ADDENDUM NO. 03

1. Refer to Specification Section 10 14 10 Interior Signage. Contractor to provide signage for every room shown on the plan (existing and new rooms) for entire building (3 floors). This refers to all room numbers, room identifications, etc. including all restrooms, offices, meeting rooms, dining rooms, kitchen areas, elevators, janitor closets, electrical, mechanical closets, stairwells, floor identification, etc. The basis of design for all new signage is to be “APCO’s Full View” and/or Synder’s “Vista” signage types.

2. Refer to Specification Section 07 53 23 Elastomeric Membrane Roofing – EPDM, specifically to Part 2.01 A. Manufacturers. Versico is an approved manufacturer.

3. Refer to the following drawing sheets AD110 – AD132, specifically to note 10, the “Bradley” sink units in the restrooms being demolished. All of these sinks are to be removed by the contractor and turned over to ETSU.

4. Refer to new drawing sheet LS216, Lower Level Patio Drainage Plan. This sheet is issued and part of the drawing set as part of this Addendum NO. 3.

5. Refer to drawing sheets A501 and A502, specifically to Upper Floor exterior patio. This roofing material is to be “Hot Fluid-Applied Rubberized Asphalt Waterproofing” as detailed on reissued drawing sheets. Refer to attached Specification Section 07 14 13 “Hot Fluid-Applied Rubberized Asphalt Waterproofing” for construction of this new roofing. Specification Section is attached and part of this Addendum NO. 3.
6. Refer to the following drawing sheets:
- Landscape: L211, L212, L311, L312, L313, L512
- Structural: S111, S121, S502
- Fire Protection: FP112
- Plumbing: P001, P002, P111, P112, P131, P141, P231, P232
- Mechanical: M001, M002, M003, M007, M009, M111, M112, M121, M122, M131, M132, M141, M221, M222, MD112, MD121

Replace these previously issued drawing sheets with new sheets of the same name with revisions marked Addendum NO. 3, attached as part of this Addendum NO. 3.

7. Refer to Specification Section 00 73 30 Supplementary Conditions. Remove this section completely.

8. Refer to Specification Section 10 44 00 Fire Extinguishers and Cabinets. Contractor to provide and install Twenty Two (22) new fire extinguishers with cabinets as specified. Install all extinguishers and cabinets in locations as directed by Architect.

9. Clarification: Refer to Sheet A900, Finishes, specifically to note that reads: "For all back of house exterior corners." Corner guards shall not be provided for the Retail Survey on the Lower Level Plan or any area that states "Not in Scope" on the drawings.

10. Clarification: Refer to Sheet A900 Finishes, specifically to note 23. Corner guards are to be supplied and installed on all exterior corners for "back of house" kitchen spaces 365, anytime dining 389 and dishroom 380 (Upper Level Plan), etc.

11. Clarification: Refer to drawing sheet A911, specifically to Coded Notes – Finish Plans. See notes 5, 7, 8 and 10 for floor transitions. Where 5mm lvt meets carpet, no transition is needed.

12. Refer to drawing sheets A960 and A961, specifically to ALL interior glazing. All interior glazing is to be 1⁄4" tempered clear glass. Verification: Interior Vestibule Curtain Wall is to be 1" clear insulated glazing.

13. Refer to Specification Section 07 10 00 Waterproofing – flood tests are NOT required. Inspections will be required.

14. Refer to Specification Section 07 24 13 EIFS – testing of EIFS is NOT required.
15. Refer to Specification Section 07 27 26 Air Barriers – testing listed will be required.

16. Refer to Specification Section 08 44 13 Glazed Aluminum Curtainwalls – Part 3.03 Field Quality Control. Testing of Aluminum Curtainwalls will be required as specified.

17. Refer to Specification Section 10 11 00, Visual Display Surfaces. These will be included in the FFE specifications under a separate bid. Omit VDS from these documents.

18. Landscape Addendum No. 3: “See attached Landscape Architecture Addendum No. 3” from Ross/Fowler Architecture Landscape Architecture. Attached as part of this Addendum NO. 3.

19. Mechanical/Plumbing Addendum: “See attached Addendum Number 3 – Mechanical/Plumbing” from Facility Systems Consultants, LLC. Attached as part of this Addendum NO. 3.

20. Electrical Addendum: “See attached Addendum Number 3 – Electrical” from Facility Systems Consultants, LLC. Attached as part of this Addendum NO. 3.

END OF ADDENDUM NO. 3
SECTION 07 14 13

HOT FLUID-APPLIED RUBBERIZED ASPHALT WATERPROOFING

PART 1 – GENERAL

1.1 SECTION INCLUDES:


1.2 RELATED SECTIONS

A. Section 03 15 00 – Concrete Accessories/Expansion Joints
B. Section 03 30 00 - Cast-In-Place Concrete
C. Section 07 90 00 - Caulking and Sealants
D. Division 04 - Masonry
E. Division 20 – Mechanical/Floor Drains and Standpipes
F. Division 25 – Electrical/Conduit and other Electrical

1.3 REFERENCES

B. ASTM Applicable Standards and Test Methods.

1.4 SYSTEM DESCRIPTION

Product provided by this Section is a 215-mil thick, reinforced, hot-applied rubberized asphalt membrane system, consisting of two layers of rubberized asphalt membrane reinforced with polyester fabric.

1.5 SUBMITTALS

A. General: Submit in accordance with Section 01 30 00.
B. Product Data: Submit manufacturer's product literature and installation instructions.
C. Subcontractor’s approval by Manufacturer: Submit document stating manufacturer's acceptance of subcontractor as an Approved Applicator for the specified materials.
D. Warranty: Submit a sample warranty identifying the terms and conditions stated in Section 1.7.
1.6 QUALITY ASSURANCE

A. Applicator Qualifications: Applicator shall be experienced in applying the same or similar materials and shall be specifically approved in writing by the membrane manufacturer.
B. Regulatory Requirements: Comply with applicable codes, regulations, ordinances, and laws regarding use and application of products that contain volatile organic compounds (VOC).
C. Pre-Application Conference: Prior to beginning work, convene a conference to review conditions, installation procedures, schedules and coordination with other work.

1.7 WARRANTY

Provide a written, single-source-year warranty for all system components agreeing that during the warranty period to promptly make repairs or replacement of defective materials of the waterproofing system without additional cost to the owner.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to project site in original, factory-sealed, unopened containers bearing manufacturer's name and label intact and legible with following information.
   1. Name of material
   2. Manufacturer's stock number and date of manufacture.
B. Store flashing, mastic and primer in a protected area out of direct sunlight. Protect from rain and physical damage.

1.9 PROJECT CONDITIONS

A. Do not apply membrane if temperature is less than 0°F or to a damp, frosty, snow covered or contaminated surface.
B. Coordinate waterproofing work with other trades. The applicator shall have sole right of access to the specified areas for the time needed to complete the application.
C. Protect adjoining surfaces not to be waterproofed against damage or soiling. Protect plants, vegetation and animals which might be affected by waterproofing operations.
D. Warn personnel against breathing of vapors and contact of material with skin or eyes. Wear applicable protective clothing and respiratory protection gear.
E. Keep flammable products away from spark or flame. Do not allow the use of spark producing equipment during application until all vapors have dissipated. Post "NO SMOKING" signs.
F. Maintain work area in a neat and orderly condition, removing empty containers, rags, and rubbish daily from the site.
PART 2 – PRODUCTS

2.1 MANUFACTURERS

Provide products manufactured and supplied by Carlisle Coatings and Waterproofing Incorporated, 900 Hensley Lane, Wylie Texas 75098, phone (800) 338-8701, fax (972) 442-0076.

2.2 PRODUCTS

A. Hot-applied liquid membrane: Shall be CCW-500 Hot-Applied Membrane, rubberized asphalt compound, and shall meet or exceed the requirements of CGSB-37.50-M89.
B. Reinforcing fabric: Shall be CCW-500 Reinforcing Fabric which is a 1.35 oz/square yard spunbond polyester fabric.

2.3 ACCESSORY PRODUCTS

A. Flashings: Shall be CCW-711-90 90-Mil Sheet Membrane and Flashing or CCW 60-mil uncured neoprene for non-exposed areas and Sure-Seal EPDM Flashing for exposed areas.
B. Surface Primer: Shall be CCW-550 Primer.
C. Mastic: Shall be CCW-704 Mastic.
D. Sealants: Shall be CCW-703 Vertical Grade LIQUISEAL™ Membrane or CCW-201 two- component Polyurethane Sealant.
E. Backer Rod: Shall be closed-cell polyethylene foam rod.
F. Expansion Joints: Shall be the EJ-500
G. Protection Course: Shall be CCW Protection Board-HS or H.
H. Root Barrier: Shall be the CCW Root Barrier
I. Drainage Composite: Shall be CCW MiraDRAIN as recommended by the manufacturer for each condition.
J. Insulation: Shall be extruded polystyrene insulation with a minimum 60 psi (or as specified by architect) compressive strength as manufactured by Insulfoam, Foamular or Dow.
K. Pavers: Where required, shall be as recommended and supplied by the membrane manufacturer.
L. Perimeter Drainage System: Where required, shall be CCW QuickDRAIN™.
M. H.P. Protective Mat shall be applied over insulation prior to paver placement.

PART 3 – EXECUTION

3.1 INSPECTION

A. Before any waterproofing work is started the waterproofing applicator shall thoroughly examine all surfaces for any deficiencies. Should any deficiencies exist, the architect, owner, or general contractor shall be notified in writing and corrections made.
B. Condition of Concrete Surfaces:
1. The concrete surfaces shall be of sound structural grade, 3500 psi minimum, and shall have a wood float or fine broom finish, free of fins, ridges, voids or entrained air holes.
2. Concrete shall be cured by water curing method. Curing compounds must be of the pure sodium silicate type and be approved by the Carlisle representative.
3. Concrete shall be cured at least 14 days and shall be sloped for proper drainage.
4. Voids, rock pockets and excessively rough surfaces shall be repaired with approved non-shrink grout or ground to match the un-repaired areas.
5. Two-stage drains shall have a minimum three inch flange and be installed with the flange flush and level with the concrete surface.
6. Surfaces at cold joints shall be on the same plane.

