single copper pair and/or fiber media. All audio messages and live pages shall originate at the one-way audio control unit. The one-way audio control unit shall store pre-recorded audio messages digitally. These messages shall be automatically directed to various areas in a facility under program control. The system shall support remote cabinets with zoned amplifiers to receive, amplify and send messages through speakers over supervised circuits.

.2 The one-way emergency audio control shall provide control switches to direct paging messages as follows:

.1 "All Call" to direct the page messages to all areas in the facility, overriding all other messages and tones.

.2 "Page to Evacuation Area" to direct the message to the evacuation area(s), overriding all other messages and tones.

.3 "Page to Alert Area" to direct page messages to the area(s) receiving the alert message and tones, overriding all other messages and tones.

.4 "Page to Balance Building" to direct page messages to the areas) in the facility NOT receiving either the evacuation area or alert area messages.

.5 "Page by Phone" switch to select the firefighters telephone system as the source for paging.

.3 The two-way voice communications control unit shall provide two-way communications between remotely located phones and the CACF room. The control unit shall provide the ability to individually select and display each two-way voice communication circuit support up to five (5) remote telephones in simultaneous two-way voice communications.

.4 Audio Amplifiers (Multi-Channel)

.1 Provide as minimum one twenty (20) watt audio amplifier per paging zone. The system software shall be capable of selecting the required audio source signal for amplification. To enhance system survivability, each audio amplifier shall automatically provide a local 3-3-3 1000 Hz temporal pattern output upon loss of the audio communications with the one-way audio control unit, during an alarm condition. Audio amplifiers shall be power limited and protected from short circuits conditions on the audio circuit wiring. Each amplifier output shall include a dedicated 70 Vrms

output. Provide a standby audio amplifier that will automatically sense the failure of a primary amplifier, and replace the function of the failed amplifier.

2.02 SPEAKERS

.1 Speaker-Ceiling Mount – 200 mm (8 inch)

.1 Provide 200 mm (8 inch) ceiling mounted speakers at the locations shown on the drawings. In and out screw terminals shall be provided for wiring. Speaker baffles shall be round or square steel with white finish as required. Provide square surface mount boxes with matching finish where required. Speakers shall provide 1/2 W, 1 W, 2 W, and 4 W power taps for use with 70 V systems. At the 4 watt setting, the speaker shall provide a 94 dBA sound output a frequency of 1000 Hz. when measured in an anechoic chamber at 10 feet.

.2 Speaker-Cone – 100 mm (4 inch)

.1 Provide 100 mm (4 inch) white speakers at the locations shown on the drawings. Speakers shall have a 100 mm (4 inch) mylar cone, paper cones are not acceptable. The rear of the speakers shall be completely sealed protecting the cone during and after installation. In and out screw terminals shall be provided for wiring. Speakers shall provide 1/4 W, 1/2 W, 1 W, and 2 W power taps for use with 70 V systems. At the 2 watt setting, the speaker shall provide a 88 dBA sound output over a frequency range of 400 Hz to 4000 Hz.

.3 Speaker-Reentrant Surface

.1 Provide 100 mm (4 inch) surface re-entrant speakers at the locations shown on the drawings. Speakers shall provide 2 W, 4 W, 8 W, and 15 W power taps for use with 70 V systems. The re-entrant speakers shall utilize a high efficiency compression drivers. Cone type drivers are not acceptable. At the 15 watt setting, the speaker shall provide a 102 dBA sound output over a frequency range of 400 Hz to 4000 Hz. when measured in reverberation room per UL 1480. Weatherproof boxes shall be provided for outdoor mounting.

.4 Speaker-Strobes

.1 Speaker strobes shall be supplied where shown on plans and drawings. Strobe output shall be determined as required by its specific location and application from a family of 15/75 cd, 30 cd, and 110 cd devices. Strobes shall provide a synchronized flash.

.2 Size strobe power supplies based on all strobes set at 75 cd.

.5 Sirens

.1 Provide surface mounted fire alarm combination horn/sirens of the heavy-duty electronic projector type at the locations shown on the drawings. The horn/siren shall be polarized for supervised operation. Select for horn or siren tone as required. Provide weatherproof wall boxes for outdoor mounting.

