



**Project:** The Living Center

**Project No.:** 12029.tlc

**Location:** 724 W 7<sup>th</sup> Street, Hastings, Ne

**Date:** July 31, 2012

This Addendum is issued by the Architect to all bidders of record prior to receipt of proposals. Bidders shall acknowledge receipt of this addendum by so indicating on the Proposal Form. Failure to do so may subject Bidder to disqualification.

All information and instructions given herein shall become a part of the Contract Documents.

**GENERAL**

1. See attachments for consultant items.
2. All contractors/ bidders must be Renovation Right certified.
3. Bid date is **Monday August 6<sup>th</sup> at 2pm**, to be opened at the **Housing Development Corporation, 301 S. Burlington, Hastings, NE**
4. The building will be open for additional informal viewing Thursday August 2 from 1 until 4. Knock for janitorial staff to let you in.
5. All hazardous materials will be abated independent of this contract, before the work starts.
6. The parking lot north and east of the building will be available for staging.
7. The distance for the finished ceiling to the underside of structure in the "attic" space above third floor is 4'-0" +/- . This space is not required to be sprinklered.
8. All laminate countertops to have Square eased Edges.
9. All backsplashes to be 4".
10. All vanities to be standard 22" deep.
11. New fire escape to be galvanized and field bolted.
12. Existing downspouts and scuppers are copper and are to be salvaged for owner. New downspouts and scuppers to be aluminum.
13. The following Substitution Requests are approved for bidding:
  - a. SpecChem Spec Rez Liquid Curing Compound
  - b. SpecChem Cure & Seal 30

**DRAWINGS**

1. See attached detail for concrete slab/ walk construction.
2. Sheet A9.1
  - A. Details F9 & F14

- i. Bearing in existing masonry wall to be 8" as noted in detail D18, not 5".
- 3. Sheet A2.1
  - A. Detail P1/ THIRD FLOOR REFLECTED CEILING PLAN
    - i. Both existing ACT and plaster ceiling above to be removed in demolition. Existing plaster ceiling above EXISTING STAIR 301 to remain.
- 4. Sheet A2.1
  - A. Detail a13/ FIRST FLOOR FININSH PLAN

No carpet in this project. Floor finish in VESTIBULE 101 and north exit of MAIN ENTRY FOYER 102 to be finished with resilient flooring to match the rest of the building. .

### **SPECIFICATIONS**

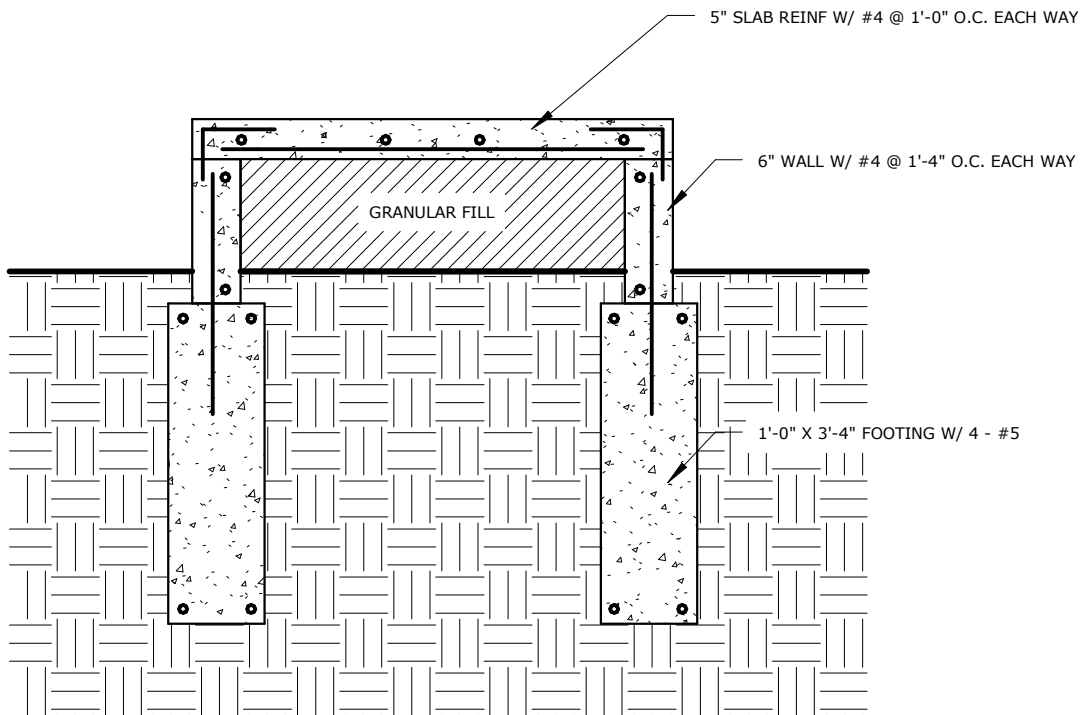
- 1. Attachments 3A and 3B to be completed by all bidding parties.
- 2. The Specification Document contains 2 DOOR HARDWARE, 087100. Disregard the first DOOR HARDWARE section.
- 3. ADVERTISEMENTS FOR BIDS, pg 001113-2/ H to read:
  - a. The successful bidder will be required to provide a Performance Bond and Payment Bond in the amount of 100% of the Contract Sum.

### **END OF ADDENDUM**

# THE LIVING CENTER

## ADDENDUM #1 - CONCRETE SLAB DETAIL

PROJECT: L12029  
DATE: JULY 16, 2012  
ISSUE DATE: JULY 31, 2012



# 1 CONCRETE SLAB DETAIL

1/2" = 1'-0"

# THE LIVING CENTER

CAGED AND LOCKED LADDER TO THE ROOF

## FIRE ESCAPE ELEVATION

PROJECT: L12029  
DATE: JULY 31, 2012  
ISSUE DATE:



LEVEL  
34'-8"



ROOF LEVEL  
129'-0"



THIRD FLOOR  
120'-0"