3.2 SURFACE PREPARATION

A. The concrete surface must be thoroughly clean, dry and free from any surface contaminates or cleaning residue that may harmfully affect the adhesion of the membrane.
B. Detail expansion joints per manufacturer's recommendation using the EJ-500.
C. Apply a thin film of CCW-550 primer 16" wide, centered over sealed cracks and joints. Apply 60-90 mils of CCW-500 membrane to cover primed areas. Install a 12" wide strip of CCW-711-90 centered over joints and cracks greater than 1/16" in width.
D. Preferred Flashing Method (500-4B): Apply CCW-550 Primer at the juncture of all horizontal surfaces and vertical surfaces to the height indicated on the drawings (eight inches min. recommended), such as parapet walls, curbs, columns and all penetrations through the deck at a rate of 500 sq. ft. per gallon. Avoid puddles. Allow primer to dry for 1 hour minimum, 8 hours maximum. Membrane will not properly adhere to wet primer. Apply 60-90 mils of CCW-500 membrane to cover primed areas. Install CCW-711-90 mil sheet membrane or uncurt neoprene flashing into this first course of CCW-500 to cover the vertical section and extend six inches onto deck surface. Flashing installation may be done during crack and joint treatment or during installation of the first layer of CCW-500 membrane. Completely cover all flashing material during installation of the subsequent layers of CCW-500 membrane.
E. Install Sure-Seal EPDM flashings in exposed areas per Carlisle recommendations (500-4A). Always clean and prime EPDM with EP-95 Splice Cement per Carlisle splice procedure prior to application of CCW-500 membrane.
F. Apply a thin film of CCW-550 Primer in a four foot square area around drains. Allow primer to dry, one hour minimum, eight hours maximum. Apply 60-90 mils of CCW-500 membrane to cover primed areas. Install a three foot square section of CCW-711-90 or uncurt neoprene flashing over the drain and onto the deck. No splices or seams are allowed within three inches of the drain flange. Terminate the flashing under the clamping ring of the drain and cut away the inner portion of the flashing. Use firm pressure to press the flashing against the CCW-500 surface and ensure good adhesion. Do not interfere with weep holes. Completely cover all flashing material during installation of the subsequent layers of CCW-500 membrane.

3.3 APPLICATION

D.P. Culp Center (TBR SBC# 166/005-01-2014CM) 07 14 13
East Tennessee State University RP2 Hot Fluid-Applied Rubberized Asphalt Waterproofing
A. Apply CCW-550 primer to all surfaces and at the juncture of all horizontal surfaces and vertical surfaces, to the height indicated on the drawings (eight inches minimum recommended), such as parapet walls, curbs, columns and all penetrations through the deck, to receive CCW-500 Waterproofing Membrane, including over flashings, at a rate of 500 sq. ft. per gallon. Avoid puddles. Allow primer to dry for one hour minimum, eight hours maximum. Membrane will not properly adhere to wet primer.

B. Heat CCW-500 Membrane blocks in a twin wall kettle with continuous agitation and apply at 350°F or between temperatures of 325°F to 375°F. (Caution: Do not exceed maximum safe operating temperature of 375°F.).

C. Apply heated CCW-500 Hot Applied Membrane to primed area and any pre-installed flashings at a rate of 18 sq. ft. per gallon or as required to obtain an average thickness of 90 mils.

D. Apply CCW-500 Reinforcing Fabric and any required flashings while membrane is still warm and tacky. Cut and trim off any wrinkles or overlap sections of the reinforcing fabric or hot the fabric splices together with CCW-500.

E. Apply a second coat of CCW-500 Hot Applied Membrane at a rate of 13 sq. ft. per gallon or as required to obtain an average thickness of 125 mils. Total thickness of the CCW-500-R System shall be 215 mils.

F. Apply CCW Protection Board H or HS into the last course of CCW-500 and splice the protection board seams together with CCW-500.

3.4 INTEGRITY TESTING

A. Test is required for all expanded warranties beyond the standard material warranty of horizontal applications.

B. The test can be done with Electronic Vector Mapping or flood testing. Flood testing requires 2" minimum head of water for a period of 24 hours.

3.5 PROTECTION COURSE

A. Install CCW QuickDRAIN Perimeter Drainage System as the first course of drainage composite immediately after membrane has cured on vertical surfaces. Install CCW MiraDRAIN Drainage Composite to complete the drainage and protection System on Vertical Installations.

B. Install CCW MiraDRAIN 9000 or 9900 over CCW Protection Board immediately after flood testing on horizontal surfaces. If flood testing is delayed, install a temporary covering to protect the CCW-500 membrane from damage by other trades.

C. Apply CCW Root Barrier in planter areas covered with soil. Apply over Protection Board and beneath the MiraDRAIN. CCW Root Barrier splices are a minimum of four inches and taped with SecurTAPE or CCW-3300.

Note: All fluid applied product application rates are based on theoretical coverage relative to the percentage of solids in the material. These are minimum application rates to achieve the required dry film thickness for the system and do not account for substrate condition or porosity. A thicker application of the product may be necessary to achieve the required dry film thickness for system relative to the substrate.
EAST TENNESSEE STATE UNIVERSITY  
CULP CENTER RENOVATION  
SBC NO. 166/005-01-2014CM  

Landscape Architecture Addendum No. 3  
April 13, 2018  

Specifications  
1. Section 32 14 00 Permeable Clay Brick Pavers 1.04.A.3 add the following sentence:  
   “Paving installer shall meet at least two of the following qualification requirements.”  
2. Section 32 14 00 Permeable Clay Brick Pavers 2.02 Aggregate Materials A.  
   Bedding Course and Joint Filler delete No. 9 and No. 89 crushed stone and insert No. 8 stone meeting the following requirements:  

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2”</td>
<td>100</td>
</tr>
<tr>
<td>3/8”</td>
<td>85-100</td>
</tr>
<tr>
<td>No. 4</td>
<td>10-30</td>
</tr>
<tr>
<td>No. 8</td>
<td>0-10</td>
</tr>
<tr>
<td>No. 16</td>
<td>0-5</td>
</tr>
</tbody>
</table>

Drawings  
3. Sheet L211- Make certain changes to the North Terrace plan  
4. Sheet L212- Correct detail marker, delete Detail 1/L212.  
5. Sheet L311- in Details 3 and 4 add reference to Detail 4/A301  
6. Sheet L311- revise Detail 8 and add Detail 9  
7. Sheet L312- in Detail 14 add reference to Detail 4/A301  
8. Sheet L313- Make certain changes to Details 5, 6 and 7  
9. Sheet L512- Make certain revisions to the Plant List and add Samara Farms as an approved nursery supplier
ADDENDUM NUMBER 3 – MECHANICAL/PLUMBING

ETSU CULP CENTER
Design Release Package 3
Johnson City, Tennessee
April 13, 2018
SBC# 166/005-01-2014 CM

Changes/Modifications to the Drawings and Specifications:

Plumbing:

1. Refer to Specification Section "22 10 05 – Plumbing Piping & Valves", Section 2.02 to be updated to following:

   2.02 SANITARY SEWER AND CONDENSATE PIPING, ABOVE GRADE
   A. Sanitary Sewer ASTM D 2665 or ASTM D 3034.
      1. Fittings: PVC.
   2. Refer to Drawings P001, P002, P111, P112, P131 for modifications to the rainwater piping.
   3. Refer to Drawings P002 and P112 for elevator sump.
   4. Refer to Drawings P002 and P231 for relocated grease trap information.
   5. Refer to Drawings P112 for clarification on relocation of domestic water main from basement to middle level.
   6. Refer to new Drawing P141 and revised P232 for gas piping to kitchen makeup units.

Fire Protection

1. Refer FP112 for clarification on relocated fire main.

Mechanical:

1. Clarification: Refer to colored drawings for reference. Blue is new supply, red is new return and green is new exhaust.
2. Refer to Specification 230923; 1.1 A; Delta, is also an approved provider on the ETSU Campus
3. Refer to Drawings M111, M112, M121, M122, M131, and M132 for updated mechanical plans to coordinate disciplines.
4. Refer to Drawing M141 for updated roof plan with kitchen equipment. Kitchen equipment provided by kitchen supplier, ductwork and connections by mechanical contractor.
5. Refer to Drawings M003, M121, M122, M221, and M222 for updated VAV boxes in Office Suite 240 and 250.
6. Refer to M001, M002, M003, and M009 for controls clarifications. Replacement of existing controls is a part of the project.
7. Refer to MD11 and MD121 for existing units to be demolished.
8. Refer to M007 for pump detail.

THIS ADDENDUM SHALL BECOME A PART OF THE PROJECT MANUAL AND HAVE FULL EFFECT AS IF SUBMITTED WITH THE ORIGINAL DOCUMENTS.

Date: ____________________

By: ______________________
Facility Systems Consultants, LLC
ADDENDUM NUMBER 3 - ELECTRICAL

ETSU CULP CENTER
Design Release Package 2
Johnson City, Tennessee
April 13, 2018
SBC# 166/005-01-2014 CM

Changes/Modifications to the Drawings and Specifications:

Electrical Specifications:

1. Refer to Specification Section 27 05 29 – Hangers and Support. Refer to Part 2 – Products, Section 2.1 Materials, Paragraph (C). Add the following sentence to the end of Paragraph C:
   "Cable tray assemblies and hardware from Snake-Tray (Bay Shore, NY) are also permitted for all non-communication room areas for cabling support and distribution, as well as cable sling supports from Pentair/Erico Caddy CAT425 (Solon, OH) for use where specified cable tray installation is prohibited or physically encumbered by other assemblies."

2. See attached revised Specification Section 28 03 00 – Fire Alarm System.


Electrical Drawings:

1. Refer to drawing T111. Change data port subscript from “W” to “AV” for port that is plan north of storage room 142K.

2. Refer to drawing T111. Change “8” cable tray, ITS” to “18” cable tray, ITS” on note above Retail Room 131 pointing to cable right before entrance into Telecom room 144.

3. Refer to drawing T111. Delete “18” cable tray” note plan south of Retail Servery room 132.

4. Refer to drawing T111. Delete the (2) 4” AV conduits running between Lounge Room 145 cable tray and cable tray plan south of Retail Servery 135.

5. Refer to drawing T112 section 2. Adjust the three stub-outs to where they connect to data port symbols behind the counter of Passport Room 147.

6. Refer to drawing T121 Storage Room 272A. Change “(3) 4” Conduits down to floor below, ITS” note to “(3) 4” Conduits down to floor below, ITS. Extend to Telecom Room 144.”

7. Refer to drawing T122 Room 211C. Poke through device shall be designated “AV”.

8. Refer to Drawing T122 Rooms 214N, 214M, 214L, 214K, 212G, 214J, 214H, 211B, and 211A. All data port stub-outs and cable shall be routed underground to nearest full-height wall, extend up in wall, and overhead to nearest cable tray.

