VETERANS AFFAIRS MEDICAL CENTER
BUILDING 110 1-EAST (9690.70)
HAMPTON, VIRGINIA
VA246-13-B-0271

SHRIVER AND HOLLAND ASSOCIATES
ARCHITECTS

ADDENDUM NO. ONE (1)
February 22, 2013

Except as may be otherwise described, bidding requirements, materials, and workmanship for the work described herein shall conform to all requirements of the original Contract Documents. The following Addendum to the previously issued addenda, specifications, and drawings are made a part of the project and takes precedence over the section of previously issued addenda, the specifications, in part, as originally written and over the drawings, in part, as originally drawn and/or written.

This Addendum consists of 5 written pages and 1 specification section: 28 31 00 – FIRE DETECTION AND ALARM.

I. SPECIFICATIONS:

SECTION 00 00 10 – TABLE OF CONTENTS

1. ADD spec section 28 31 00 – FIRE DETECTION AND ALARM

SECTION 01 00 00 – GENERAL REQUIREMENTS

1. 1.6.H.1.c.: REVISE sentence to read: "Perform all demolition activities, floor slab drilling/cutting, and powder driven fastener installation after normal working hours and on weekends as required to prevent disruptions to existing building operations as determined by the COR."

2. 1.6.: ADD 1.6.P.: "P. Shirts or pullovers: Each contractor or subcontractor shall supply all employees working on the VAMC campus with a shirt that is a consistent color among their workers and shall have the company logo and name identifying the organization printed on the top third of the front and back. Each company may have its own color which does not have to match the prime Contractor shirt, but must be consistent within the company. Letters shall be high contrast and not less than 1 1/2 inches high. Shirt shall be worn and lettering visible at all times while employee is on project site."

SECTION 06 20 00 – FINISH CARPENTRY

1. 1.3.B.1.: REVISE sentence to read: "Millwork items including wall panels, counter tops, window sills and aprons, casework, and chairrails – Half full size scale for sections and details 1:50 (1/4-inch) for elevations and plans."

2. 2.14.: CHANGE "2.14.B. Window sills and aprons:" to read "2.14.C. Window sills and aprons:"

3. 2.14.A.6.: REVISE sentence to read: "…back channeled and molded as shown." in lieu of "…back channeled and molded a shown."

SECTION 10 26 00 – WALL AND DOOR PROTECTION

1. 1.3.B.: ADD after the first sentence: "Provide floor plan indicating layout of work. Provide 1/4-inch plans and elevations and half full size scale for sections and details."

SECTION 23 09 23 – DIRECT DIGITAL CONTROL SYSTEM FOR HVAC

1. 1.1.F.: ADD 1.1.F.2. "2. Acceptable Manufacturer's shall be Alerton, Johnson Controls, or Automated Logic. No substitutions."

SECTION 27 15 00 – COMMUNICATIONS HORIZONTAL CABLING

1. 2.2.B.1.: CHANGE sentence to read: "The TCO shall consist of two telephone multipin jacks and two data multipin jacks mounted in a steel outlet box. A separate 6in. x 6in. x 2.5in. steel outlet box with a labeled stainless faceplate will be used."

SECTION 28 31 00 – FIRE DECTION AND ALARM

1. ADD this specification section to the Project Manual – see enclosed section of 13 pages.

II. DRAWINGS:

A. ARCHITECTURAL DRAWINGS

SHEET 110-AS1-1

1. REVISE Demolition Note #12 "REMOVE FURNITURE AND EQUIPMENT AND STORE IN LOCATION DIRECTED BY COR" to read "REMOVE FURNITURE AND EQUIPMENT AND STORE IN LOCATION ON EXISTING VETERANS AFFAIRS CAMPUS AS DIRECTED BY THE COR – SEE CAMPUS LOCATION MAP ON SHEET 110-T1".