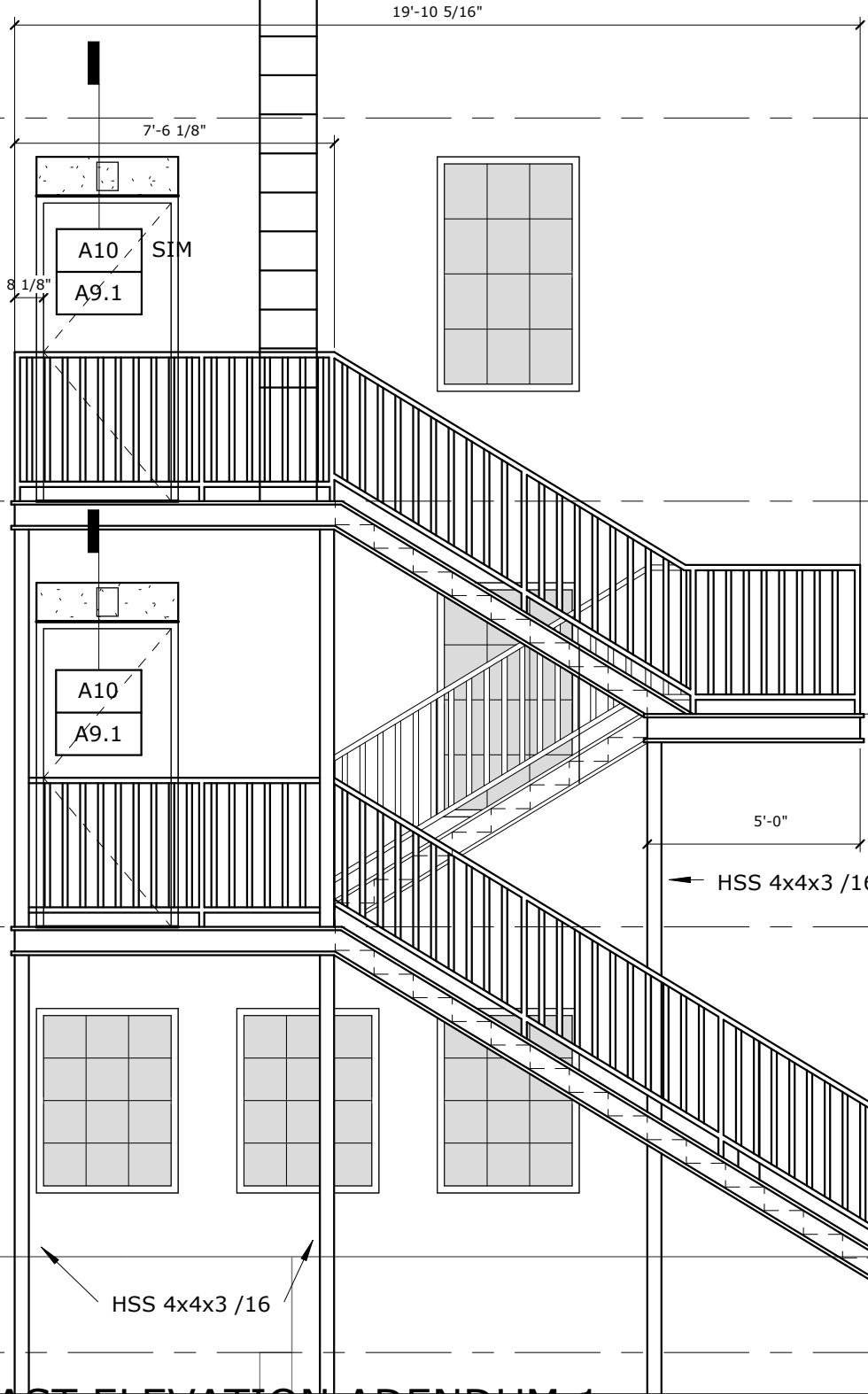
FIRE ESCAPE LANDING  
115'-0"



SECOND FLOOR  
110'-0"



FIRST FLOOR  
100'-0"  
GRADE LINE  
99'-0"



# 1 EAST ELEVATION ADENDUM 1

1/4" = 1'-0"

BAHR VERMEER HAECKER ARCHITECTS

440 N 8TH ST STE 100 LINCOLN NE 68508V 402 475 4551 F 402 475 0226

BVH.COM

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3'-11 3/16"

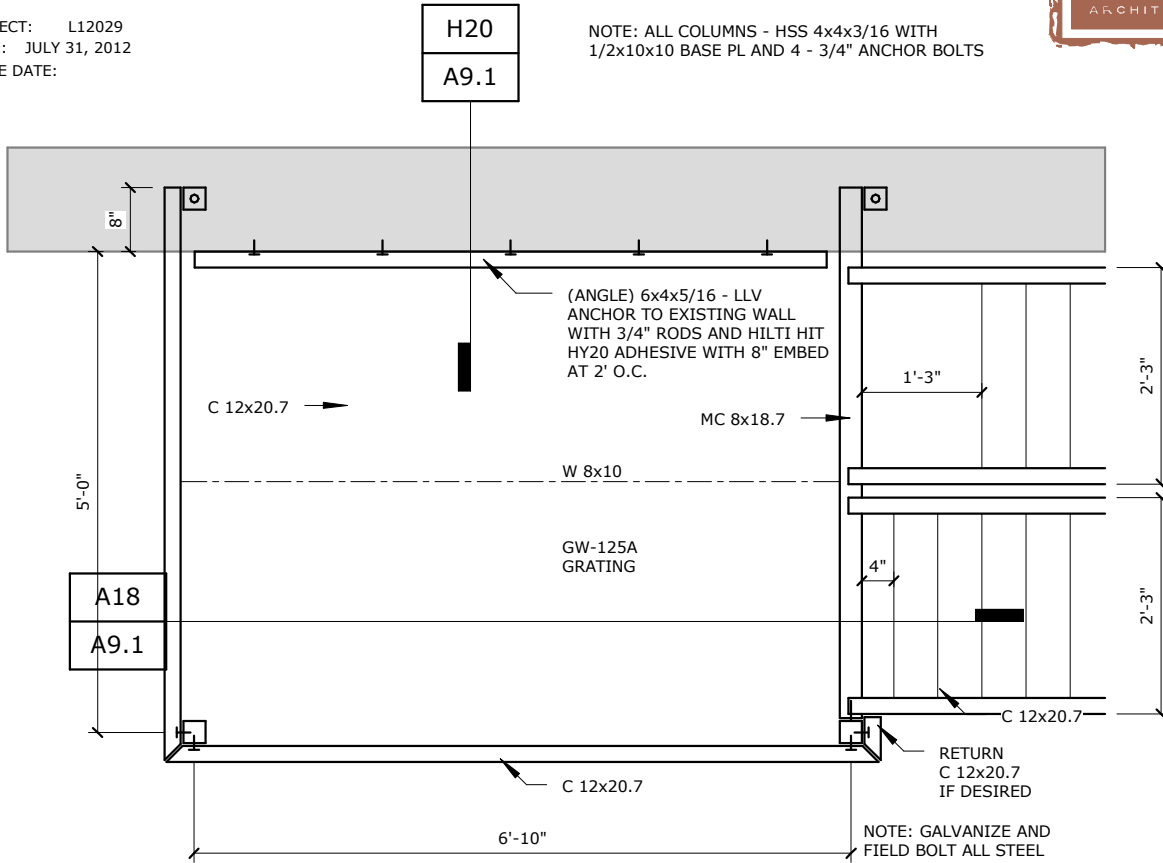
# THE LIVING CENTER



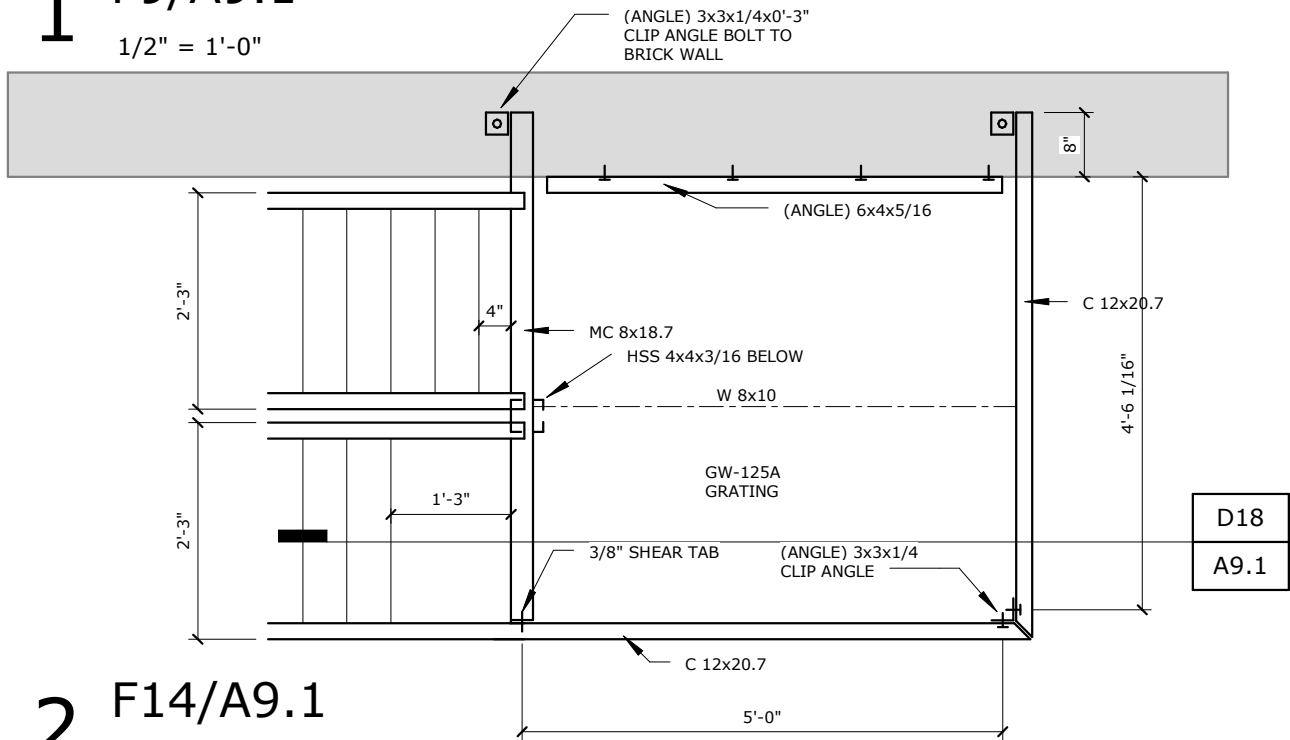
## LANDINGS

PROJECT: L12029  
 DATE: JULY 31, 2012  
 ISSUE DATE:

NOTE: ALL COLUMNS - HSS 4x4x3/16 WITH  
 1/2x10x10 BASE PL AND 4 - 3/4" ANCHOR BOLTS



### 1 F9/A9.1 1/2" = 1'-0"



### 2 F14/A9.1 1/2" = 1'-0"



DATE ISSUED July 31, 2012

ADDENDUM # 1

ENGINEER Engineering Technologies, Inc.
825 M Street, Suite 200
Lincoln, NE 68508

PROJECT Hastings Living Center

ETI PROJECT # 2012-070

The Architect issues this Addendum to all known bidders before receipt of proposals. Bidder shall acknowledge the receipt of this addendum on their proposal sheet and all information contained herein shall become a part of the contract documents.

ADDENDUM:

PRIOR APPROVAL – MECHANICAL

1. The following manufacturers have received prior approval for bidding purposes subject to shop drawing review:

A. List Equipment Here

- Expansion Tanks
Air Separators
Relief Valves
Base Mounted Pumps
Hydronic Accessories
Hydronic Components
Flow Control
Backflow Preventers
Boiler
Chemical Feeder
Glycol Fill System
Fan Coil
Unit Heater
Fintube
Cabinet Unit Heater
VFD's
Exhaust Fans
Backdraft Dampers
Volume Dampers
Diffuser, Registers & Grilles

List Manufacturer Here

- Armstrong, Patterson, American Wheatley
Armstrong, Bell & Gossett, Thrush
Conbraco, American Wheatley
Armstrong, Bell & Gossett, Patterson, WILO
American Wheatley
HCI
Pro Hydronic, Nexus, HCI
Apollo
Camus, Burnham
General Treatment, American Wheatley
John Woods
Nailor
Vulcan, Markel, Zehnder/Rittling
Vulcan, Zehnder/Rittling
Zehnder/Rittling
Yaskawa, Eaton-Cutler Hammer
ILG/American Coolair, ACME, Twin City
United Enertech
NCA, United Enertech
MetalAire, Tuttle & Bailey

SPECIFICATIONS – MECHANICAL

- 1. Section 21 1300 – Fire Suppression Sprinkler
A. All recessed fire sprinkler head are acceptable.

GENERAL ITEMS – ELECTRICAL

- A. Sheets E1.3, E2.3, E3.3 – change the room numbers to 300 series room numbers.
B. Sheets E3.1, E3.2, E3.3 – provide wiremold down the exterior walls on the inside of the Dwelling Units. Devices shall be mounted on wiremold boxes. These walls are not being furred out.

PRIOR APPROVAL – ELECTRICAL

1. The following manufacturers have received prior approval for bidding purposes subject to shop drawing review:

A. List Equipment Here

- Light Fixture #1
Light Fixture #2
Light Fixture #4
Light Fixture #5
Light Fixture #6

List Manufacturer Here

- Kichler Lighting
Kichler Lighting
AES Lighting
AES Lighting
Columbia Lighting

Light Fixture #7	Columbia Lighting
Light Fixture #8	Columbia Lighting
Light Fixture #9	Columbia Lighting
Light Fixture #10	Dual Light
Light Fixture #11	Dual Light
Light Fixture #12	Columbia Lighting
Light Fixture #14	Kenall
Light Fixture #15	Columbia Lighting
Light Fixture #16	Dual Light
Light Fixture #17	Cooper Lighting, Hubbell Lighting
Light Fixture #18	Cooper Lighting, Kenall

**SPECIFICATIONS – ELECTRICAL**

1. Section 26 0534 – Conduit
  - A. ½” conduit is acceptable for minimum size conduit as long as NEC required conduit fill is used.
2. Section 26 3100 – Fire Detection and Alarm
  - A. Delete the existing specification and replace with the attached specification.
  - B. Summary of the new Fire Detection and Alarm Specification – the existing system is obsolete and will not support the renovation:
    - i. Remove the existing system including the main panel, wiring, audible and visual devices, pull stations, any power supplies, relays, smoke detectors, heat detectors, and any duct detectors. The existing system shall be removed in its entirety including any areas not specifically indicated on the drawings.
    - ii. Provide a new Notifier NFW-100 intelligent addressable fire alarm panel and system. Provide 120-volt power to panel and a telephone circuit to the automatic dialer. Provide a the dialer (DACT).
    - iii. The contractor shall layout the system to meet NFPA and ADA requirements, and any state or local requirements.
    - iv. Provide all addressable devices including pull stations at all exit doors and at the stairs of each level, sprinkler flow and tamper switches, post indicator valve monitoring, and smoke detector at the panel location. Provide smoke detectors down the corridors on each floor.
    - v. Provide ADA compliant horns and horn/strobes down corridors, stairwells, and one system horn/strobe in each of the apartments. Provide the 120-volt, battery backup smoke detectors in the apartments as indicated on the Lighting Sheets E2.1, E2.2, and E2.3.
    - vi. Provide any other device or apparatus as required to meet all applicable codes.
    - vii. Provide all new wiring. Reuse conduit where possible, provide new conduit where existing conduit is not in the correct location or unusable. Any existing conduit not used shall be removed. Conduit shall be concealed. Where conduit cannot be concealed use wiremold and surface box for devices from the fire alarm device manufacturer. Do not use wiremold boxes for devices.
    - viii. See new Section 28 3100 attached.

**DRAWINGS – ELECTRICAL**

1. Sheet E2.2 Second Floor Lighting
  - A. In Corridor 202 the lighting circuit shall be 01-15.
2. Sheet E2.3 Third Floor Lighting
  - A. Change the room numbers to 300 series room numbers.
3. Sheet E3.0 Basement Floor Plan - Electrical
  - A. In the mechanical room provide a 120-volt, 20-Amp circuit to the Horizontal Unit Heater HUH-1. Provide HP rated toggle switch for disconnect and connect to Existing Basement Load Center. See Note 5 on Sheet M2.0 for HUH-1 location.
4. Sheet E3.1 First Floor Plan - Electrical
  - A. In Corridor 103 there is a box with a special connection on it and no circuiting hanging in the middle of the corridor. This can be deleted.
  - B. In Laundry 116, the clothes dryer shall be connected to circuit 01-30. Provide a 4-wire receptacle, a plug and cord for the dryer, and 3-#10 AWG with #10 ground.
  - C. In Laundry 116, the clothes washer shall be connected to circuit 01-34. Provide 20-amp receptacle non-GFCI.
5. Sheet E3.2 Second Floor Plan - Electrical
  - A. In Corridor 202 the east electric wall heater shall be connected to circuit 01-28.
  - B. In Corridor 202 the receptacle circuit shall be connected to circuit 01-17.
  - C. In Corridor 202 the west electric wall heater shall be connected to circuit 01-27.
6. Sheet E3.3 Third Floor Plan – Electrical
  - A. Change the room number to 300 series room numbers.
7. Sheet E4.0 Schedules, Symbols & Riser Diagram
  - A. Panel “MD” – Change the branch circuit feeder circuit breakers to Panels A & B’s to 80A/2P.
  - B. Panel “01” – Add a 30A/2P circuit breaker in 01-30 for the new clothes dryer.