9. Refer to existing panelboards to remain throughout the facility. Contractor shall remove all unused branch circuits and associated conduits, install knock-out seals in openings,
trace and identify all existing circuits to remain, and provide NEW type-written labels reflecting all existing circuit loads, new circuit loads, and spare breakers.

10. Refer to all Plans. Change panelboard, transformer, and disconnect names and locations in Mechanical Room 149 to what's shown on Drawing E211.

11. Refer to all Plans. Change panelboard, transformer, and disconnect names and locations in Mechanical Room 139 and Storage Room 138 to what's shown on Drawing E212.

12. Refer to all Plans. Change panelboard, transformer, and disconnect names and locations in Electrical Room 107 and Storage Room 138 to what's shown on Drawing E212.

13. Refer to all Plans. Change panelboard, transformer, and disconnect names and locations in Mechanical Room 139 and Mail Room 108 to what's shown on Drawing E212.

14. Refer to all Plans. Change panelboard, transformer, and disconnect names and locations in Mechanical Room 139 and Mail Room 108 to what's shown on Drawing E212.

15. Refer to drawing E332. Refer to HWC-330. This HWC (VAV) is existing to remain and connected to circuit AA-17.

16. Refer to attached new drawing sheets T007, T008, and T009.


THIS ADDENDUM SHALL BECOME A PART OF THE PROJECT MANUAL AND HAVE FULL EFFECT AS IF SUBMITTED WITH THE ORIGINAL DOCUMENTS.

04/13/2018

Date

By: Facility Systems Consultants, LLC
SECTION 28 03 00

FIRE ALARM SYSTEM

PART 1   GENERAL

1.01   SUMMARY

A. This Section covers fire alarm systems, including initiating devices, notification appliances, controls, and supervisory devices.

B. Work covered by this section includes the furnishing of labor, equipment, and materials for installation of the fire alarm system as indicated on the drawings and specifications.

C. The Fire Alarm System shall consist of all necessary hardware equipment and software programming to perform the following functions:
   1. Fire alarm and detection operations
   2. Control and monitoring of elevators, smoke control equipment, door hold-open devices, fire suppression systems, emergency power systems, and other equipment as indicated in the drawings and specifications.
   3. One-way supervised automatic voice alarm operations.

1.02   ACCEPTABLE MANUFACTURERS

A. Manufacturers: The equipment and service described in this specification are those supplied and supported by Notifier and represent the base bid for the equipment. Portions of the system are existing to remain; therefore Notifier shall be used to ensure compatibility with existing devices and cabling to remain. Equal manufacturer’s (Simplex and EST) will not be considered unless they agree to completely replace all existing devices within the facility including areas of "No Work", and the Auditorium.

1.03   RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

B. The work covered by this section is to be coordinated with related work as specified elsewhere in the specifications. Requirements of the following sections apply:
   1. Division 26: "Basic Electrical Materials and Methods."
   2. Division 26: "Wiring Methods."
   3. Division 21: "Fire Protection"
   4. Division 23: "HVAC Systems"

C. The system and all associated operations shall be in accordance with the following:
1. Guidelines of the following Building Code: BOCA
2. NFPA 72, National Fire Alarm Code
3. NFPA 70, National Electrical Code
5. NFPA 90A, Standard for the Installation of Air Conditioning and Ventilating Systems
6. Other applicable NFPA standards
7. Local Jurisdictional Adopted Codes and Standards
8. ADA Accessibility Guidelines

1.04 SYSTEM DESCRIPTION

A. General: Provide a complete, non-coded, addressable microprocessor-based fire alarm system with initiating devices, notification appliances, and monitoring and control devices as indicated on the drawings and as specified herein. Connect the new fire alarm panel to the existing token-ring fire alarm network via fiber optic cable, make any and all fiber connections necessary for a complete fire alarm network. Provide 25% Spare Capacity in all power supplies and battery banks to allow for future NAC expansions and added Notification Devices as space uses change.

B. Software: The fire alarm system shall allow for loading and editing instructions and operating sequences as necessary. The system shall be capable of on-site programming to accommodate system expansion and facilitate changes in operation. All software operations shall be stored in a non-volatile programmable memory within the fire alarm control unit. Loss of primary and secondary power shall not erase the instructions stored in memory. System shall be capable of storing dual configuration programs with one active and one in reserve. Panel shall be capable of full system operation during a new configuration download.

C. History Logs: The system shall provide a means to recall alarms and trouble conditions in chronological order for the purpose of recreating an event history. A separate alarm and trouble log shall be provided.

D. Recording of Events: Record all alarm, supervisory, and trouble events by means of system printer. The printout shall include the type of signal (alarm, supervisory, or trouble) the device identification, date and time of the occurrence. The printout differentiates alarm signals from all other printed indications.

E. Wiring/Signal Transmission:
   1. Transmission shall be hard-wired, using separate individual circuits for each zone of alarm operation as required or addressable signal transmission, dedicated to fire alarm service only.
   2. System connections for initiating (signaling) circuits and notification appliance circuits shall be Class B.
   3. Circuit Supervision: Circuit faults shall be indicated by a trouble signal at the FACP. Provide a distinctive indicating audible tone.
F. Remote Access:
1. FACP shall have the capability to provide Remote Access through a Dial-Up Service Modem using the public switched telephone system of a private switched telephone system.

2. A personal computer or technician’s laptop, configured with terminal emulation software shall have the ability to access the FACP for diagnostics, maintenance reporting and information gathering.

3. FACP shall have the capability to provide Remote Access through a listed Internet Interface via a standard web browser user interface.

G. Required Functions: The following are required system functions and operating features:
1. Priority of Signals: Alarm events have highest priority. Subsequent alarm events are queued in the order received and do not affect existing alarm conditions. Priority Two, Supervisory and Trouble events have second-, third-, and fourth-level priority respectively. Signals of a higher-level priority take precedence over signals of lower priority even though the lower-priority condition occurred first. Annunciate all events regardless of priority or order received.

2. Noninterfering: An event on one zone does not prevent the receipt of signals from any other zone. All zones are manually resettable from the FACP after the initiating device or devices are restored to normal. The activation of an addressable device does not prevent the receipt of signals from subsequent activations.

3. Transmission to Remote Central Station: Automatically route alarm, supervisory, and trouble signals to a remote central station service transmitter provided under another contract.

4. Annunciator: Operation of alarm and supervisory initiating devices shall be annunciated at the FACP and the remote annunciator, indicating the location and type of device.

5. General Alarm: A system general alarm shall include:
   a. Indication of alarm condition at the FACP and annunciator(s).
   b. Identification of the device or zone that is the source of the alarm at the FACP.
   c. Operation of audible and visible notification devices throughout the building until silenced at FACP.
   d. Closing doors normally held open by magnetic door holders.
   e. Unlocking designated doors.
   f. Shutting down supply and return fans serving zone where alarm is initiated.
   g. Closing smoke dampers on system serving zone where alarm is initiated.
   h. Initiation of smoke control sequence through the building temperature control system.
   i. Notifying the local fire department.
Initiation of elevator recall in accordance with ASME/ANSI A17.1, when specified detectors or sensors are activated.

6. **Supervisory Operations:** Upon activation of a supervisory device such as fire pump power failure, low air pressure switch, and tamper switch, the system shall operate as follows:
   a. Activate the system supervisory service audible signal and illuminate the LED at the control unit and the graphic annunciator.
   b. Pressing the Supervisory Acknowledge Key will silence the supervisory audible signal while maintaining the Supervisory LED "on" indicating off-normal condition.
   c. Record the event in the FACP historical log.
   d. Transmission of supervisory signal to remote central station.
   e. Restoring the condition shall cause the Supervisory LED to clear and restore the system to normal.

7. **Alarm Silencing:** If the "Alarm Silence" button is pressed, all audible alarm signals shall cease operation.

8. **System Reset**
   a. The "System Reset" button shall be used to return the system to its normal state. Display messages shall provide operator assurance of the sequential steps ("IN PROGRESS", "RESET COMPLETED") as they occur. The system shall verify all circuits or devices are restored prior to resetting the system to avoid the potential for re-alarming the system. The display message shall indicate "ALARM PRESENT, SYSTEM RESET ABORTED."
   b. Should an alarm condition continue, the system will remain in an alarmed state.

9. **A manual evacuation (drill) switch shall be provided to operate the notification appliances without causing other control circuits to be activated.**

10. **WALKTEST:** The system shall have the capacity of 8 programmable passcode protected one person testing groups, such that only a portion of the system need be disabled during testing. The actuation of the "enable one person test" program at the control unit shall activate the "One Person Testing" mode of the system as follows:
   a. The city circuit connection and suppression release circuits shall be bypassed for the testing group.
   b. Control relay functions associated to one of the 8 testing groups shall be bypassed.
   c. The control unit shall indicate a trouble condition.
   d. The alarm activation of any initiation device in the testing group shall cause the audible notification appliances to sound a voice announcement code to identify the device or zone.
   e. The unit shall automatically reset itself after signalling is complete.
f. Any momentary opening of an initiating or notification appliance circuit wiring shall cause the audible signals to voice announce sound for 4 seconds indicating the trouble condition.

H. Analog Smoke Sensors:
1. Monitoring: FACP shall individually monitor sensors for calibration, sensitivity, and alarm condition, and shall individually adjust for sensitivity. The control unit shall determine the condition of each sensor by comparing the sensor value to the stored values.
2. Environmental Compensation: The FACP shall maintain a moving average of the sensor's smoke chamber value to automatically compensate for dust, dirt, and other conditions that could affect detection operations.
3. Programmable Sensitivity: Photoelectric Smoke Sensors shall have 7 sensitivity levels ranging from 0.2% to 3.7%, programmed and monitored from the FACP.
4. Sensitivity Testing Reports: The FACP shall provide sensor reports that meet NFPA 72 calibrated test method requirements. The reports shall be viewed on a CRT Display or printed for annual recording and logging of the calibration maintenance schedule.
5. The FACP shall automatically indicate when an individual sensor needs cleaning. The system shall provide a means to indicate that a sensor requires cleaning. When a sensor's average value reaches a predetermined value, (3) progressive levels of reporting are provided. The first level shall indicate that a sensor is close to a trouble reporting condition and will be indicated on the FACP as "ALMOST DIRTY." This condition provides a means to alert maintenance staff of a dirty sensor without creating a trouble in the system. If this indicator is ignored, a second level "DIRTY SENSOR" condition shall be indicated at the FACP and subsequently a system trouble is reported. The sensor base LED shall glow steady giving a visible indication at the sensor location. The "DIRTY SENSOR" condition shall not affect the sensitivity level required to alarm the sensor. If a "DIRTY SENSOR" is left unattended, and its average value increases to a third predetermined value, an "EXCESSIVELY DIRTY SENSOR" trouble condition shall be indicated at the control unit.
6. The FACP shall continuously perform an automatic self-test on each sensor which will check sensor electronics and ensure the accuracy of the values being transmitted. Any sensor that fails this test shall indicate a "SELF TEST ABNORMAL" trouble condition.
7. Multi-Sensors shall combine photoelectric smoke sensing and heat sensing technologies. An alarm shall be determined by either smoke detection, with selectable sensitivity from 0.2 to 3.7 %/ft obscuration; or heat detection, selectable as fixed temperature or fixed with selectable rate-of-rise; or based on an analysis of the combination of smoke and heat activity.
8. Programmable bases. It shall be possible to program relay and
sounder bases to operate independently of their associated sensor.