B. PLUMBING DRAWINGS

SHEET PL-01

1. General Fire Protection Notes: CHANGE Note 2 to read: "EXISTING CPVC PIPING IN THE AREAS RENOVATED BY THIS CONTRACT SHALL BE REMOVED AND REPLACED WITH STEEL PIPING IN ACCORDANCE WITH THE VA FIRE PROTECTION GUIDE. REMOVE EXISTING SPRINKLER HEADS AND REVISE SPRINKLER PIPING AS REQUIRED TO ENABLE THE INSTALLATION OF NEW SPRINKLER HEADS AND PIPING. COORDINATE NEW PIPING AND SPRINKLER HEADS WITH NEW CEILING LAYOUT,

EQUIPMENT, STRUCTURAL SUPPORTS, AND MECHANICAL & ELECTRICAL WORK. PROVIDE OFFSETS IN SPRINKLER PIPING AS REQUIRED IN ORDER TO LOCATE NEW SPRINKLER HEADS CENTERED IN CEILING TILES."

C. ELECTRICAL DRAWINGS

SHEET 110-E1

1. LEGEND: CHANGE description for Cable Tray to read: "CABLE TRAY. WHERE SHOWN ON DEMOLITION PLANS - REMOVE EXISTING ENCLOSED CABLE TRAY. WHERE SHOWN ON NEW WORK PLANS - PROVIDE NEW 4" X 12" WIRE MESH CABLE TRAY. CABLE TRAY SHALL CONSIST OF MINIMUM .16" DIAMETER HIGH STRENGTH STEEL WIRE WELDED INTO A 2" X 2" GRID. TRAY SHALL BE MANUFACTURED IN ACCORDANCE WITH NEMA VE-1 AND SHALL BE INSTALLED IN ACCORDANCE WITH NEMA VE-2."

2. LEGEND: CHANGE description for Duress Alarm to read: "DURESS ALARM PROVIDED BY OTHERS. PROVIDE SINGLE GANG BOX WITH COVER FLUSH-MOUNTED 36" ABOVE FINISHED FLOOR. PROVIDE 3/4" CONDUIT WITH PULL CORD TO CABLE TRAY. LOCATE 6" FROM DESK LOCATION. COORDINATE EXACT LOCATION WITH VAMC INTERIOR DESIGNER."

3. LEGEND: CHANGE description for Communication Outlet to read: "TELECOMMUNICATION OUTLET. TWO VOICE JACKS, TWO DATA JACKS IN 6" X 6" X 2.5" BOX. MOUNT AT SAME HEIGHT AS ADJACENT RECEPTACLE. PROVIDE 4 CAT 5E CABLES BACK TO EXISTING PATCH PANEL IN ROOM D112. PROVIDE 1" CONDUIT FOR ROUTING OF CABLES FROM OUTLET TO CABLE TRAY IN CORRIDORS."

4. LEGEND: CHANGE description for RECEPTACLE, DUPLEX, GROUND FAULT CIRCUIT INTERRUPTING to read "RECEPTACLE(S), DUPLEX, GROUND FAULT CIRCUIT INTERRUPTING 20A, 125V, NEMA 5-20R. WHERE INDICATED MOUNTED UNDER SINK, COORDINATE LOCATION WITH SINK INSTALLATION.
   CH - MOUNT ONE 6" ABOVE SINK & ONE BELOW SINK FOR SENSOR CONNECTION
   MW - MOUNT 66" AFF FOR MICROWAVE

5. LEGEND: CHANGE description for SINGLE PHASE MOTOR CONNECTION WITH EQUIPMENT LABEL to read "SINGLE PHASE MOTOR CONNECTION WITH EQUIPMENT LABEL. PROVIDE UNIT MOUNTED DISCONNECT SWITCH."

6. LEGEND: CHANGE description for SINGLE PHASE MOTOR CONNECTION WITH EQUIPMENT LABEL to read "SINGLE PHASE MOTOR CONNECTION WITH EQUIPMENT LABEL. PROVIDE UNIT MOUNTED DISCONNECT SWITCH."