- C. Panels "A" & "B" shall be single-phase 100A MLO load centers not 3-phase.
- D. Electrical Riser Notes - Note 6 shall read, "Feeder to Panel "A" and "B" shall be 3-#4 AWG with #8 ground in 1-1/4" conduit.
- E. Equipment Connection Schedule – Change the conductor size for ACC-1 to 3-1/0 AWG with #6 ground in 2" conduit.

END OF ADDENDUM

## SECTION 28 3100

### FIRE DETECTION AND ALARM SYSTEM

#### PART 1 GENERAL

##### 1.1 RELATED SECTIONS

- A. Section 21 0500 – Common Work Results for Fire Suppression.
- B. Section 21 1300 - Fire Suppression Sprinkler Systems.
- C. Section 26 0534 – Conduit.

##### 1.2 DESCRIPTION:

- A. This section of the specification includes the designing, furnishing, installation, connection and testing of the microprocessor controlled, intelligent reporting fire alarm equipment required to form a complete, operative, coordinated system. It shall include, but not be limited to, alarm initiating devices, alarm notification appliances, Fire Alarm Control Panel (FACP), auxiliary control devices, annunciators, and wiring as shown on the drawings and specified herein.
- B. The fire alarm system shall comply with requirements of NFPA Standard No. 72 for Local Protected Premises Signaling Systems except as modified and supplemented by this specification. The system field wiring shall be supervised either electrically or by software-directed polling of field devices.
  - 1. The Secondary Power Source of the fire alarm control panel will be capable of providing at least 24 hours of backup power with the ability to sustain 5 minutes in alarm at the end of the backup period.
- C. The fire alarm system shall comply with requirements of NFPA Standard No. 72 for Auxiliary Protected Premises Signaling Systems except as modified and supplemented by this specification. The system field wiring shall be supervised either electrically or by software-directed polling of field devices..
- G. The fire alarm system shall be manufactured by an ISO 9001 certified company and meet the requirements of BS EN9001: ANSI/ASQC Q9001-1994.
- H. The FACP and peripheral devices shall be manufactured 100% by a single U.S. manufacturer (or division thereof).
- I. Underwriters Laboratories Inc. (UL) - USA:
  - No. 38 Manually Actuated Signaling Boxes
  - No. 50 Cabinets and Boxes
  - No. 864 Control Units for Fire Protective Signaling Systems
  - No. 268 Smoke Detectors for Fire Protective Signaling Systems
  - No. 268A Smoke Detectors for Duct Applications
  - No. 346 Waterflow Indicators for Fire Protective Signaling Systems
  - No. 464 Audible Signaling Appliances
  - No. 521 Heat Detectors for Fire Protective Signaling Systems
  - No. 1971 Visual Notification Appliances

- J. The installing company shall employ NICET (minimum Level II Fire Alarm Technology) technicians on site to guide the final check-out and to ensure the systems integrity.

### **1.3 SCOPE:**

- A. An intelligent, microprocessor-controlled, fire alarm detection system shall be installed in accordance to the project specifications and codes. Provide a complete and ready to operate system. Provide all appurtenances and labor as required. The contractor shall visit the site and verify all equipment and conditions that may affect their work.
- B. The Contractor is responsible for the design and installation of the system.
- C. Basic Performance:
  - 1. Alarm, trouble and supervisory signals from all intelligent reporting devices shall be encoded on NFPA Style 4 (Class B), NFPA Style 6 (Class A) or NFPA 7 (Class A) Signaling Line Circuits (SLC).
  - 2. Initiation Device Circuits (IDC) shall be wired Class B (NFPA Style B) or Class A (NFPA Style D) as part of an addressable device connected by the SLC Circuit.
  - 3. Notification Appliance Circuits (NAC) shall be wired Class B (NFPA Style Y) or Class A (NFPA Style Z) as part of an addressable device connected by the SLC Circuit.
  - 4. All circuits shall be power-limited, UL864 9<sup>th</sup> edition requirements.
  - 5. A single ground fault or open circuit on the system Signaling Line Circuit shall not cause system malfunction, loss of operating power or the ability to report an alarm when wired NFPA Style 6/7.
  - 6. Alarm signals arriving at the main FACP shall not be lost following a primary power failure or outage of any kind until the alarm signal is processed and recorded.

### **D. BASIC SYSTEM FUNCTIONAL OPERATION**

When a fire alarm condition is detected and reported by one of the system initiating devices, the following functions shall immediately occur:

- 1. The system Alarm LED on the FACP shall flash.
- 2. A local sounder with the control panel shall sound.
- 3. A backlit 80-character LCD display on the FACP shall indicate all information associated with the fire alarm condition, including the type of alarm point and its location within the protected premises.
- 4. In response to a fire alarm condition, the system will process all control programming and activate all system outputs (alarm notification appliances and/or relays) associated with the point(s) in alarm

### **1.4 SUBMITTALS**

- A. General:
  - 1. Seven copies of all submittals shall be submitted to the Architect for review.
  - 2. All references to manufacturer's model numbers and other pertinent information herein is intended to establish minimum standards of performance, function and quality. Equivalent compatible UL-listed equipment from other manufacturers may be substituted for the specified equipment as long as the minimum standards are met.
  - 3. For equipment other than that specified, the contractor shall supply proof that such substitute equipment equals or exceeds the features, functions, performance, and quality of the specified equipment.

B. Shop Drawings:

1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
2. Include manufacturer's name(s), model numbers, ratings, power requirements, equipment layout, device arrangement, complete wiring point-to-point diagrams, and conduit layouts.
3. Show annunciator layout, configurations, and terminations.
4. Contractor shall submit drawings that have been stamped and signed by the AHJ.

C. Manuals:

1. At close out submit complete operating and maintenance manuals listing the manufacturer's name(s), including technical data sheets.
2. Wiring diagrams shall indicate internal wiring for each device and the interconnections between the items of equipment.
3. Provide a clear and concise description of operation that gives, in detail, the information required to properly operate the equipment and system.

D. Software Modifications

1. Provide the services of a qualified technician to perform all system software modifications, upgrades or changes. Response time of the technician to the site shall not exceed 4 hours.
2. Provide all hardware, software, programming tools and documentation necessary to modify the fire alarm system on site. Modification includes addition and deletion of devices, circuits, zones and changes to system operation and custom label changes for devices or zones. The system structure and software shall place no limit on the type or extent of software modifications on-site. Modification of software shall not require power-down of the system or loss of system fire protection while modifications are being made.

**1.5 GUARANTY:**

All work performed and all material and equipment furnished under this contract shall be free from defects and shall remain so for a period of at least one (1) year from the date of acceptance. The full cost of maintenance, labor and materials required to correct any defect during this one year period shall be included in the submittal bid.

**1.6 MAINTENANCE:**

- A. Maintenance and testing shall be on a semi-annual schedule or as required by the local AHJ. A preventive maintenance schedule shall be provided by the contractor describing the protocol for preventive maintenance. The schedule shall include:
1. Systematic examination, adjustment and cleaning of all detectors, manual fire alarm stations, control panels, power supplies, relays, waterflow switches and all accessories of the fire alarm system.
  2. Each circuit in the fire alarm system shall be tested semiannually.
  3. Each smoke detector shall be tested in accordance with the requirements of NFPA 72 (Current Edition) Chapter 10.
- B. As part of the bid/proposal, include a quote for a maintenance contract to provide all maintenance, tests, and repairs described below. Include also a quote for unscheduled maintenance/repairs, including hourly rates for technicians trained on this equipment, and response travel costs for each year of the maintenance period. Submittals that do not identify all post contract maintenance costs will not be accepted. Rates and costs shall be valid for the period of five (5) years after expiration of the guaranty.