9. Magnet test activation of smoke sensors shall be distinguished by its label and history log entry as being activated by a magnet.

I. Smoke Detectors: A maintenance and testing service providing the following shall be included with the base bid:
1. Biannual sensitivity reading and logging for each smoke sensor.
2. Scheduled biannual threshold adjustments to maintain proper sensitivity for each smoke sensor.
3. Threshold adjustment to any smoke sensor that has alarmed the system without the presence of particles of combustion.
4. Scheduled biannual cleaning or replacement of each smoke detector or sensor within the system.
5. Semi-annual functional testing of each smoke detector or sensor using the manufacturer's calibrated test tool.
6. Written documentation of all testing, cleaning, replacing, threshold adjustment, and sensitivity reading for each smoke detector or sensor device within the system.
7. The initial service included in the bid price shall provide the above listed procedures for a period of five years after owner acceptance of the system.

J. Audible Alarm Notification: By voice evacuation and tone signals on loudspeakers in areas as indicated on drawings.
1. Automatic Voice Evacuation Sequence:
   a. The audio alarm signal shall consist of an alarm tone for a maximum of five seconds followed by an automatic digital voice message. At the end of the voice message, the alarm tone shall resume. This sequence shall sound continuously until the "Alarm Silence" switch is activated.
   b. All audio operations shall be activated by the system software so that any required future changes can be facilitated by authorized personnel without any component rewiring or hardware additions.

K. Speaker: Speaker notification appliances shall be listed to UL 1480.
1. The speaker shall operate on a standard 25VRMS or 70.7VRMS NAC using twisted/shielded wire.
2. The following taps are available: 0.25W, 0.50W, 1.0W and 2.0W. At the 1.0W tap, the speaker has minimum UL rated sound pressure level of 84dBA at 10 feet.
3. The speaker shall have a frequency response of 400 to 4000 Hz for Fire Alarm and 125 to 12kHz for General Signaling.

L. Manual Voice Paging
1. The system shall be configured to allow voice paging. Upon activation of any speaker manual control switch, the alarm tone shall be sounded over all speakers in that group.
2. The control panel operator shall be able to make announcements
via the push-to-talk paging microphone over the pre-selected speakers.

3. Facility for total building paging shall be accomplished by the means of an "All Call" switch.

M. Fire Suppression Monitoring:
1. Water flow: Activation of a water flow switch shall initiate general alarm operations.
2. Sprinkler valve tamper switch: The activation of any valve tamper switch shall activate system supervisory operations.
3. WSO: Water flow switch and sprinkler valve tamper switch shall be capable of existing on the same initiating zone. Activation of either device shall distinctly report which device is in alarm on the initiating zone.

N. Power Requirements
1. The control unit shall receive AC power via a dedicated fused disconnect circuit.
2. The system shall be provided with sufficient battery capacity to operate the entire system upon loss of normal AC power in a normal supervisory mode for a period of 24 hours with 15 minutes of alarm operation at the end of this period. The system shall automatically transfer to battery standby upon power failure. All battery charging and recharging operations shall be automatic.
3. All circuits requiring system-operating power shall be 24 VDC and shall be individually fused at the control unit.
4. The incoming power to the system shall be supervised so that any power failure will be indicated at the control unit. A green "power on" LED shall be displayed continuously while incoming power is present.
5. The system batteries shall be supervised so that a low battery or depleted battery condition or disconnection of the battery shall be indicated at the control unit and displayed for the specific fault type.
6. The system shall support NAC Lockout feature to prevent subsequent activation of Notification Appliance Circuits after a Depleted Battery condition occurs in order to make use of battery reserve for front panel annunciation and control.
7. The system shall support 100% of addressable devices in alarm or operated at the same time, under both primary (AC) and secondary (battery) power conditions.
8. Loss of primary power shall sound a trouble signal at the FACP. FACP shall indicate when the system is operating on an alternate power supply.

1.05 SUBMITTALS

A. General: Submit the following according to Conditions of Contract and Division 1 Specification Sections
1. Product data sheets for system components highlighted to
indicate the specific products, features, or functions required to meet this specification. Alternate or as-equal products submitted under this contract must provide a detailed line-by-line comparison of how the submitted product meets, exceeds, or does not comply with this specification.

2. Wiring diagrams from manufacturer.

3. Shop drawings showing system details including location of FACP, all devices, circuiting and details of graphic annunciator.

4. System Power and battery charts with performance graphs and voltage drop calculations to assure that the system will operate per the prescribed backup time periods and under all voltage conditions per UL and NFPA standards.

5. System operation description including method of operation and supervision of each type of circuit and sequence of operations for all manually and automatically initiated system inputs and outputs. A list of all input and output points in the system shall be provided with a label indicating location or use of IDC, NAC, relay, sensor, and auxiliary control circuits.

6. Operating instructions for FACP.

7. Operation and maintenance data for inclusion in Operating and Maintenance Manual. Include data for each type product, including all features and operating sequences, both automatic and manual. Provide the names, addresses, and telephone numbers of service organizations.

8. Product certification signed by the manufacturer of the fire alarm system components certifying that their products comply with indicated requirements.

9. Record of field tests of system.

B. Submission to Authority Having Jurisdiction: In addition to routine submission of the above material, make an identical submission to the authority having jurisdiction. Include copies of shop drawings as required to depict component locations to facilitate review. Upon receipt of comments from the Authority, make resubmissions if required to make clarifications or revisions to obtain approval.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: A factory authorized installer is to perform the work of this section.

B. Each and all items of the Fire Alarm System shall be listed as a product of a single fire alarm system manufacturer under the appropriate category by Underwriters Laboratories, Inc. (UL), and shall bear the "UL" label.
1.07 MAINTENANCE SERVICE

A. Maintenance Service Contract: Provide maintenance of fire alarm systems and equipment for a period of 12 months, using factory-authorized service representatives.

B. Basic Services: Systematic, routine maintenance visits on a quarterly basis at times scheduled with the Owner. In addition, respond to service calls within 24 hours of notification of system trouble. Adjust and replace defective parts and components with original manufacturer's replacement parts, components, and supplies.

C. Additional Services: Perform services within the above 12-month period not classified as routine maintenance or as warranty work when authorized in writing. Compensation for additional services must be agreed upon in writing prior to performing services.

PART 2 PRODUCTS

2.01 FIRE ALARM CONTROL PANEL (Notifier NFS2-3030/IFC2-3030) shall be the basis of design.

A. General: Comply with UL 864, "Control Units for Fire-Protection Signaling Systems."

B. The following FACP hardware shall be provided:
   1. Power Limited base panel with cabinet and door, 120 VAC input power.
   2. 3,000 point capacity where (1) point equals (1) monitor (input) or (1) control (output).
   3. 3,000 points of Network Annunciation at FACP Display when applied as a Network Node
   4. 3,000 points of annunciation where one (1) point of annunciation equals:
      a. 1 LED driver output on a graphic driver or 1 switch input on a graphic switch input module.
      b. 1 LED on panel or 1 switch on panel.
   5. From all battery charging circuits in the system provide battery voltage and ammeter readouts on the FCP LCD Display.
   6. Municipal City Circuit Connection with Disconnect switch, 24VDC Remote Station (reverse polarity), local energy, shunt master box, or a form "C" contact output.
   7. One Auxiliary electronically resetable fused 2A @24VDC Output, with programmable disconnect operation for 4-wire detector reset.
   8. One Auxiliary Relay, SPDT 2A @32VDC, programmable as a trouble relay, either as normally energized or de-energized, or as an auxiliary control.
   9. Where required provide Intelligent Remote Battery Charger for charging up to 110Ah batteries.
   10. Power Supplies with integral intelligent Notification Appliance Circuit Class B for system expansion.
11. Four (4) form "C" Auxiliary Relay Circuits (Form C contacts rated 2A @ 24VDC, resistive), operation is programmable for trouble, alarm, supervisory of other fire response functions. Relays shall be capable of switching up to ½ A @ 120VAC, inductive.

12. The FACP shall support (6) RS-232-C ports and one service port.

13. Remote Unit Interface: supervised serial communication channel for control and monitoring of remotely located annunciators and I/O panels.

14. Programmable DACT for either Common Event Reporting or per Point Reporting.

15. Service Port Modem for dial in passcode access to all fire control panel information.

C. Cabinet: Lockable steel enclosure. Arrange unit so all operations required for testing or for normal care and maintenance of the system are performed from the front of the enclosure. If more than a single unit is required to form a complete control unit, provide exactly matching modular unit enclosures.

D. Alphanumeric Display and System Controls: Panel shall include an 840 character LCD display to indicate alarm, supervisory, and component status messages and shall include a keypad for use in entering and executing control commands.

E. Voice Alarm: Provide an emergency communication system, integral with the FACP, including voice alarm system components, microphones, amplifiers, and tone generators. Features include:

1. Amplifiers comply with UL 1711, "Amplifiers for Fire Protective Signaling Systems." Amplifiers shall provide an onboard local mode temporal coded horn tone as a default backup tone. Test switches on the amplifier shall be provided to test and observe amplifier backup switchover. Each amplifier shall communicate to the host panel amplifier and NAC circuit voltage and current levels for display on the user interface.

2. All announcements are made over dedicated, supervised communication lines. All risers shall support Class B wiring for each audio channel.