7. CHANGE title of SHEET NEW WORK KEYNOTES to SHEET DEMOLITION KEYNOTES.

8. SHEET DEMOLITION KEYNOTES: ADD KEYNOTE 4: "REMOVE EXISTING BREAKERS IN SPACES 27,29,31,33,35 OF PANELBOARD 1RB."

9. ADD SHEET DEMOLITION KEYNOTE 4 to ROOM D109.

SHEET 110-E3

1. ADD General Note: "PROVIDE 2 #12 AWG & 1 #12 AWG EG IN 3/4" CONDUIT BETWEEN TERMINAL UNITS SHOWN ON SHEET MH101 & 2 #12 AWG & 1 #12 AWG EG IN 3/4" CONDUIT HOMERUN FROM TERMINAL UNIT TB-D106 TO BREAKER 1LB-2 TO POWER TERMINAL UNITS.

2. CHANGE homerun designation for HWP-1 to 1RB-27.

3. CHANGE homerun designation for EF-1 to 1RB-29.

4. CHANGE homerun designation for CWP-1 to 1RB-31.

5. CHANGE equipment label for EF-1 to OASF-1.

6. SHEET NEW WORK KEYNOTES: CHANGE KEYNOTE 2 to read "PROVIDE 60A/3P CIRCUIT BREAKER IN SPACES 2,4,6 & 35A/3P CIRCUIT BREAKER IN SPACES 8,10,12 WITH PERMANENTLY MOUNTED LOCKING DEVICE."

7. SHEET NEW WORK KEYNOTES: ADD KEYNOTE 7: "PROVIDE 3 15A/1P BREAKERS IN SPACES 27, 29 & 37 OF PANELBOARD 1RB. PROVIDE 15A/3P BREAKER IN SPACES 27,29,31 OF PANELBOARD 1RB."

8. SHEET NEW WORK KEYNOTES: ADD KEYNOTE 8: "PROVIDE 3 #10 AWG & 1 #10 AWG EG IN 3/4" CONDUIT FROM WATER HEATER TO 1LB-8."

9. SHEET NEW WORK KEYNOTES: ADD KEYNOTE 9: "PROVIDE 2 #12 AWG & 1 #12 AWG EG IN 1/2" CONDUIT FROM PUMP CP-1 TO 1LB-37."

10. ADD SHEET NEW WORK KEYNOTE 6 to ROOM D109.

11. ADD SHEET NEW WORK KEYNOTE 8 to ROOM D137.

12. ADD SHEET NEW WORK KEYNOTE 9 to ROOM D137.

- End of Addendum -

SECTION 28 31 00
FIRE DETECTION AND ALARM

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section of the specifications includes the furnishing, installation, and connection of the fire alarm equipment to form a complete coordinated system ready for operation. It shall include, but not be limited to, alarm initiating devices, alarm notification appliances, control units, fire safety control devices, annunciators, power supplies, and wiring as shown on the drawings and specified.

B. Fire alarm systems shall comply with requirements of NFPA 72 unless variations to NFPA 72 are specifically identified within these contract documents by the following notation: "variation". The design, system layout, document submittal preparation, and supervision of installation and testing shall be provided by a technician that is certified NICET level III or a registered fire protection engineer. The NICET certified technician shall be on site for the supervision and testing of the system. Factory engineers from the equipment manufacturer, thoroughly familiar and knowledgeable with all equipment utilized, shall provide additional technical support at the site as required by the Contracting Officer or his authorized representative. Installers shall have a minimum of two years experience installing fire alarm systems.

1.2 SCOPE

A. Existing system is Edwards EST3. All existing fire alarm equipment, wiring, devices and sub-systems that are not shown to be reused shall be removed. All existing fire alarm conduit not reused shall be removed.

B. New fire alarm devices shall fully compatible with existing system and shall be designed and installed in accordance with the specifications and drawings. Device location and wiring runs shown on the drawings are for reference only unless specifically dimensioned. Actual locations shall be in accordance with NFPA 72 and this specification.

C. Existing fire alarm bells, chimes, door holders, 120VAC duct smoke detectors, valve tamper switches and waterflow/pressure switches may be reused only as specifically indicated on the drawings and provided the equipment:

1. Meets this specification section
2. Is UL listed or FM approved
3. Is compatible with new equipment being installed

4. Is verified as operable through contractor testing and inspection
5. Is warranted as new by the contractor.

D. Existing 120 VAC duct smoke detectors, waterflow/pressure switches, and valve tamper switches reused by the Contractor shall be equipped with an addressable interface device compatible with the new equipment being installed.