## **1.8 APPLICABLE STANDARDS AND SPECIFICATIONS:**

The specifications and standards listed below form a part of this specification. The system shall fully comply with the latest issue of these standards, if applicable.

### **A. National Fire Protection Association (NFPA) - USA:**

No. 13 Sprinkler Systems  
No. 70 National Electric Code (NEC)  
No. 72 National Fire Alarm Code  
No. 101 Life Safety Code

### **B. The system and its components shall be Underwriters Laboratories, Inc. listed under the appropriate UL testing standard as listed herein for fire alarm applications and the installation shall be in compliance with the UL listing.**

### **C. Local and State Building Codes.**

### **D. All requirements of the Authority Having Jurisdiction (AHJ).**

## **1.9 APPROVALS:**

### **A. The system shall have proper listing and/or approval from the following nationally recognized agencies:**

UL Underwriters Laboratories Inc  
ULC Underwriters Laboratories Canada  
FM Factory Mutual  
MEA Material Equipment Acceptance (NYC)  
CSFM California State Fire Marshal

## **PART 2.0 PRODUCTS**

### **2.1 EQUIPMENT AND MATERIAL, GENERAL:**

#### **A. All equipment and components shall be new, and the manufacturer's current model. The materials, appliances, equipment and devices shall be tested and listed by a nationally recognized approvals agency for use as part of a fire protective signaling system, meeting the National Fire Alarm Code.**

#### **B. All equipment and components shall be installed in strict compliance with manufacturers' recommendations. Consult the manufacturer's installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc., before beginning system installation.**

#### **C. All equipment shall be attached to walls and ceiling/floor assemblies and shall be held firmly in place (e.g., detectors shall not be supported solely by suspended ceilings). Fasteners and supports shall be adequate to support the required load.**

### **2.2 CONDUIT AND WIRE:**

#### **A. Conduit:**

##### **1. Conduit shall be in accordance with The National Electrical Code (NEC), local and state requirements.**

2. Where required, all wiring shall be installed in conduit or raceway. Conduit fill shall not exceed 40 percent of interior cross sectional area where three or more cables are contained within a single conduit.
  3. Cable must be separated from any open conductors of power, or Class 1 circuits, and shall not be placed in any conduit, junction box or raceway containing these conductors, per NEC Article 760-55.
  4. Wiring for 24-volt DC control, alarm notification, emergency communication and similar power-limited auxiliary functions may be run in the same conduit as initiating and signaling line circuits. All circuits shall be provided with transient suppression devices and the system shall be designed to permit simultaneous operation of all circuits without interference or loss of signals.
  5. Conduit shall not enter the fire alarm control panel, or any other remotely mounted control panel equipment or backboxes, except where conduit entry is specified by the FACP manufacturer.
  6. Conduit shall be 3/4-inch (19.1 mm) minimum.
- B. Wire:
1. All fire alarm system wiring shall be new.
  2. Wiring shall be in accordance with local, state and national codes (e.g., NEC Article 760) and as recommended by the manufacturer of the fire alarm system. Number and size of conductors shall be as recommended by the fire alarm system manufacturer, but not less than 18 AWG (1.02 mm) for Initiating Device Circuits and Signaling Line Circuits, and 14 AWG (1.63 mm) for Notification Appliance Circuits.
  3. All wire and cable shall be listed and/or approved by a recognized testing agency for use with a protective signaling system.
  4. Wire and cable not installed in conduit shall have a fire resistance rating suitable for the installation as indicated in NEC 760 (e.g., FPLR).
  5. Wiring used for the multiplex communication circuit (SLC) shall be twisted and support a minimum wiring distance of 10,000 feet when sized at 12 AWG. The design of the system shall permit use of IDC and NAC wiring in the same conduit with the SLC communication circuit. Shielded wire shall not be required.
  6. All field wiring shall be electrically supervised for open circuit and ground fault.
  7. The fire alarm control panel shall be capable of T-tapping Class B (NFPA Style 4) Signaling Line Circuits (SLCs). Systems which do not allow or have restrictions in, for example, the amount of T-taps, length of T-taps etc., is not acceptable.
- C. Terminal Boxes, Junction Boxes and Cabinets:
1. All boxes and cabinets shall be UL listed for their use and purpose.
- D. The fire alarm control panel shall be connected to a separate dedicated branch circuit, maximum 20 amperes. This circuit shall be labeled at the main power distribution panel as FIRE ALARM. Fire alarm control panel primary power wiring shall be 12 AWG. The control panel cabinet shall be grounded securely to either a cold water pipe or grounding rod. The control panel enclosure shall feature a quick removal chassis to facilitate rapid replacement of the FACP electronics.
1. The FACP shall be capable of coding Notification Appliance Circuits in March Time Code (120 PPM), Temporal (NFPA 72 A-2-2.2.2), and California Code. Main panel notification circuits (NACs 1 & 2) shall also automatically synchronize any of the following manufacturer's notification appliances connected to them: System Sensor, Wheelock, or Gentex with no need for additional synchronization modules.

## 2.3 MAIN FIRE ALARM CONTROL PANEL:

- A. The FACP shall be a NOTIFIER NFW-100 (FireWarden-100) and shall contain a microprocessor-based Central Processing Unit (CPU). The CPU shall communicate with and control the following types of equipment used to make up the system: intelligent addressable smoke and thermal (heat) detectors, addressable modules, printer, and other system controlled devices.
- B. Operator Control
1. Acknowledge Switch:
    - a. Activation of the control panel Acknowledge switch in response to new alarms and/or troubles shall silence the local panel piezo electric signal and change the alarm and trouble LEDs from flashing mode to steady-ON mode. If multiple alarm or trouble conditions exist, depression of this switch shall advance the 80-character LCD display to the next alarm or trouble condition
    - b. Depression of the Acknowledge switch shall also silence all remote annunciator piezo sounders.
  2. Alarm Silence Switch:

Activation of the alarm silence switch shall cause all programmed alarm notification appliances and relays to return to the normal condition after an alarm condition. The selection of notification circuits and relays that are silenceable by this switch shall be fully field programmable within the confines of all applicable standards. The FACP software shall include silence inhibit and auto-silence timers.
  3. Alarm Activate (Drill) Switch:

The Alarm Activate switch shall activate all notification appliance circuits. The drill function shall latch until the panel is silenced or reset.
  4. System Reset Switch:

Activation of the System Reset switch shall cause all electronically-latched initiating devices, appliances or software zones, as well as all associated output devices and circuits, to return to their normal condition.
  5. Lamp Test:

The Lamp Test switch shall activate all system LEDs and light each segment of the liquid crystal display.
- C. System Capacity and General Operation
1. The control panel shall provide, or be capable of, expansion to 198 intelligent/addressable devices.
  2. The control panel shall include Form-C Alarm, Trouble and Supervisory relays rated at a minimum of 2.0 amps @ 30 VDC. It shall also include programmable Notification Appliance Circuits (NACs) capable of being wired as Class B (NFPA Style Y) or Class A (NFPA Style Z).
  3. The fire alarm control panel shall include an operator interface control and annunciation panel that shall include a backlit Liquid Crystal Display (LCD), individual color-coded system status LEDs, and an alphanumeric keypad for the field programming and control of the fire alarm system.