3. Emergency voice communication audio controller module shall provide up to 32 minutes of message memory for digitally stored messages. Provide supervised connections for master microphone.

F. Fiber Optic Modem: Network communications shall be via Fiber Optic Modems. The fiber modems shall allow Full Duplex/Bi-Directional Network and Audio Communications over a single Fiber Optic Cable. Modems shall use Type ST fiber connections. Modems shall use Multi-Mode 62.5 micron fiber cable. Fiber transmission shall be via split frequency utilizing 1310nm and 1550nm. 4100-6074 Left Port Fiber Modem Assembly, and 4100-6075 Right Port Fiber Modem Assembly.
2.02 REMOTE CRTS, PC ANNUNCIATOR AND PRINTERS

A. Fire Alarm Control Unit shall be capable of operating remote CRT's and/or printers; output shall be ASCII from an RS-232-C connection with an adjustable baud rate.

B. Fire Alarm Control Unit shall be capable of operating a PC Annunciator which provides status annunciation and limited system control using a convenient and familiar Microsoft operating system based interface. PC Annunciator shall provide the following functions:
   1. Login/logout password protection with time duration selectable automatic logout
   2. Displays Alarm, Supervisory, Priority 2, and Trouble conditions with numerical tallies for each
   3. Displays first and last alarms
   4. Different event types have separate visible indicators with a common audible indicator
   5. Event logs can be searched and printed
   6. View and/or print Alarm status reports and service reports (printing requires an available local or network printer)
   7. Alarm Silence; System Reset; and Priority 2 Reset
   8. Global and individual point acknowledge
   9. Set system time and date; and clear event log
   10. Individual point access for control or parameter revisions

C. Each RS-232-C port shall be capable of supporting and supervising a remote Printer; the FACP shall support as many as two (2) remote displays. The Fire Alarm Control Panel shall support five (5) RS-232-C ports.

2.03 REMOTE LCD ANNUNCIATORS

A. Provide 160 Character Remote LCD Annunciators with the same "look and feel" as the FACP operator interface. The Remote LCD Annunciator shall use the same Primary Acknowledge, Silence, and Reset Keys, Status LEDs and LCD Display as the FACP.

B. Annunciator shall have super-twist LCD display with four lines of 40 characters each. Annunciator shall be provided with four (4) programmable control switches and associated LEDs.

C. Under normal conditions the LCD shall display a "SYSTEM IS NORMAL" message and the current time and date.

D. Should an abnormal condition be detected the appropriate LED (Alarm, Supervisory or Trouble) shall flash. The unit audible signal shall pulse for alarm conditions and sound steady for trouble and supervisory conditions.

E. The LCD shall display the following information relative to the abnormal condition of a point in the system.
1. 80-character custom location label.
2. Type of device (e.g., smoke, pull station, workflow).
3. Point status (e.g., alarm, trouble).

F. Operator keys shall be key switch enabled to prevent unauthorized use. The key shall only be removable in the disabled position. Acknowledge, Silence and Reset operation shall be the same as the FACP.

G. General: Components include battery, charger, and an automatic transfer switch.

H. Battery: Sealed lead-acid. Provide sufficient capacity to operate the complete alarm system in normal or supervisory (non-alarm) mode for a period of 24 hours. Following this period of operation on battery power, the battery shall have sufficient capacity to operate all components of the system, including all alarm indicating devices in alarm or supervisory mode for a period of 15 minutes. Provide 25% Spare Capacity in battery calcs.

2.04 ADDRESSABLE MANUAL PULL STATIONS

A. Description: Addressable double-action type (push-in then pull down), red LEXAN, with molded, raised-letter operating instructions of contrasting color. Station will mechanically latch upon operation and remain so until manually reset by opening with a key common with the control units.

B. Protective Shield: Where required provide a tamperproof, clear LEXAN shield and red frame that easily fits over manual pull stations. When shield is lifted to gain access to the station, a battery powered piercing warning horn shall be activated. The horn shall be silenced by lowering and realigning the shield. The horn shall provide 85dB at 10 feet and shall be powered by a 9 VDC battery.

2.05 SMOKE SENSORS

A. General: Comply with UL 268, "Smoke Detectors for Fire Protective Signaling Systems." Include the following features:
1. Factory Nameplate: Serial number and type identification.
2. Operating Voltage: 24 VDC, nominal.
3. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore normal operation.
4. Each sensor base shall contain an LED that will flash each time it is scanned by the Control Unit (once every 4 seconds). In alarm condition, the sensor base LED shall be on steady.
5. Each sensor base shall contain a magnetically actuated test switch to provide for easy alarm testing at the sensor location.
6. Each sensor shall be scanned by the Control Unit for its type identification to prevent inadvertent substitution of another sensor type. Upon detection of a "wrong device", the control unit shall operate with the installed device at the default alarm settings for
that sensor; 2.5% obscuration for photoelectric sensor, 135-deg F and 15-deg F rate-of-rise for the heat sensor, but shall indicate a "Wrong Device" trouble condition.

7. The sensor's electronics shall be immune from false alarms caused by EMI and RFI.

8. Sensors include a communication transmitter and receiver in the mounting base having a unique identification and capability for status reporting to the FACP. Sensor address shall be located in base to eliminate false addressing when replacing sensors.

9. Removal of the sensor head for cleaning shall not require the setting of addresses.

B. Type: Smoke sensors shall be of the photoelectric or combination photoelectric / heat type.

C. Bases: Relay output, sounder and isolator bases shall be supported alternatives to the standard base.

D. Duct Smoke Sensor: Photoelectric type, with sampling tube of design and dimensions as recommended by the manufacturer for the specific duct size and installation conditions where applied. Sensor includes relay as required for fan shutdown.

1. Environmental compensation, programmable sensitivity settings, status testing, and monitoring of sensor dirt accumulation for the duct sensor shall be provided by the FACP.

2. The Duct Housing shall provide a supervised relay driver circuit for driving up to 15 relays with a single "Form C" contact rated at 7A@ 28VDC or 10A@ 120VAC. This auxiliary relay output shall be fully programmable. Relay shall be mounted within 3 feet of HVAC control circuit.

3. Duct Housing shall provide a relay control trouble indicator Yellow LED.

4. Compact Duct Housing shall have a transparent cover to monitor for the presence of smoke. Cover shall secure to housing by means of four (4) captive fastening screws.

5. Duct Housing shall provide two (2) Test Ports for measuring airflow and for testing. These ports will allow aerosol injection in order to test the activation of the duct smoke sensor.

6. Duct Housing shall provide a magnetic test area and Red sensor status LED.

7. For maintenance purposes, it shall be possible to clean the duct housing sampling tubes by accessing them through the duct housing front cover.

8. Each duct sensor shall have a Remote Test Station with an alarm LED and test switch.

9. Where indicated a NEMA 4X weatherproof duct housing enclosure shall provide for the circulation of conditioned air around the internally mounted addressable duct sensor housing to maintain the sensor housing at its rated temperature range. The housing shall be UL Listed to Standard 268A.
2.06 HEAT SENSORS

A. Thermal Sensor: Combination fixed-temperature and rate-of-rise unit with plug-in base and alarm indication lamp; 135-deg F fixed-temperature setting except as indicated.

B. Thermal sensor shall be of the epoxy encapsulated electronic design. It shall be thermistor-based, rate-compensated, self-restoring and shall not be affected by thermal lag.

C. Sensor fixed temperature sensing shall be independent of rate-of-rise sensing and/or programmable to operate at 135-deg F or 155-deg F. Sensor rate-of-rise temperature detection shall be selectable at the FACP for either 15-deg F or 20-deg F per minute.

D. Sensor shall have the capability to be programmed as a utility monitoring device to monitor for temperature extremes in the range from 32-deg F to 155-deg F.

2.07 ADDRESSABLE CIRCUIT INTERFACE MODULES

A. Addressable Circuit Interface Modules: Arrange to monitor one or more system components that are not otherwise equipped for addressable communication. Modules shall be used for monitoring of waterflow, valve tamper, non-addressable devices, and for control of evacuation indicating appliances and AHU systems.

B. All Circuit Interface Modules shall be supervised and uniquely identified by the control unit. Module identification shall be transmitted to the control unit for processing according to the program instructions. Modules shall have an on-board LED to provide an indication that the module is powered and communicating with the FACP. The LEDs shall provide a troubleshooting aid since the LED blinks on poll whenever the peripheral is powered and communicating.

2.08 MAGNETIC DOOR HOLDERS

A. Description: Units shall be listed to UL 228. Units are equipped for wall or floor mounting as indicated and are complete with matching door plate. Unit shall operate from a 120VAC, a 24VAC or a 24VDC source, and develops a minimum of 25 lbs. holding force.

B. Material and Finish: Match door hardware.

2.09 STANDARD ALARM NOTIFICATION APPLIANCES

A. VISIBLE ONLY: Strobe shall be listed to UL 1971. The V/O shall consist of a xenon flash tube and associated lens/reflect system. The V/O enclosure shall mount directly to standard single gang, double gang or 4" square electrical box, without the use of special adapters or trim rings.
VO appliances shall be provided with selectable flash intensities of 15cd, 75cd and 110cd. Provide a label inside the strobe lens to indicate the listed candela rating of the specific Visible/Only appliance.

B. SPEAKER/VISIBLE: Combination Speaker/Visible (S/V) units combine the speaker and visible functions into a common housing. The S/V shall be listed to UL 1971 and UL 1460.
1. Twisted/shielded wire is required for speaker connections on a standard 25VRMS or 70.7VRMS NAC using and UTP conductors, having a minimum of 3 twists per foot is required for addressable strobe connections.
2. The following taps are available: 0.25W, 0.50W, 1.0W and 2.0W. At the 1.0W tap, the speaker has minimum UL rated sound pressure level of 84dBA at 10 feet.
3. The S/V shall have a frequency response of 400 to 4000 Hz for Fire Alarm and 125 to 12kHz for General Signaling.
4. The S/V installs directly to a 4" square, 1 1/2 in. deep electrical box with 1 1/2" extension

C. Accessories: The contractor shall furnish the necessary accessories.

PART 3  EXECUTION

3.01 INSTALLATION, GENERAL

A. Install system components and all associated devices in accordance with applicable NFPA Standards and manufacturer's recommendations.

B. Installation personnel shall be supervised by persons who are qualified and experienced in the installation, inspection, and testing of fire alarm systems. Examples of qualified personnel shall include, but not be limited to, the following:
1. Factory trained and certified personnel.
2. National Institute of Certification in Engineering Technologies (NICET) fire alarm level II certified personnel.
3. Personnel licensed or certified by state or local authority.