E. Existing reused equipment shall be covered as new equipment under the Warranty specified herein.

1.3 RELATED WORK

A. Section 01 00 00, GENERAL REQUIREMENTS: Restoration of existing surfaces.

B. Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES: Procedures for submittals.

C. Section 07 84 00, FIRESTOPPING: Fire proofing wall penetrations.

D. Section 09 91 00, PAINTING: Painting for equipment and existing surfaces.

E. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: General electrical requirements for items which are common to other Division 26 sections.

F. Section 26 05 33, RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS: Conduits and boxes for cables/wiring.

G. Section 26 05 21, LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 VOLTS AND BELOW: Cables/wiring.

1.4 SUBMITTALS

A. General: Submit 4 copies and 1 reproducible in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, and Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.

B. Drawings:

1. Floor plans: Provide locations of all devices (with device number at each addressable device corresponding to control unit programming), appliances, panels, equipment, junction/terminal cabinets/boxes, risers, electrical power connections, individual circuits and raceway routing, system zoning; number, size, and type of raceways and conductors in each raceway; conduit fill calculations with cross section area percent fill for each type and size of conductor and raceway. Only those devices connected and incorporated into the final system shall be on these floor plans. Do not show any removed devices on the floor plans. Show all interfaces for all fire safety functions.

2. Riser diagrams: Provide, for the entire system, the number, size and type of riser raceways and conductors in each riser raceway and number of each type device per floor and zone. Show door holder interface, elevator control interface, HVAC shutdown interface, fire extinguishing system interface, and all other fire safety interfaces. Show wiring Styles on the riser diagram for all circuits. Provide diagrams both on a per building and campus wide basis.
3. Detailed wiring diagrams: Provide for control panels, modules, power supplies, electrical power connections, auxiliary relays and annunciators showing termination identifications, size and type conductors, circuit boards, LED lamps, indicators, adjustable controls, switches, ribbon connectors, wiring harnesses, terminal strips and connectors, spare zones/circuits. Diagrams shall be drawn to a scale sufficient to show spatial relationships between components, enclosures and equipment configuration.
4. Two weeks prior to final inspection, the Contractor shall deliver to the COTR one (1) set of reproducible, as-built drawings, two blueline copies and one (1) set of the as-built drawing computer files. As-built drawings (floor plans) shall show all new and existing conduit used for the fire alarm system.

C. Manuals:
1. Submit simultaneously with the shop drawings, companion copies of complete maintenance and operating manuals including technical data sheets for all items used in the system, power requirements, device wiring diagrams, dimensions, and information for ordering replacement parts.
   a. Wiring diagrams shall have their terminals identified to facilitate installation, operation, expansion and maintenance.
   b. Wiring diagrams shall indicate internal wiring for each item of equipment and the interconnections between the items of equipment.
   c. Include complete listing of all software used and installation and operation instructions including the input/output matrix chart.
   d. Provide a clear and concise description of operation that gives, in detail, the information required to properly operate, inspect, test and maintain the equipment and system. Provide all manufacturer's installation limitations including but not limited to circuit length limitations.
   e. Complete listing of all digitized voice messages.

f. Provide standby battery calculations under normal operating and alarm modes. Battery calculations shall include the magnets for holding the doors open for one minute.
g. Include information indicating who will provide emergency service and perform post contract maintenance.
h. Provide a replacement parts list with current prices. Include a list of recommended spare parts, tools, and instruments for testing and maintenance purposes.
i. A computerized preventive maintenance schedule for all equipment. The schedule shall be provided on disk in a computer format acceptable to the VAMC and shall describe the protocol for preventive maintenance of all equipment. The schedule shall include the required times for systematic examination, adjustment and cleaning of all equipment. A print out of the schedule shall also be provided in the manual. Provide the disk in a pocket within the manual.
j. Furnish manuals in 3 ring loose-leaf binder or manufacturer's standard binder.
k. A print out for all devices proposed on each signaling line circuit with spare capacity indicated.