4. All programming or editing of the existing program in the system shall be achieved without special equipment and without interrupting the alarm monitoring functions of the fire alarm control panel. The system shall be fully programmable, configurable, and expandable in the field without the need for special tools, PROM programmers or PC based programmers. It shall not require replacement of memory ICs to facilitate programming changes. The control unit will support the ability to upgrade its operating program using FLASH memory technology. The unit shall provide the user with the ability to program from either the included keypad, a standard PS2-style PC keyboard or from a computer running upload/download software.
5. The system shall allow the programming of any input to activate any output or group of outputs. Systems which have limited programming (such as general alarm), have complicated programming (such as a diode matrix), or REQUIRE a laptop personal computer are not considered suitable substitutes.
6. The FACP shall provide the following features:
  - a. Drift compensation to extend detector accuracy during the accumulation of dust and foreign material.
  - b. Detector sensitivity test, meeting requirements of NFPA 72, Maintenance alert, with two levels (maintenance alert/maintenance urgent), to warn of excessive smoke detector dirt or dust accumulation.
  - c. The ability to display or print system reports.
  - d. Alarm verification.
  - e. Positive Alarm Sequence (PAS presignal), meeting NFPA 72 (2002 Edition) 6.8.1.3 requirements
  - f. Rapid manual station reporting.
  - g. Non-alarm points for general (non-fire) control.
  - h. Periodic detector test, conducted automatically by the software.
  - i. Walk test, with a check for two detectors set to same address.
7. The FACP shall be capable of coding Notification Appliance Circuits in March Time Code (120 PPM), Temporal (NFPA 72 A-2-2.2.2), and California Code. Main panel notification circuits (NACs 1 & 2) shall also automatically synchronize the following manufacturer's notification appliances connected to them: System Sensor, Wheelock, or Gentex with no need for additional synchronization modules.

D. Central Microprocessor

1. The microprocessor shall be a state-of-the-art, high speed, 16-bit RISC device and it shall communicate with, monitor and control all external interfaces. It shall include an EPROM for system program storage, non-volatile memory for building-specific program storage, and a "watch dog" timer circuit to detect and report microprocessor failure.
2. The microprocessor shall contain and execute all specific actions to be taken in the condition of an alarm. Control programming shall be held in non-volatile programmable memory, and shall not be lost even if system primary and secondary power failure occurs.
3. The microprocessor shall also provide a real-time clock for time annotation of system displays, printer, and history file.
4. A special program check function shall be provided to detect common operator errors.
5. An auto-programming capability (self-learn) shall be provided to quickly identify devices connected on the SLC and make the system operational.
6. For flexibility and to ensure program validity, an optional Windows(TM) based program utility shall be available. This program shall be used to off-line program the system with batch upload/download. This program shall also have a verification utility which scans the program files, identifying possible errors. It shall also have the ability to compare old program files to new ones, identifying differences in the two files to allow complete testing of any system operating changes. This shall be in compliance with the NFPA 72 requirements for testing after system modification.

E. Local Keyboard Interface

1. In addition to an integral keypad, the fire alarm control panel will accept a standard PS2-style keyboard for programming, testing, and control of the system. The keyboard will be able to execute the system functions ACKNOWLEDGE, SIGNALS SILENCED, DRILL and RESET.

F. Display

1. The display shall provide all the controls and indicators used by the system operator and may also be used to program all system operational parameters.
2. The display shall include status information and custom alphanumeric labels for all intelligent detectors, addressable modules, internal panel circuits, and software zones.
3. The display shall contain an alphanumeric, text-type display and dedicated LEDs for the annunciation of AC POWER, FIRE ALARM, SUPERVISORY, TROUBLE, MAINTENANCE, ALARM SILENCED, DISABLED, BATTERY, and GROUND conditions.
4. The display keypad shall be part of the standard system and have the capability to command all system functions, entry of any alphabetic or numeric information, and field programming. Two different password levels shall be provided to prevent unauthorized system control or programming.
5. The display shall include the following operator control switches: ACKNOWLEDGE, ALARM SILENCE, DRILL (alarm activate), and SYSTEM RESET.

G. Signaling Line Circuit (SLC)

1. The SLC interface shall provide power to and communicate with up to 99 intelligent detectors (ionization, photoelectric or thermal) and 99 intelligent modules (monitor or control) for a system capacity of 198 devices. Each SLC shall be capable of NFPA 72 Style 4, Style 6, or Style 7 (Class A or B) wiring.
2. The CPU shall receive information from all intelligent detectors to be processed to determine whether normal, alarm, or trouble conditions exist for each detector. The software shall automatically compensate for the accumulation of dust in each detector up to allowable limits. The information shall also be used for automatic detector testing and for the determination of detector maintenance conditions.
3. The detector software shall meet NFPA 72, Chapter 7 requirements and be certified by UL as a calibrated sensitivity test instrument.

H. Serial Interfaces

1. The system shall provide a means of interfacing to UL Listed Electronic Data Processing (EDP) peripherals using the EIA-232 communications standard.

I. The control panel will have the capability of Reverse Polarity Transmission or connection to a Municipal Box for compliance with applicable NFPA standards.

J. Digital Alarm Communicator Transmitter (DACT). The DACT is an interface for communicating digital information between a fire alarm control panel and a UL-Listed central station.

1. The DACT shall be an integral component of the fire alarm control panel requiring no interconnecting wiring, plug-in module or supervisory circuitry.
2. The DACT shall include connections for dual telephone lines (with voltage detect), per UL/NFPA/FCC requirements. It shall include the ability for split reporting of panel events up to two different telephone numbers.
3. The DACT shall be completely field programmable locally from the control panel keypad or via PC software connected to the panel serial port. The DACT shall support

upload/download of programming parameters from a remote location over a phone line using upload/download PC software

4. The DACT shall be capable of transmitting events in at least 15 different formats. This ensures compatibility with existing and future transmission formats.
5. Communication shall include vital system status such as:
  - Independent Zone (Alarm, trouble, non-alarm, supervisory)
  - Independent Addressable Device Status
  - AC (Mains) Power Loss
  - Low Battery and Earth Fault
  - System Off Normal
  - 12 and 24-Hour Test Signal
  - Abnormal Test Signal (per UL requirements)
  - EIA-485 Communications Failure
  - Phone Line Failure
6. The DACT shall support independent zone/point reporting when used in the Contact ID format. In this format, the DACT shall support the transmission of up addressable points with the system. This format shall enable the central station to have exact details concerning the location of the fire for emergency response.

K. Enclosures:

1. The control panel shall be housed in a UL-listed cabinet suitable for surface or semi-flush mounting. The cabinet and front shall be corrosion protected, given a rust-resistant prime coat, and manufacturer's standard finish.
2. The back box and door shall be constructed of steel with provisions for electrical conduit connections into the sides and top.
3. The door shall provide a key lock and shall provide for the viewing of all indicators.
4. The cabinet shall accept a chassis containing the PCB and to assist in quick replacement of all the electronics including power supply shall require no more than two bolts to secure the panel to the enclosure back box.

L. Field Charging Power Supply: The FCPS is a device designed for use as either a remote 24-volt power supply or as a booster for powering Notification Appliances.

1. The FCPS shall offer up to 8.0 amps (6.0 amps continuous) of regulated 24-volt power. It shall include an integral charger designed to charge 18.0 amp hour batteries.
2. The Field Charging Power Supply shall have two input triggers. The input trigger shall be a Notification Appliance Circuit (from the fire alarm control panel) or a control relay. Four NAC outputs, wired NFPA Style Y or Z, shall be available for connection to the Notification devices.
3. The FCPS shall optionally provide synchronization of all connected strobes or horn strobe combinations when System Sensor, Wheelock, or Gentex devices are installed.
4. The FCPS shall function as a sync follower as well as a sync generator.
5. The FCPS shall include a surface mount backbox.
6. The Field Charging Power Supply shall include the ability to delay the reporting of an AC fail condition per NFPA requirements.
7. The FCPS shall provide 24 VDC regulated and power-limited circuitry per 1995 UL standards.

M. Power Supply:

1. The main power supply for the fire alarm control panel shall provide up to 6.0 amps of available power for the control panel and peripheral devices.