3.02 EQUIPMENT INSTALLATION

A. Furnish and install a complete Fire Alarm System as described herein and as shown on the plans. Include sufficient control unit(s), annunciator(s), manual stations, automatic fire detectors, smoke detectors, audible and visible notification appliances, wiring, terminations, electrical boxes, and all other necessary material for a complete operating system.

B. All fire alarm panels shall be monitored and networked via the existing campus fiber optic network.

C. Equipment Removal: After acceptance of the new fire alarm system, disconnect and remove the existing fire alarm equipment and restore damaged surfaces. Package operational fire alarm and detection
equipment that has been removed and deliver to the Owner. Remove from the site and legally dispose of the remainder of the existing material. Remove all associated conduit and wiring. Provide blank cover plate over all abandoned outlets recessed in walls.

D. Water-Flow and Valve Supervisory Switches: Connect for each sprinkler valve required to be supervised.

3.03 WIRING INSTALLATION

A. System Wiring: Wire and cable shall be a type listed for its intended use by an approval agency acceptable to the Authority Having Jurisdiction (AHJ) and shall be installed in accordance with the appropriate articles from the current approved edition of NFPA 70: National Electric Code (NEC).

B. Contractor shall obtain from the Fire Alarm System Manufacturer written instruction regarding the appropriate wire/cable to be used for this installation. No deviation from the written instruction shall be made by the Contractor without the prior written approval of the Fire Alarm System Manufacturer.

C. Color Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color code for alarm initiating device circuits wiring and a different color code for supervisory circuits. Color-code notification appliance circuits differently from alarm-initiating circuits. Paint fire alarm system junction boxes and covers red.

3.04 FIELD QUALITY CONTROL

A. Manufacturer's Field Services: Provide services of a factory-authorized service representative to supervise the field assembly and connection of components and the pretesting, testing, and adjustment of the system.

B. Service personnel shall be qualified and experienced in the inspection, testing, and maintenance of fire alarm systems. Examples of qualified personnel shall be permitted to include, but shall not be limited to, individuals with the following qualifications:
   1. Factory trained and certified.
   2. National Institute for Certification in Engineering Technologies (NICET) fire alarm certified.
   3. International Municipal Signal Association (IMSA) fire alarm certified.
   4. Certified by a state or local authority.
   5. Trained and qualified personnel employed by an organization listed by a national testing laboratory for the servicing of fire alarm systems.

C. Pretesting: Determine, through pretesting, the conformance of the system to the requirements of the Drawings and Specifications. Correct
deficiencies observed in pretesting. Replace malfunctioning or damaged items with new and retest until satisfactory performance and conditions are achieved.

D. Final Test Notice: Provide a 10-day minimum notice in writing when the system is ready for final acceptance testing.

E. Minimum System Tests: Test the system according to the procedures outlined in NFPA 72.

F. Retesting: Correct deficiencies indicated by tests and completely retest work affected by such deficiencies. Verify by the system test that the total system meets the Specifications and complies with applicable standards.

G. Report of Tests and Inspections: Provide a written record of inspections, tests, and detailed test results in the form of a test log.

H. Final Test, Certificate of Completion, and Certificate of Occupancy:
   1. Test the system as required by the Authority Having Jurisdiction in order to obtain a certificate of occupancy.

3.05 CLEANING AND ADJUSTING

A. Cleaning: Remove paint splatters and other spots, dirt, and debris. Clean unit internally using methods and materials recommended by manufacturer.

B. Occupancy Adjustments: When requested within one year of date of Substantial Completion, provide on-site assistance in adjusting sound levels and adjusting controls and sensitivities to suit actual occupied conditions. Provide up to three visits to the site for this purpose.

3.06 TRAINING

A. Provide the services of a factory-authorized service representative to demonstrate the system and train Owner's maintenance personnel as specified below.
   1. Train Owner's maintenance personnel in the procedures and schedules involved in operating, troubleshooting, servicing, and preventive maintaining of the system. Provide a minimum of 8 hours' training.

   2. Schedule training with the Owner at least seven days in advance.

END OF SECTION
SECTION 26 12 19

PAD MOUNTED LIQUID FILLED MEDIUM VOLTAGE TRANSFORMERS

PART 1 – GENERAL

1.1. DESCRIPTION

A. This specification covers the electrical and mechanical characteristics of 45-10,000 kVA Three-Phase Step-Down Pad-Mounted Distribution Transformers.

1.2. Applicable Standards

A. All characteristics, definitions, and terminology, except as specifically covered in this specification, shall be in accordance with the latest revision of the following ANSI®, IEEE®, NEMA®, and Department of Energy standards.


PART 2 – PRODUCTS

2.1. TRANSFORMER CONSTRUCTION

A. The transformer shall be designed in accordance with this specification and the kVA rating shall be 1000 to 1500kVA as shown on drawings. Acceptable manufacturers include Eaton/Cooper, Howard Industries,
Square-D/Schneider, General Electric, and Siemens.

B. The primary voltage, configuration, and the basic lightning impulse insulation level (BIL) shall be 12470GrdY/7200 at 95kV BIL.

C. The secondary voltage, configuration, and the basic insulation level (BIL) of the secondary voltage shall be 480Y/277 at 30kV BIL.

1. For complete connector rating, see IEEE Std 386™-2006 standard.

2. Transformers are suitable for connectors with phase-to-ground or phase-to-ground/phase-to-phase high-voltage ratings as listed.

3. Arrester coordination may require higher BIL on multiple connections than indicated to achieve a minimum protection level of 20%.

D. The transformer may be furnished with full capacity high-voltage taps. The tap changer shall be clearly labeled to reflect that the transformer must be de-energized before operating the tap changer as required in Section 4.3 of IEEE Std C57.12.34™-2009 standard. The tap changer shall be operable on the higher voltage only for transformers with dual voltage primaries. The unit shall have one of the following tap configurations:

1. Four - 2 ½% taps below rated voltage (four below)

E. The average winding temperature rise above ambient temperature, when tested at the base transformer rating, shall not exceed 55 °C, and when tested at 112% of the base rating, shall not exceed 65 °C.

F. The percent impedance voltage, as measured on the rated voltage connection, shall be per Table 2. For target impedances, the tolerance on the impedance shall be +/- 7.5% of nominal value for impedance values greater than 2.5%. The tolerance on the impedance shall be +/- 10.0% for impedance values less than or equal to 2.5%.

<table>
<thead>
<tr>
<th>KVA Rating (Low voltage &lt; 700 V)</th>
<th>Impedance</th>
</tr>
</thead>
<tbody>
<tr>
<td>75</td>
<td>1.10 - 5.75</td>
</tr>
<tr>
<td>112.5-300</td>
<td>1.40 - 5.75</td>
</tr>
<tr>
<td>500</td>
<td>1.70 - 5.75</td>
</tr>
<tr>
<td>750-3750</td>
<td>nominal</td>
</tr>
</tbody>
</table>

G. The core and coil shall be vacuum processed to ensure maximum penetration of insulating fluid into the coil insulation system. While under vacuum, the windings will be energized to heat the coils and drive out moisture, and the transformer will be filled with preheated filtered degassed insulating fluid. The core shall be manufactured from burr-free, grain-oriented silicon steel and shall be precisely stacked to eliminate gaps in the corner joints. The coil shall be insulated with B-stage, epoxy
coated, diamond pattern, insulating paper, which shall be thermally cured under pressure to ensure proper bonding of conductor and paper. Coils shall be either aluminum or copper (eliminate a metal if one is required over the other).

H. The dielectric coolant shall be listed less-flammable fluid meeting the requirements of National Electrical Code Section 450-23 and the requirements of the National Electrical Safety Code (IEEE Std C2™-2002 standard), Section 15. The dielectric coolant shall be non-toxic*, non-bioaccumulating and be readily and completely biodegradable per EPA OPPTS 835.3100. The base fluid shall be 100% derived from edible seed oils and food grade performance enhancing additives. The fluid shall not require genetically altered seeds for its base oil. The fluid shall result in zero mortality when tested on trout fry *. The fluid shall be certified to comply with the US EPA Environmental Technology Verification (ETV) requirements, and tested for compatibility with transformer components. The fluid shall be Factory Mutual Approved®, UL® Classified Dielectric Medium (UL-ECUV) and UL® Classified Transformer Fluid (UL-EOVK), Envirotemp™ FR3™ fluid.

I. The high-voltage and low-voltage compartments, separated by a metal barrier, shall be located side-by-side on one side of the transformer tank. When viewed from the front, the low-voltage compartment shall be on the right. Each compartment shall have a door that is constructed so as to provide access to the high-voltage compartment only after the door to the low-voltage compartment has been opened. There shall be one or more additional fastening devices that must be removed before the high-voltage door can be opened. Where the low-voltage compartment door is of a flat panel design, the compartment door shall have three-point latching with a handle provided for a locking device. Hinge pins and associated barrels shall be constructed of corrosion-resistant material, passivated ANSI® Type 304 or the equivalent.

1. A recessed, captive, penta-head or hex-head bolt that meets the dimensions per IEEE Std C57.12.28™-2014 standard shall secure all access doors.

2. The compartment depth shall be in accordance with IEEE Std C57.12.34™-2009 standard, unless additional depth is specified.

3. The tank base must be designed to allow skidding or rolling in any direction. Lifting provisions shall consist of four lifting lugs welded to the tank.

4. The tank shall be constructed to withstand 7 psi without permanent deformation, and 15 psi without rupture. The tank shall include a 15 psig pressure relief valve with a flow rate of minimum 35 SCFM.

5. The exterior of the unit shall be painted Munsell 7GY3.29/1.5 green (STD), ANSI® 70 gray, or ANSI® 61 gray in color. If a special paint color is specified, a federal spec number or paint chip must be provided at the time of order. The cabinet interior and front plate shall be painted gray for ease of viewing the inside compartment.
6. The tank shall be complete with an anodized aluminum laser engraved nameplate. This nameplate shall meet Nameplate B per IEEE Std C57.12.00™-2010 standard. High Voltage Bushings and Terminals

7. High voltage bushings will be installed in the high voltage termination compartment located on the front left of the transformer and requiring access via the low voltage termination compartment on the front right.

J. The high voltage bushings shall be 15/25 kV 200A bushing wells with bushing well inserts installed. The bushings shall be externally removable and be supplied with a removable stud (Re: Catalog Data CA8000116EN, 500-12, and 500-26).