2. Two weeks prior to final inspection, deliver four copies of the final updated maintenance and operating manual to the COTR.
a. The manual shall be updated to include any information necessitated by the maintenance and operating manual approval.
b. Complete "As installed" wiring and schematic diagrams shall be included that shows all items of equipment and their interconnecting wiring. Show all final terminal identifications.
c. Complete listing of all programming information, including all control events per device including an updated input/output matrix.
d. Certificate of Installation as required by NFPA 72 for each building. The certificate shall identify any variations from the National Fire Alarm Code.
e. Certificate from equipment manufacturer assuring compliance with all manufacturers installation requirements and satisfactory system operation.

D. Certifications:
1. Together with the shop drawing submittal, submit the technician's NICET level III fire alarm certification as well as certification

from the control unit manufacturer that the proposed performer of contract maintenance is an authorized representative of the major equipment manufacturer. Include in the certification the names and addresses of the proposed supervisor of installation and the proposed performer of contract maintenance. Also include the name and title of the manufacturer’s representative who makes the certification.

2. Together with the shop drawing submittal, submit a certification from either the control unit manufacturer or the manufacturer of each component (e.g., smoke detector) that the components being furnished are compatible with the control unit.
3. Together with the shop drawing submittal, submit a certification from the major equipment manufacturer that the wiring and connection diagrams meet this specification, UL and NFPA 72 requirements.

1.5 RESERVED

1.6 RESERVED

1.7 APPLICABLE PUBLICATIONS

A. The publications listed below (including amendments, addenda, revisions, supplements and errata) form a part of this specification to the extent referenced. The publications are referenced in text by the basic designation only.

B. National Fire Protection Association (NFPA):

70-2005.....National Electrical Code (NEC).

72-2002.....National Fire Alarm Code.

90A-2002.....Installation of Air Conditioning and Ventilating Systems.

101-2003.....Life Safety Code

C. Underwriters Laboratories, Inc. (UL):

2000-2000.....Fire Protection Equipment Directory

D. Factory Mutual Research Corp (FM): Approval Guide, 2005 Edition

E. American National Standards Institute (ANSI):

S3.41-1996.....Audible Emergency Evacuation Signal

F. International Code Council, International Building Code (IBC) 2003 Edition

PART 2 - PRODUCTS

2.1 EQUIPMENT AND MATERIALS, GENERAL

A. Existing equipment may be reused only where indicated on the drawings.

B. Except as indicated in paragraph A above, All equipment and components shall be new and the manufacturer's current model. All equipment shall be tested and listed by Underwriters Laboratories, Inc. or Factory

Mutual Research Corporation for use as part of a fire alarm system. The authorized representative of the manufacturer of the major equipment shall certify that the installation complies with all manufacturer's requirements and that satisfactory total system operation has been achieved.

2.2 CONDUIT, BOXES, AND WIRE

A. Conduit shall be in accordance with Section 26 05 33, RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS and as follows:
   1. All new and reused conduit shall be installed in accordance with NFPA 70.
   2. Conduit fill shall not exceed 40 percent of interior cross sectional area.
   3. All new conduit shall be 19 mm (3/4 inch) minimum.

B. Wire:
   1. All existing wiring shall be removed and new wiring installed in a conduit or raceway.
   2. Wiring shall be in accordance with NEC article 760, Section 26 05 21, LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 VOLTS AND BELOW), and as recommended by the manufacturer of the fire alarm system. All wires shall be color coded. Number and size of conductors shall be as recommended by the fire alarm system manufacturer, but not less than 18 AWG for initiating device circuits and 14 AWG for notification device circuits.
   3. Addressable circuits and wiring used for the multiplex communication loop shall be twisted and shielded unless specifically excepted by the fire alarm equipment manufacturer in writing.
   4. Any fire alarm system wiring that extends outside of a building shall have additional power surge protection to protect equipment from physical damage and false signals due to lightning, voltage and current induced transients. Protection devices shall be shown on the submittal drawings and shall be UL listed or in accordance with written manufacturer's requirements.
   5. All wire or cable used in underground conduits including those in concrete shall be listed for wet locations.

C. Terminal Boxes, Junction Boxes, and Cabinets:
   1. Shall be galvanized steel in accordance with UL requirements.
   2. All new and reused boxes shall be sized and installed in accordance with NFPA 70.