2. Provisions will be made to allow the audio-visual power to be increased as required by adding modular expansion audio-visual power supplies.
  3. Positive-Temperature-Coefficient (PTC) thermistors, circuit breakers, or other over-current protection shall be provided on all power outputs. The power supply shall provide an integral battery charger or may be used with an external battery and charger systems. Battery arrangement may be configured in the field.
  4. The main power supply shall continuously monitor all field wires for earth ground conditions.
  5. The main power supply shall operate on 120 VAC, 60 Hz, and shall provide all necessary power for the FACP.
- N. Programmable Electronic Sounders:
1. Electronic sounders shall operate on 24 VDC nominal.
  2. Electronic sounders shall be field programmable without the use of special tools, to provide slow whoop, continuous, or interrupted tones with an output sound level of at least 90 dBA measured at 10 feet from the device.
  3. Shall be flush or surface mounted as show on plans.
- O. Strobe lights shall meet the requirements of the ADA, UL Standard 1971 and shall meet the following criteria:
1. The maximum pulse duration shall be 2/10 of one second.
  2. Strobe intensity shall meet the requirements of UL 1971.
  3. The flash rate shall meet the requirements of UL 1971.
- P. Audible/Visual Combination Devices:
1. Shall meet the applicable requirements of Section A listed above for audibility.
  2. Shall meet the requirements of Section B listed above for visibility.
- W. Waterflow Indicator:
1. Waterflow Switches shall be an integral, mechanical, non-coded, non-accumulative retard type.
  2. Waterflow Switches shall have an alarm transmission delay time which is conveniently adjustable from 0 to 60 seconds. Initial settings shall be 30-45 seconds.
  3. All waterflow switches shall come from a single manufacturer and series.
  4. Waterflow switches shall be provided and connected under this section but installed by the mechanical contractor.
  5. Where possible, locate waterflow switches a minimum of one (1) foot from a fitting which changes the direction of the flow and a minimum of three (3) feet from a valve.
- X. Sprinkler and Standpipe Valve Supervisory Switches:
1. Each sprinkler system water supply control valve riser, zone control valve, and standpipe system riser control valve shall be equipped with a supervisory switch. Standpipe hose valves, and test and drain valves shall not be equipped with supervisory switches.
  2. PIV (post indicator valve) or main gate valves shall be equipped with a supervisory switch.
  3. The switch shall be mounted so as not to interfere with the normal operation of the valve and adjusted to operate within two revolutions toward the closed position of the valve control, or when the stem has moved no more than one-fifth of the distance from its normal position.
  4. The supervisory switch shall be contained in a weatherproof aluminum housing, which shall provide a 3/4-inch (19 mm) conduit entrance and incorporate the necessary facilities for attachment to the valves.

5. The switch housing shall be finished in red baked enamel.
6. The entire installed assembly shall be tamper proof and arranged to cause a switch operation if the housing cover is removed, or if the unit is removed from its mounting.
7. Valve supervisory switches shall be provided and connected under this section and installed by mechanical contractor.

Y. Specific System Operations

1. Alarm Verification: Each of the intelligent addressable smoke detectors in the system may be independently programmed for verification of alarm signals. The alarm verification time period shall not exceed 2 minutes.
2. Point Disable: Any addressable device or conventional circuit in the system may be enabled or disabled through the system keypad.
3. Point Read: The system shall be able to display the following point status diagnostic functions:
  - a. Device status
  - b. Device type
  - c. Custom device label
  - d. Device zone assignments
4. System Status Reports: Upon command from an operator of the system, a status report will be generated and printed, listing all system status.
5. System History Recording and Reporting: The fire alarm control panel shall contain a history buffer that will be capable of storing up to 1000 events. Each of these activations will be stored and time and date stamped with the actual time of the activation. The contents of the history buffer may be manually reviewed, one event at a time, or printed in its entirety.
6. The history buffer shall use non-volatile memory. Systems that use volatile memory for history storage are not acceptable substitutes.
7. Automatic Detector Maintenance Alert: The fire alarm control panel shall automatically interrogate each intelligent detector and shall analyze the detector responses over a period of time. If any intelligent detector in the system responds with a reading that is above or below normal limits, then the system will enter the trouble mode, and the particular detector will be annunciated on the system display. This feature shall in no way inhibit the receipt of alarm conditions in the system, nor shall it require any special hardware, special tools or computer expertise to perform.
8. The fire alarm control panel shall include Silent and Audible Walk Test functions - Silent and Audible. It shall include the ability to test initiating device circuits and Notification Appliance Circuits from the field without returning to the panel to reset the system. The operation shall be as follows:
  - a. The Silent Walk Test will not sound NACs but will store the Walk Test information in History for later viewing.
  - b. Alarming an initiating device shall activate programmed outputs, which are selected to participate in Walk Test.
  - c. Introducing a trouble into the initiating device shall activate the programmed outputs.
  - d. Walk Test shall be selectable on a per device/circuit basis. All devices and circuits which are not selected for Walk Test shall continue to provide fire protection and if

an alarm is detected, will exit Walk Test and activate all programmed alarm functions.

e. All devices tested in walk test shall be recorded in the history buffer.

9. Waterflow Operation

An alarm from a waterflow detection device shall activate the appropriate alarm message on the control panel display; turn on all programmed Notification Appliance Circuits and shall not be affected by the Signal Silence switch.

10. Supervisory Operation

An alarm from a supervisory device shall cause the appropriate indication on the control panel display, light a common supervisory LED, but will not cause the system to enter the trouble mode.

11. Signal Silence Operation

The FACP shall have the ability to program each output circuit (notification circuit or relay) to deactivate upon depression of the Signal Silence switch.

12. Non-Alarm Input Operation

Any addressable initiating device in the system may be used as a non-alarm input to monitor normally open contact type devices. Non-alarm functions are a lower priority than fire alarm initiating devices.

**2.4 SYSTEM COMPONENTS:**

A. Addressable Pull Box (manual station)

1. Addressable pull boxes shall, on command from the control panel, send data to the panel representing the state of the manual switch and the addressable communication module status. They shall use a key operated test-reset lock, and shall be designed so that after actual emergency operation, they cannot be restored to normal use except by the use of a key.
2. All operated stations shall have a positive, visual indication of operation and utilize a key type reset.
3. Manual stations shall be constructed of Lexan with clearly visible operating instructions provided on the cover. The word FIRE shall appear on the front of the stations in raised letters, 1.75 inches (44 mm) or larger.

C. Intelligent Photoelectric Smoke Detector

1. The detectors shall use the photoelectric (light-scattering) principal to measure smoke density and shall, on command from the control panel, send data to the panel representing the analog level of smoke density.
2. The detectors shall be ceiling-mounted and available in an alternate model with an integral fixed 135-degree heat-sensing element.
3. Each detector shall contain a remote LED output and a built-in test switch.
4. Detector shall be provided on a twist-lock base.
5. It shall be possible to perform a calibrated sensitivity and performance test on the detector without the need for the generation of smoke. The test method shall test all detector circuits.
6. A visual indication of an alarm shall be provided by dual latching Light Emitting Diodes (LEDs), on the detector, which may be seen from ground level over 360 degrees. These

LEDs shall periodically flash to indicate that the detector is in communication with the control panel.

7. The detector shall not go into alarm when exposed to air velocities of up to 1500 feet per minute (fpm).
8. The detector screen and cover assembly shall be easily removable for field cleaning of the detector chamber.
9. All field wire connections shall be made to the base through the use of a clamping plate and screw.

F. Intelligent Ionization Smoke Detector

1. The detectors shall use the dual-chamber ionization principal to measure products of combustion and shall, on command from the control panel, send data to the panel representing the analog level of products of combustion.

G. Intelligent Thermal Detectors

1. Thermal detectors shall be intelligent addressable devices rated at 135 degrees Fahrenheit (58 degrees Celsius) and have a rate-of-rise element rated at 15 degrees F (9.4 degrees C) per minute. It shall connect via two wires to the fire alarm control panel signaling line circuit.