K. The transformer shall be provided with six (6) high voltage bushings in accordance Figure 2 dimensions (Figure 5a dimensions may be specified when a larger termination compartment for greater working space is desired) of IEEE Std C57.12.34™-2009 standard for loop feed configurations. The bushing heights shall be in accordance with Figure 3 minimum dimensions (Figure 6 dimensions may be specified for greater bushing height) of IEEE Std C57.12.34™-2009 standard.

L. The transformer shall be provided with tin-plated spade-type bushings for vertical takeoff. The spacing of the connection holes shall be 1.75" on center, per IEEE Std C57.12.34™-2009 standard Figure 13a. The quantity of connection holes per bushing shall be 12 holes. Bushing supports shall be provided for transformers requiring 10 or more connection holes. Bushing supports shall be affixed to the cabinet sidewalls; tank-mounted supports mountings are not acceptable.

M. The transformer shall be provided with bushings in a staggered arrangement in accordance with Figure 11a dimensions (Figure 12a dimensions may be specified when a larger termination compartment for greater working space is desired) of IEEE Std C57.12.34™-2009 standard.

N. The primary switching scheme provided with the transformer shall be one on-off-ground under-oil load-break switch.

O. The high-voltage overcurrent protection scheme provided with the transformer shall be an externally removable loadbreak expulsion Bay-O-Net fuse assembly with a flapper valve to minimize oil spillage. The bayonet fuses shall be in series with ELSP under-oil partial-range current-limiting back-up fuses with an interrupting rating of 50,000 A.

P. Externally mounted, Distribution Class M.O.V.E. Dead-front elbow arresters shall be supplied. (Re: Catalog Data 235-65.) M.O.V.E. arresters are for installation on 200 A rated dead-front bushing interfaces only.

Q. The high voltage switch shall be located on the exterior tank wall on the high voltage side of the transformer and shall include a viewing window that provides visible confirmation of the switch blade position. The switch shall be of a 3-position, on/off/ground configuration and shall be operable without exposure to any live circuits. Hinged covers with padlock provisions shall be provided over the window and over the switch handle. Properly sized current-limiting fuses shall be included in the transformer.
R. For additional safety and ease of maintenance, the following instrumentation devices shall be located on the front of the external load break switch compartment: liquid level gauge, dial-type thermometer, pressure/vacuum gauge, pressure relief valve and ½” fluid sampling valve. These devices shall be protected by a hinged cover with padlock provisions.

S. The tank coating shall meet all requirements in IEEE Std C57.12.28™-2014 standard including:
1. Salt Spray
2. Crosshatch adhesion
3. Humidity
4. Impact
5. Oil resistance
6. Ultraviolet accelerated weathering
7. Abrasion resistance – taber abraser

T. The enclosure integrity of the tank and cabinet shall meet the requirements for tamper resistance set forth in IEEE Std C57.12.28™-2014 standard including but not limited to the pry test, pull test, and wire probe test.

U. All units shall be tested for the following:
1. No-Load (65 °C or 20 °C) losses at rated current
2. Total (65 °C) losses at rated current
3. Percent Impedance (85 °C) at rated current
4. Excitation current (100% voltage) test
5. Winding resistance measurement tests
6. Ratio tests using all tap settings
7. Polarity and phase relation tests
8. Induced potential tests
9. Full wave and reduced wave impulse test

V. Transformers shall conform to efficiency levels for liquid immersed distribution transformers, as specified in the Department of Energy ruling “10 CFR Part 431 Energy Conservation Program: Energy Conservation Standards for Distribution Transformers; Final Rule; April 18, 2013.” Manufacturer shall comply with the intent of all regulations set forth in noted ruling.

W. In addition, the manufacturer shall provide certification upon request for all design and other tests listed in IEEE Std C57.12.00™-2010 standard, including verification that the design has passed short circuit criteria per IEEE Std C57.12.00™-2010 standard and IEEE Std C57.12.90™-2010 standard.

X. In the event of proposal bid evaluated with guaranteed losses due to a loss evaluation (see section 10.0), manufacturer shall conform to guaranteed average losses as specified in IEEE Std C57.12.00™-2010 standard. The no-load losses of a transformer shall not exceed the specified no-load losses by more than 10%, and the total losses of a transformer shall not exceed the specified total losses by more than 6%.

**PART 3 – EXECUTION**
3.1 OPTIONS

A. The following accessories and options shall be provided:
   1. 1.0" drain valve w/ sampling device in LV compartment
   2. Automatic pressure relief valve
   3. Metal drip shield
   5. Meet NEMA® TR-1 sound levels
   6. Liquid level gauge
   7. Dial-type thermometer gauge
   8. 24" deep cabinet
   9. Spare bayonet fuse links
  10. Ground connectors
  11. Danger high voltage warning signs
  12. Non-PCB decal
  13. Combination UL® Listed & Classified transformer (to comply with NEC® 450-23 listing restrictions for installations on, near, or inside of buildings) per UL XPLH

3.2 SUBMITTALS

A. The following data shall be submitted for review by the engineer:
   1. Core losses (when requested per Sections 7.4 and 10.0).
   2. Winding losses (when requested per Sections 7.4 and 10.0).
   3. Percent Impedance
   4. Approval drawing – drawings shall show final dimensions and features.

3.3 INSTALLATION

A. The manufacturer of the transformer shall have regional service centers located within two (2) hours flight time of all contiguous 48 states. Service personnel shall be factory trained in commissioning and routine service of quoted transformers.

B. Transformer shall be installed per manufacturers recommended instructions on a 12" deep x 96" square concrete pad with #5 re-bar installed 12" o.c., both ways in two layers. Provide windows in in concrete pad to match primary and secondary wells of the transformer.

END OF SECTION
<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>BV</td>
<td>BALL VALVE</td>
</tr>
<tr>
<td>ZURN</td>
<td>GENERAL SERVICE DRAIN W/ SQUARE STRAINER &amp; DEEP SEA L STRAP</td>
</tr>
<tr>
<td>ELKAY</td>
<td>&quot;CORIAN&quot; SOLID SURFACE BATHROOM SINK</td>
</tr>
<tr>
<td>DUPONT</td>
<td>&quot;AQUASENSE&quot; BATTER POWERED FAUCET, CHROME, .5 GPM F LOW</td>
</tr>
<tr>
<td>TRUEBRO</td>
<td>1 1/2&quot; CAST BRASS P-TRAP W/ C.O. PLUG</td>
</tr>
<tr>
<td>ZURN</td>
<td>&quot;AQUASENSE&quot; BATTER POWERED FAUCET, CHROME, .5 GPM F LOW</td>
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</tr>
</tbody>
</table>

*Note: Contractor shall be responsible for verification of activation mechanisms location per ADA requirements.*
This drawing is the property of Beeson, Lusk & Street, Architects, Inc., and the copying, use or reproduction of it, or any part of it, without the written consent of the owner, is prohibited.

1. Grease Trap tank, septic tank, and pump station wetwell shall be watertight.
2. All cast iron frame and covers to be at finished grade. Use spacers as required.
3. All 4" pipe must be Schedule 40.
4. Provide 1.00% minimum slope for all sanitary sewer lines into and out of grease trap.
5. Mastic gaskets shall be used between all manhole and tank sections.
6. Cast iron frame and cover for tank access over outlet shall be Neenah #R-1737 or equivalent.
7. Grease trap shall be H-20 traffic rated.
8. Pumps shall be in accordance with the manufacturer's recommendations for the specific application.

**Details:**
- 3,000 gal. grease trap detail
- 4" minimum #57 crushed stone
- 4" PVC tee
- 4" sanitary tee from stack
- 4" CVP tee from stack
- 4" CVP tee from stack
- 4" pipe trench detail
- Floor drain detail
- Floor wall cleanout
- Standard elevator oil-minder system diagram
- Typical exterior hydrant
- Typical vent thru roof detail
- Drain detail - combination main roof and overflow drains

**Other Notes:**
- Power In
- Slope floor 1/8" per foot
- 120V 120V 1/8" bend if C.O.
- Water flow 1/2" tube
- 90°
- Insulation
- Standard elevator oil-minder system diagram
- 4" PVC tee
- 4" sanitary tee from stack
- 4" CVP tee from stack
- 4" pipe trench detail
- Floor drain detail
- Floor wall cleanout
- Standard elevator oil-minder system diagram
- Typical vent thru roof detail
- Drain detail - combination main roof and overflow drains

**Project:**
- JOHNSON CITY, TENNESSEE
- D.P. CULP EXPANSION & RENOVATION: RELEASE PACKAGE 2: MAIN BUILDING
- EAST TENNESSEE STATE UNIVERSITY
- SBC Project no. 166/005-01-2014CM

**Contact Information:**
- Beeson, Lusk & Street, Inc.
- 37605-1909 P.O. Box
- Johnson City, TN.
- Phone: 432-928-1175

**Website:**
- www.moodynolan.com
P112

LOWER LEVEL PLUMBING PLAN - AREA 'B'

1/8" = 1'-0"

3/32" = 1'-0"

KEY PLAN - LOWER LEVEL B

EXIST. 6"SS LINE IS TO REMAIN
CONNECT NEW 6"SS TO EXIST.

EXIST. 3/4"CW TO REMAIN
CONNECT NEW 3/4"CW TO EXIST.