3. New and existing covers shall be repainted red in accordance with Section 09 91 00, PAINTING and shall be identified with white markings as "FA" for junction boxes and as "FIRE ALARM SYSTEM" for cabinets and terminal boxes. Lettering shall be a minimum of 19 mm (3/4 inch) high.
4. Terminal boxes and cabinets shall have a volume 50 percent greater than required by the NFPA 70. Minimum sized wire shall be considered as 14 AWG for calculation purposes.
5. Terminal boxes and cabinets shall have identified pressure type terminal strips and shall be located at the base of each riser. Terminal strips shall be labeled as specified or as approved by the COTR.

2.3 ALARM NOTIFICATION APPLIANCES

C. Strobes:

1. Xenon flash tube type minimum 15 candela in toilet rooms and 75 candela in all other areas with a flash rate of 1 HZ. Strobes shall be synchronized where required by the National Fire Alarm Code (NFPA 72).
2. Backplate shall be red with 13 mm (1/2 inch) permanent red letters. Lettering to read "Fire", be oriented on the wall or ceiling properly, and be visible from all viewing directions.
3. Each strobe circuit shall have a minimum of twenty (20) percent spare capacity.
4. Strobes may be combined with the audible notification appliances specified herein.

2.4 ALARM INITIATING DEVICES

A. Smoke Detectors:

1. Smoke detectors shall be UL listed for use with the fire alarm control unit being furnished.
2. Smoke detectors shall be addressable type complying with applicable UL Standards for system type detectors. Smoke detectors shall be installed in accordance with the manufacturer's recommendations and NFPA 72.
3. Detectors shall have an indication lamp to denote an alarm condition. Provide remote indicator lamps and identification plates where detectors are concealed from view. Locate the remote indicator lamps and identification plates flush mounted on walls so they can be observed from a normal standing position.

4. All spot type and duct type detectors installed shall be of the photoelectric type.
5. Photoelectric detectors shall be factory calibrated and readily field adjustable. The sensitivity of any photoelectric detector shall be factory set at 3.0 plus or minus 0.25 percent obscuration per foot.
6. Detectors shall provide a visual trouble indication if they drift out of sensitivity range or fail internal diagnostics. Detectors shall also provide visual indication of sensitivity level upon testing. Detectors, along with the fire alarm control units shall be UL listed for testing the sensitivity of the detectors.

B. Water Flow and Pressure Switches:
1. Wet pipe water flow switches and dry pipe alarm pressure switches for sprinkler systems shall be connected to the fire alarm system by way of an address reporting interface device.
2. All new water flow switches shall be of a single manufacturer and series and non-accumulative retard type.
3. All new switches shall have an alarm transmission delay time that is conveniently adjustable from 0 to 60 seconds. Initial settings shall be 30-45 seconds. Timing shall be recorded and documented during testing.

2.5 SUPERVISORY DEVICES

A. Duct Smoke Detectors:
1. Duct smoke detectors shall be provided and connected by way of an address reporting interface device. Detectors shall be provided with an approved duct housing mounted exterior to the duct, and shall have perforated sampling tubes extending across the full width of the duct (wall to wall). Detector placement shall be such that there is uniform airflow in the cross section of the duct.
2. Interlocking with fans shall be provided in accordance with NFPA 90A and as specified hereinafter under Part 3.2, "TYPICAL OPERATION".
3. Provide remote indicator lamps, key test stations and identification nameplates (e.g. "DUCT SMOKE DETECTOR AHU-X") for all duct detectors. Locate key test stations in plain view on walls or ceilings so that they can be observed and operated from a normal standing position.

B. Sprinkler and Standpipe System Supervisory Switches:
1. Each sprinkler system water supply control valve, riser valve or zone control valve, and each 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 valve shall be equipped with a supervisory switch.
3. Valve supervisory switches shall be connected to the fire alarm system by way of address reporting interface device.
4. The mechanism shall be contained in a weatherproof die-cast aluminum housing that shall provide a 19 mm (3/4 inch) tapped conduit entrance and incorporate the necessary facilities for attachment to the valves.
5. 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.
6. Where dry-pipe sprinkler systems are installed, high and low air pressure switches shall be provided and monitored by way of an address reporting interface devices.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Installation shall be in accordance with NFPA 70, 72, 90A, and 101 as shown on the drawings, and as recommended by the major equipment manufacturer. Fire alarm wiring shall be installed in conduit. All conduit and wire shall be installed in accordance with Section 26 05 33, RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS , Section 26 05 21, LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 VOLTS AND BELOW), and all penetrations of smoke and fire barriers shall be protected as required by Section 07 84 00, FIRESTOPPING.