H. Intelligent Duct Smoke Detector

1. The smoke detector housing shall accommodate an intelligent photoelectric detector that provides continuous monitoring and alarm verification from the panel.
2. When sufficient smoke is sensed, an alarm signal is initiated at the FACP, and appropriate action taken to change over air handling systems to help prevent the rapid distribution of toxic smoke and fire gases throughout the areas served by the duct system.

I. Addressable Dry Contact Monitor Module

1. Addressable monitor modules shall be provided to connect one supervised IDC zone of conventional alarm initiating devices (any normally open dry contact device) to one of the fire alarm control panel SLCs.
2. The monitor module shall mount in a 4-inch square (101.6 mm square), 2-1/8 inch (54 mm) deep electrical box.
3. The IDC zone shall be suitable for Style D or Style B operation. An LED shall be provided that shall flash under normal conditions, indicating that the monitor module is operational and in regular communication with the control panel.
4. For difficult to reach areas, the monitor module shall be available in a miniature package and shall be no larger than 2-3/4 inch (70 mm) x 1-1/4 inch (31.7 mm) x 1/2 inch (12.7 mm). This version need not include Style D or an LED.

K. Addressable Control Relay Module

1. Addressable control relay modules shall be provided to control the operation of fan shutdown and other auxiliary control functions.
2. The control module shall mount in a standard 4-inch square, 2-1/8 inch deep electrical box, or to a surface mounted backbox.
3. The control relay module will provide a dry contact, Form-C relay. The relay coil shall be magnetically latched to reduce wiring connection requirements, and to insure that 100% of all auxiliary relays may be energized at the same time on the same pair of wires.
4. The control relay module shall be suitable for pilot duty applications and rated for a minimum of 0.6 amps at 30 VDC.

L. Isolator Module

1. Isolator modules shall be provided to automatically isolate wire-to-wire short circuits on an SLC Style 6 (Class A) or Style 4 (Class B branch). The isolator module shall limit the number of modules or detectors that may be rendered inoperative by a short circuit fault on the SLC loop segment or branch. At least one isolator module shall be provided for each floor or protected zone of the building.
2. If a wire-to-wire short occurs, the isolator module shall automatically open-circuit (disconnect) the SLC. When the short circuit condition is corrected, the isolator module shall automatically reconnect the isolated section.
3. The isolator module shall not require any address setting, and its operations shall be totally automatic. It shall not be necessary to replace or reset an isolator module after its normal operation.
4. The isolator module shall mount in a standard 4-inch (101.6 mm) deep electrical box or in a surface mounted backbox. It shall provide a single LED that shall flash to indicate that the isolator is operational and shall illuminate steadily to indicate that a short circuit condition has been detected and isolated.

O. Door Holders:

1. Door Holders will be available in 120 VAC and 24 VDC models.
2. 120 VAC models will be transient-protected against surges up to 600 volts.
3. Door holders will be designed for Fail Safe operation (power failure release door to close).

**2.5 SYSTEM COMPONENTS - ADDRESSABLE DEVICES**

A. Addressable Devices - General

1. Addressable devices shall employ the simple-to-set decade addressing scheme. Addressable devices which use a binary-coded address setting method, such as a DIP switch, are not an allowable substitute.
2. Detectors shall be addressable and intelligent, and shall connect with two wires to the fire alarm control panel signaling line circuits.
3. Addressable smoke and thermal (heat) detectors shall provide dual alarm and power/polling LEDs. Both LEDs shall flash under normal conditions, indicating that the detector is operational and in regular communication with the control panel, and both LEDs shall be placed into steady illumination by the control panel, indicating that an alarm condition has been detected. An output connection shall also be provided in the base to connect an external remote alarm LED.
4. Using software in the FACP, detectors shall automatically compensate for dust accumulation and other slow environmental changes that may affect their performance. The detectors shall be listed by UL as meeting the calibrated sensitivity test requirements of NFPA Standard 72, Chapter 7.
5. Detectors shall be ceiling-mount and shall include a separate twist-lock base with tamper proof feature. Base options shall include a base with a built-in (local) sounder rated for a minimum of 85 DBA, a relay base and an isolator base designed for Style 7 applications.
6. Detectors shall provide a test means whereby they will simulate an alarm condition and report that condition to the control panel.
7. Detectors shall also store an internal identifying type code that the control panel shall use to identify the type of device (ION, PHOTO, THERMAL).
8. Detectors shall provide address-setting means using decimal switches.

## **2.6 BATTERIES:**

- A. Upon loss of Primary (AC) power to the control panel, the batteries shall have sufficient capacity to power the fire alarm system for required standby time (24 hours) followed by 5 minutes of alarm.
- B. The batteries are to be completely maintenance free. No liquids are required. Fluid level checks for refilling, spills, and leakage shall not be required.
- C. If necessary to meet standby requirements, external battery/charger systems may be used.

## **PART 3.0 - EXECUTION**

### **3.1 INSTALLATION:**

- A. Installation shall be in accordance with the NEC, NFPA 72, local and state codes, as shown on the drawings, and as recommended by the major equipment manufacturer.
- B. All wiring shall be in raceway.
- C. All conduit, junction boxes, conduit supports and hangers shall be concealed in finished areas and may be exposed in unfinished areas. Smoke detectors shall not be installed prior to the system programming and test period. If construction is ongoing during this period, measures shall be taken to protect smoke detectors from contamination and physical damage.
- D. Conduit shall be concealed. Existing conduit may be reused but if the devices are in different locations provide new conduit. Wiremold shall be used in areas where it has to be exposed. When wiremold is used provide a device box from the fire alarm device manufacturer and do not use a wiremold box.
- E. All fire detection and alarm system devices, control panels and remote annunciators shall be flush mounted when located in finished areas and may be surface mounted when located in unfinished areas.
- F. Manual pull stations shall be suitable for surface mounting or semi flush mounting as shown on the plans, and shall be installed not less than 42 inches (1067 mm), nor more than 48 inches (122 mm) above the finished floor.

### **3.2 TEST:**

The service of a competent, factory-trained engineer or technician authorized by the manufacturer of the fire alarm equipment shall be provided to technically supervise and participate during all of the adjustments and tests for the system. All testing shall be in accordance with NFPA 72, Chapter 7.

- A. Before energizing the cables and wires, check for correct connections and test for short circuits, ground faults, continuity, and insulation.
- B. Close each sprinkler system flow valve and verify proper supervisory alarm at the FACP.
- C. Verify activation of all waterflow switches.
- D. Open initiating device circuits and verify that the trouble signal actuates.
- E. Open and short signaling line circuits and verify that the trouble signal actuates.

- F. Open and short notification appliance circuits and verify that trouble signal actuates.
- G. Ground all circuits and verify response of trouble signals.
- H. Check presence and audibility of tone at all alarm notification devices.
- I. Check installation, supervision, and operation of all intelligent smoke detectors using the walk test.
- J. Each of the alarm conditions that the system is required to detect should be introduced on the system. Verify the proper receipt and the proper processing of the signal at the FACP and the correct activation of the control points.
- K. When the system is equipped with optional features, the manufacturer's manual shall be consulted to determine the proper testing procedures. This is intended to address such items as verifying controls performed by individually addressed or grouped devices, sensitivity monitoring, verification functionality and similar.

**3.3 FINAL INSPECTION:**

- A. At the final inspection a minimum NICET Level II technician shall demonstrate that the system functions properly in every respect.

**3.4 INSTRUCTION:**

- A. Instruction shall be provided as required for operating the system. Hands-on demonstrations of the operation of all system components and the entire system including program changes and functions shall be provided. Provide a minimum of 2-hours of Owner Training.
- B. The contractor or installing dealer shall provide a user manual indicating "Sequence of Operation."

**END OF SECTION**