DOMESTIC WATER LINES ARE TO REMAIN

CONNECTOR

GCO

WATER MAINS SHALL BE ROUTED TO THIS CHASE IN BASEMENT UP TO CEILING OF LEVEL 1 - THEN ROUTED BACK TO ORIGINAL CHASE AND CONNECTED TO ORIGINAL MAINS TO FLOORS ABOVE

REFERENCE TO ENLARGED KITCHEN PLANS ON SHEET P211

REFERENCE TO ENLARGED STARBUCKS PLANS ON SHEET P213

STAIR 3
100C

STAIR 4
100D

STAIR 5
100E

DOMESTIC WATER LINES ARE TO REMAIN

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### Table: Equipment Specifications

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Capacity (BTUH)</th>
<th>Manufacturer</th>
<th>Model</th>
<th>Price</th>
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</thead>
<tbody>
<tr>
<td>LOUVERS &amp; DAMPERS MODEL CD-400</td>
<td>3.0</td>
<td>LOUVERS &amp; DAMPERS</td>
<td>CD-400</td>
<td>27,000</td>
</tr>
<tr>
<td>LOUVERS &amp; DAMPERS MODEL CD-600</td>
<td>771</td>
<td>LOUVERS &amp; DAMPERS</td>
<td>CD-600</td>
<td>125,000</td>
</tr>
</tbody>
</table>

### Note
- LRV: LOUVERS & DAMPERS MODEL CD-400;
- KRUEGER MODEL 0BD-DM

### Note
- CONTRACTOR IS RESPONSIBLE FOR THE COMPLETE H.V.A.C. SYSTEM AS IT RELATES TO DRAWINGS

### Note
- 480/3 72,000 219,000 296,000

### Note
- 771 125,000 (12.59)

### Note
- ALUMINUM PRICE

### Note
- CENTER CONE

### Note
- STRUCTURAL WARNING

### Note
- 8. COORDINATE CEILING DIFFUSERS AND FLOOR REGISTER LOCATIONS WITH ARCHITECT'S REFLECTED CEILING PLAN.

### Note
- ARC - (.75) 10,600 16,000

### Note
- 4-2

### Note
- 45°

### Note
- 3.53 1,400 28,800

### Note
- 2. CONTRACTOR SHALL FIELD VERIFY ALL DUCT ROUTING DIMENSIONS AND TERMINAL DEVICES TO

### Note
- 4. CONTRACTOR SHALL FIELD VERIFY ALL DUCT ROUTING DIMENSIONS AND TERMINAL DEVICES TO

### Note
- 6. BRAND NAMES AND MODEL NUMBERS ARE PROVIDED TO ESTABLISH A LEVEL OF QUALITY AND

### Note
- 7. PROVIDE ACCESS DOOR (12"x12" MIN) AS REQUIRED FOR DAMPER AND CONTROL ACCESS IN WALLS

### Note
- 8. COORDINATE CEILING DIFFUSERS AND FLOOR REGISTER LOCATIONS WITH ARCHITECT'S REFLECTED CEILING PLAN.

### Note
- FAROS - 3.04 2,270 21,600

### Note
- 3-1 4,270 21,600

### Note
- 1.5 3-3 1,470 21,600

### Note
- 1.5 3-1 21,600

### Note
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### Rooftop Air Handler Unit with Chilled Water Cooling/Hot Water Pre-Heating Coils

#### External Chilled Water

- Supply
- Static Pressure
- Water Pressure

#### Hot Water

- Supply
- Pressure
- Water Pressure

#### Related Symbols

- [FLOW RATE] (CFM.)
- [MOTOR] TYPE
- [COMPRESSOR] H.P.
- [VOLTAGE] VFD
- [PRESSURE] AIR (P.D.)
- [TEMPERATURE] L.A.T.
- [E.A.T.
- [DIA. (INCHES)] (GPM)
- [WEIGHT] (AT THE COIL)

### Accessory and Features

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### Pump Schedule

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Type</th>
<th>Capacity (GPM)</th>
<th>Pressure (PSI)</th>
<th>Temperature (°F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Motor</td>
<td>80</td>
<td>150</td>
<td>50</td>
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</table>

### Air Cooled Chiller Schedule

<table>
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<th>Capacity (GPM)</th>
<th>Pressure (PSI)</th>
<th>Temperature (°F)</th>
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<tbody>
<tr>
<td>100</td>
<td>Motor</td>
<td>80</td>
<td>150</td>
<td>50</td>
</tr>
</tbody>
</table>

### VAV Box with Hot Water Reheat Coil Schedule

- Accessory and Features
- Contractor shall propose transformer for control of pumps, see electrical drawings.
THE TERTIARY HOT WATER PUMP SPEED SHALL BE CONTROLLED TO MAINTAIN THE SPECIFIED BUILDING LOOP DP.

THERE ARE TWO VSD-DRIVEN, TERTIARY HW PUMPS PIPED TO A COMMON HEADER, SO THAT ANY TCHWP deposits the TERTIARY HOT WATER PUMPS AND ADJUST THE OPERATING ORDER. IF A DEVICE FAILURE IS DETECTED OR BECOMES UNAVAILABLE FOR MAINTENANCE, IT WILL BE SHUT DOWN IN AN ORDERLY MANNER AND THE STANDBY PUMP SHALL BE STARTED.

When the OUTSIDE AIR TEMPERATURE IS LESS THAN 45°F (ADJ.), THE VAV SCHEDULE) IN SEQUENCE WITH THE N.O. TWO WAY MODULATING HW CONTROL VALVE TO MAINTAIN SETPOINT °F (ADJ.).

ALL SETPOINTS SHALL BE UNOCCUPIED MODE TEMPERATURE SETPOINTS. IN THE UNOCCUPIED MODE, THE RETURN FAN SHALL TRACK THE SUPPLY FAN TO MAINTAIN EQUAL AIRFLOW.


THE TERTIARY HOT WATER PUMP SPEED SHALL BE CONTROLLED TO MAINTAIN THE SPECIFIED BUILDING LOOP DP. THE TERTIARY CHILLED WATER PUMP SPEED SHALL BE CONTROLLED TO MAINTAIN THE SPECIFIED BUILDING LOOP DP.
UPPER LEVEL HVAC PLAN - AREA 'B'

- 25"x20"
- 40"x20"
- 19"x18"
- 32"x20"
- 18"x12"
- 34"x20"

- 205 CFM
- 125 CFM
- 200 CFM
- 200 CFM
- 200 CFM

- 6"Ø up to 125 CFM
- 6"Ø up to 125 CFM
- 6"Ø up to 125 CFM
- 6"Ø up to 125 CFM

- Roof cap with 200 CFM
- Room cap with 150 CFM
- Office cap with 200 CFM
- Office cap with 200 CFM

- No work in this area

- Drawn by
- Checked by

- #R E V I S I O N S D A T E JANUARY, 2018

- www.moodynolan.com
- Phone: (615) 386-9690
- Fax: (615) 386-0528

- JOHNSON CITY, TENNESSEE
- JOHNSON CITY, TN.

- Besson Lusk & Street, Inc

- D.P. Culp Expansion & Renovation: Package

- BLS

- M132

- SBC Project no. 166/005-01-2014CM

- KEY PLAN

- EXISTING SMOKE PARTITION
- NEW 1-HR FIRE BARRIER
- EXISTING 2-HR FIRE BARRIER
- NOT USED

- 12"ø
- 9"ø

- 1000 CFM
- 1000 CFM
- 1000 CFM
- 1000 CFM

-厅中层暖通空调平面图 - 区域'B'
- 25"x20"
- 40"x20"
- 19"x18"
- 32"x20"
- 18"x12"
- 34"x20"

- 205 CFM
- 125 CFM
- 200 CFM
- 200 CFM
- 200 CFM

- 6"Ø up to 125 CFM
- 6"Ø up to 125 CFM
- 6"Ø up to 125 CFM
- 6"Ø up to 125 CFM

- Roof cap with 200 CFM
- Room cap with 150 CFM
- Office cap with 200 CFM
- Office cap with 200 CFM

- No work in this area

- Drawn by
- Checked by

- #R E V I S I O N S D A T E JANUARY, 2018

- www.moodynolan.com
- Phone: (615) 386-9690
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- JOHNSON CITY, TENNESSEE
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- BLS

- M132

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- KEY PLAN

- EXISTING SMOKE PARTITION
- NEW 1-HR FIRE BARRIER
- EXISTING 2-HR FIRE BARRIER
- NOT USED

- 12"ø
- 9"ø

- 1000 CFM
- 1000 CFM
- 1000 CFM
- 1000 CFM
REFERENCE NOTES:

1. REMOVE AND REWORK AS INDICATED.
2. EXISTING TO REMAIN. RELOCATE AS INDICATED.

PARTIAL POWER RISER DIAGRAM - EXISTING

DATE: Sheet Content:

Sheet No.:

CONSTRUCTION DOCUMENTS
## LIGHTING FIXTURE SCHEDULE

<table>
<thead>
<tr>
<th>No.</th>
<th>COMPANY</th>
<th>MODEL NUMBER</th>
<th>DESCRIPTION</th>
<th>LAMP VOLS</th>
<th>MOUNTING</th>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>KELA LIGHTING</td>
<td>FZD-800-UNV-3500K-80CRI-DB(0-10V)</td>
<td>DECORATIVE MODERN PENDANT,  5&quot; DIA X 16&quot; H, &quot;CYLINDER-IN-CYLINDER&quot; DESIGN, 116W, 11,600 LUMENS</td>
<td>270W</td>
<td>LED INCL</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>EUREKA LIGHTING</td>
<td>31W LED UNV</td>
<td>DECORATIVE MODERN PENDANT, 17&quot; X 19&quot; ASYMMETRIC, TRAPEZOIDAL SHAPE, 120V SURFACE MOUNTED</td>
<td>100W</td>
<td>LED INCL</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>INTERLUX - BASE SERIES</td>
<td>HP-4R-4'-V-835-F-UNV-SC-C1 38W 4&quot;X4' LINEAR RECESSED. VERIFY GRID CONFIGURATION PRIOR TO ORDER. 10 YEAR WARRANTY.</td>
<td></td>
<td>112W</td>
<td>LED INCL</td>
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[Diagram Image]
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**Note:** All requirements must be met before proceeding with the installation.

---

**Reference:**
- Central Electrical Panel Specification
- Local Building Code Regulations

---

**Questions:**
- What are the specifications for the wall receptacles?
- How many surface mountings are required for the installation?
1. REPLACE WITH NEW CRESTRON KEYPAD. WIRE RELAY INPUTS (3-WIRE) TO POWER LINK TO SWEEP LIGHTS ON; REPLACE EXISTING LIGHT AT SAME LOCATION; RE-
Wall Rating Legend:
- Existing Fire Barrier
- New 2-Hour Fire Barrier
- New 1-Hour Fire Barrier
- New Smoke Partition
- Unused

Sheet No.: [Sheet Number]
Date: [Date]

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Architects
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Suite 3C
P.O. Box 1909
Johnson City, TN 37605-1909
Phone: (423) 928-1175

Project No.: [Project Number]
Checked By: [Checked By]
Project Coordinator: [Project Coordinator]
Drawn By: [Drawn By]
Date: [Date]

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1625 Broadway
Nashville, TN 37203

SBC Project No.: 166/005-01-2014 CM
JANUARY, 2018

D.P. Culp Expansion & Renovation:
Release Package 2: Main Building
East Tennessee State University
Johnson City, Tennessee

Middle Level HVAC Power Plan - Area 'B'
Construction Documents

# REVISIONS DATE
1 ADDENDUM 3 4-13-2018