2.03 STROBES

.1 Strobes shall be supplied where shown on plans and drawings. Strobe output shall be determined as required by its specific location and application from a family of 15/75 cd, 30 cd, and 110 cd devices. Strobes shall provide a synchronized flash.

.2 Size strobe power supplies based on all strobes set at 75 cd with exact setting determined in the field to provide adequate visual signals in accordance with CAN/ULC-S524.

2.04 REMOTE BOOSTER POWER SUPPLIES

.1 Power supply booster designed to extend power available to notification appliance circuits.

.2 Enclosure: Steel, with lockable front panel allowing access to all interior components, surface mounted.

.3 Functions: Contains circuits to monitor and charge batteries, control and supervise 4 Class B appliance circuits, and monitor two controlling inputs from external sources.

.1 Configurable to operate at any one of three signaling rates, or to follow the main panel's notification appliance circuit.

.2 Trouble contact with 16-second delay.

.4 Batteries: Two, sized for 24 hours of standby followed by 15 minutes of alarm.

.5 Indicators: LEDs, one for each circuit, one for battery supervision, one for ground fault, and one for power.

.6 Input: 120 volt circuit.

3. EXECUTION

3.01 INSTALLATION

.1 Installation to Section 28 46 13.

.2 Initial speaker tap settings:

.1 Use 0.25 watt taps for speakers in residential suites.

.2 Use 0.5 watt taps for speakers in corridors.

.3 Use 0.5 watt taps for speakers in public areas.

.3 Strobe light output (candela) in accordance with CAN/ULC-S524-14:

.1 Table 5 – Light Output for Wall-Mounted Strobe Lights for Various Room Sizes:

Maximum Area of Coverage (m)	Minimum Light Output, Candela (Effective Luminous Intensity)		
	One Light per Area	Two Lights per Area	Four Lights per Area
6.10 x 6.10	15	Not allowable	Not allowable
8.53 x 8.53	30	15	Not allowable
9.14 x 9.14	34	15	Not allowable
12.2 x 12.2	60	30	15
13.7 x 13.7	75	60	30
15.2 x 15.2	94	60	30
16.5 x 16.5	110	60	30
18.3 x 18.3	135	95	30
21.3 x 21.3	184	95	60
24.4 x 24.4	240	135	60
27.4 x 27.4	304	185	95
30.5 x 30.5	375	240	95
33.5 x 33.5	455	240	135
36.6 x 36.6	540	305	135
39.9 x 39.9	635	375	135

.2 Table 6 – Light Output for Ceiling-Mounted Strobe Lights for Various Room Sizes:

Maximum Area of Coverage (m)	Minimum Light Output, Candela (Effective Luminous Intensity)	
	Maximum Mounting Height (m)	One Light
6.10 x 6.10	3	15
9.14 x 9.14	3	30
12.2 x 12.2	3	60
15.2 x 15.2	3	95
6.10 x 6.10	6	30
9.14 x 9.14	6	45
12.2 x 12.2	6	80
15.2 x 15.2	6	115
6.10 x 6.10	9	55
9.14 x 9.14	9	75
12.2 x 12.2	9	115
15.2 x 15.2	9	150

.3 Table 7 – Corridor Spacing Allocation for Ceiling or Wall-Mounted Strobe Lights:

Corridor Length (m)	Minimum Number of 15 cd Strobe Lights
0 – 9	1
10 – 40	2
41 – 70	3
71 – 100	4
101 – 130	5
131 - 160	6

3.02 SITE TESTS AND INSPECTIONS

.1 Testing, and inspection to Section 28 46 13.

.2 Perform audibility test. Adjust tap settings to ensure required audibility is provided.

.1 Minimum 65 dBA and at least 10 dBA over ambient.

.2 Minimum 75 dBA in sleeping rooms.

.3 Submit audibility report. Ensure tap settings for each speaker and strobe are documented.

.4 Perform verification to Section 28 46 13.

End of Section