B. All new conduits, junction boxes, conduit supports and hangers shall be concealed in finished areas and may be exposed in unfinished areas. All existing accessible fire alarm conduit not reused shall be removed.

C. All new or reused exposed conduit shall be painted in accordance with Section 09 91 00, PAINTING to match surrounding finished areas and red in unfinished areas.

D. Existing devices that are reused shall be properly mounted and installed. Where devices are installed on existing shallow backboxes, extension rings of the same material, color and texture of the new fire alarm devices shall be used. Mounting surfaces shall be cut and patched in accordance with Section 01 00 00, GENERAL REQUIREMENTS, Restoration, and be re-painted in accordance with Section 09 91 00, PAINTING as necessary to match existing.

E. All fire detection and alarm system devices, control units and remote annunciators shall be flush mounted when located in finished areas and

may be surface mounted when located in unfinished areas. Exact locations to be approved by the COTR.

F. Speakers shall be ceiling mounted and fully recessed in areas with suspended ceilings. Speakers shall be wall mounted and recessed in finished areas without suspended ceilings. Speakers may be surface mounted in unfinished areas.

G. Strobes shall be flush wall mounted 2,000 mm (80 inches) above the floor or 150 mm (6 inches) below ceiling, whichever is lower. Locate and mount to maintain a minimum 900 mm (36 inches) clearance from side obstructions.

H. Manual pull stations shall be installed not less than 1050 mm (42 inches) or more than 1200 mm (48 inches) from finished floor to bottom of device and within 1500 mm (60 inches) of a stairway or an exit door.

I. Where possible, locate water flow and pressure switches a minimum of 300 mm (12 inches) from a fitting that changes the direction of the flow and a minimum of 900 mm (36 inches) from a valve.

J. Mount valve tamper switches so as not to interfere with the normal operation of the valve and adjust 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.

3.2 TESTS

A. Provide the service of a NICET level III, competent, factory-trained engineer or technician authorized by the manufacturer of the fire alarm equipment to technically supervise and participate during all of the adjustments and tests for the system. Make all adjustments and tests in the presence of the COTR.

B. When the systems have been completed and prior to the scheduling of the final inspection, furnish testing equipment and perform the following tests in the presence of the COTR. When any defects are detected, make repairs or install replacement components, and repeat the tests until such time that the complete fire alarm systems meets all contract requirements. After the system has passed the initial test and been approved by the COTR, the contractor may request a final inspection.

1. Before energizing the cables and wires, check for correct connections and test for short circuits, ground faults, continuity, and insulation.
2. Test the insulation on all installed cable and wiring by standard methods as recommended by the equipment manufacturer.

3. Run water through all flow switches. Check time delay on water flow switches. Submit a report listing all water flow switch operations and their retard time in seconds.
4. Open each alarm initiating and notification circuit to see if trouble signal actuates.
5. Ground each alarm initiation and notification circuit and verify response of trouble signals.

3.3 FINAL INSPECTION AND ACCEPTANCE

A. Prior to final acceptance a minimum 30 day "burn-in" period shall be provided. The purpose shall be to allow equipment to stabilize and potential installation and software problems and equipment malfunctions to be identified and corrected. During this diagnostic period, all system operations and malfunctions shall be recorded. Final acceptance will be made upon successful completion of the "burn-in" period and where the last 14 days is without a system or equipment malfunction.

B. At the final inspection a factory trained representative of the manufacturer of the major equipment shall repeat the tests in Article 3.3 TESTS and those required by NFPA 72. In addition the representative shall demonstrate that the systems function properly in every respect. The demonstration shall be made in the presence of a VA representative.

- - - END - - -