100% SCHEMATIC DESIGN PACKAGE

ETSU Culp Center Expansion and Renovation
SBC: 166/005-01-2014A
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100% Schematic Design Package
SBC Project No: 166/005-01-2014A
March 23, 2017

EAST TENNESSEE STATE UNIVERSITY
OVERVIEW
Existing Site Conditions: Continuation of Promenade

ETSU Culp Center Expansion and Renovation
SBC: 166/005-01-2014A
Existing Site Conditions: Views from the Facility

ETSU Culp Center Expansion and Renovation
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ETSU Culp Center Expansion and Renovation
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ETSU Culp Center Expansion and Renovation
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Architecture is not similar to most buildings on Campus

Northeast entry

Southeast facade

ETSU Culp Center Expansion and Renovation
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Existing Site Conditions: DP Culp Center existing views.
Architecture is not similar to most buildings on Campus

Northeast, main, Entry- end of Promenade and Pride Walk

ETSU Culp Center Expansion and Renovation
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Pride Walk

Promenade to football stadium

ETSU Culp Center Expansion and Renovation
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ETSU Culp Center Expansion and Renovation
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Overall View: Early Schematic Curve Iteration

ETSU Culp Center Expansion and Renovation
SBC: 166/005-01-2014A
Overall View: Early Schematic Curve Iteration

ETSU Culp Center Expansion and Renovation
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Overall View: final schematic

ETSU Culp Center Expansion and Renovation
SBC: 166/005-01-2014A
Overall View: final schematic

ETSU Culp Center Expansion and Renovation
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ETSU Culp Center Expansion and Renovation
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ETSU Culp Center Expansion and Renovation
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ETSU Culp Center Expansion and Renovation
SBC: 166/005-01-2014A
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ETSU Culp Center Expansion and Renovation
SBC: 166/005-01-2014A
Overall Site Plan with highlighted focus areas

ETSU Culp Center Expansion and Renovation
SBC: 166/005-01-2014A
ESTIMATES
## LEVEL 2 ELEMENTAL SUMMARY

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**SCHEMATIC BUDGET**

**East Tennessee State University**
D.P. Culp Addition and Renovation
SBC No. 166/005-01-2014CM

**BurWil Construction Company**

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<tr>
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3/20/2017

**ETSU Culp Center Expansion and Renovation**
SBC: 166/005-01-2014A
NARRATIVES
Architectural Narrative

The architecture firms of Beeson, Lusk & Street (BLS) and Moody Nolan, Inc. (MNI) have been retained to design an approximate 163,404 square foot renovation and addition to the DP Culp Student Center for East Tennessee State University in Johnson City, TN. The renovation would reorganize and improve the existing facilities for Food Services, Student Services, Administrative Offices, Bookstore, Post Office and provide more and improved space for student studying, collaboration, and general activities. The building is located along the south edge of Campus adjacent to the Library along JL Seehorn Jr Dr, although its primary façade faces in towards campus. Schematic Design drawings dated March 21st, 2017 depict the proposed design of the Culp Center.

The Culp Center needs were determined by a series of programming meetings and department interviews conducted by BLS and MNI. The results of that programming effort are available in the document entitled “ETSU Culp Center Expansion and Renovation: a program/pre-design report for East Tennessee State University and the Tennessee Board of Regents SBC Project No.: 166/005-10-2014A, August 2016”. In the current schematic design, the departments and ancillary spaces within the proposed Culp Center renovation are to include:

- Food Services: retail dining, anytime dining and convenience stores.
- Student Organization Resource Center (SORC)
- Student Media Center
- Bookstore
- University Center (UC) Services
- ID Services
- Post Office
- Shared Classrooms and Meeting Rooms
- Shared Student areas for studying and gathering
- Ballroom Pre-function/Lobby
- Student Forum
- Performance Lounge
- Gaming
- Meditation Space

Spaces within the Culp Center that are not included in the renovation:

- Multicultural Suite
- Ballroom (some in-place renovation, if funds allow)
- Achievement Resource Center (ARC)
- Student Affairs (associated meeting rooms being relocated and renovated)
- Student Support Services
- Attached Martha Culp Auditorium

The existing Culp Center was originally built in the 1970s and has had several renovations of varying degrees, including extensive renovation to its mechanical and plumbing systems.

The building is a three story concrete structure comprised of columns and double T beams, that is best described as Brutalist style. The three story structure has three different level changes on the lowest level due to being constructed on a hill side. The lower level varies from 1696’ to 1700.5’ and then to 1705’. The lower level has an existing footprint of 50,652sf with a proposed addition of 17,687sf. The lower level’s program consists of Retail Dining, the “Cave” area which provides seating for dining and gatherings for larger events, Gaming, Bookstore, Post Office, and a multi-functional main corridor which is an interior continuation of the east-west promenade, illustrated in the master plan, while also serving as gathering for pre-function, studying and social situations throughout its path. The middle level’s program has ARC, SORC, UC and ID Services, Multicultural Suite, Meeting rooms, including a 200 person meeting/ board room, student lounge and collaboration areas are also integrated within the 59,829sf existing and 9,495sf new footprint. The main renovation on the upper level will be dedicated to the expansion of their kitchen, Servery and Anytime Dining spaces. The 83,571sf existing footprint also includes a renovated pre-function space and renovated meeting rooms and existing Student Services, Student Affairs and Ballroom to remain. The proposed area of addition on the Upper Level is 3,017sf.

Building Context and Relationships:

The Culp Center is located along the east west Campus axis which stretches from the Football Stadium (under construction currently) to the west end of the Library. The current design of the Student Center and Auditorium does not allow for continuous exterior passage across the east west axis. The new design will provide a clear, interior path that would connect the east to the west sides. The student center also anchors the south end of campus and is the end of two main north south paths through the end of campus. At the west entry the student center is the terminus of the “Pride Walk”, a student path leading from the north side of Campus. Directly to the north is also a sunken outdoor amphitheater. The main addition faces the amphitheater, Pride Walk and promenade toward the football stadium. These areas provide some inviting views that the new design captures and features on all levels, including new outdoor gathering spaces. Outdoor spaces are planned for both east and west entries adding to the open environment of the Student Center and encouraging more pedestrian activity throughout the building and along the paths that it connects.

Exterior Materials:

The existing building is a mixture of exposed concrete and precast panels with curtain wall and storefront openings. For this renovation, the majority of the exterior façade will remain intact. Where the additions occur along the façade, the majority of the new openings will be curtain wall along the north façade. The interior to the existing building is very cavernous and exterior glazing will allow light to enter deeper into the building and provide a brighter/ lighter experience to the building. Louvers will be applied to the curtain wall at the first and second stories to provide some deflection of direct light while keeping the ambient lights and views out of the building less obscured.

Pre-cast Concrete will be used to match existing materials on the building in areas that are renovated which do not require glazing. Stone will be used in cladding the existing vertical circulation such as the stairs or retaining walls to support the exterior outdoor terraces. Some metal is utilized for fascia of canopies and roofs.

The existing roof will remain intact with only some edges being modified to allow the additions to tie in to the existing roof (with a curb).

Interior Materials:

The interior partitions will be metal stud and gypsum board. Primary circulation along the Lower Level main corridor may include wall enhancements like stone and tile. Internal corridors will be luxury vinyl tile. The primary meeting and classroom flooring material will be luxury vinyl tile with cove base. Offices and Conference Rooms will be carpet tile. Ceilings will be a mix of exposed...
ARCHITECTURAL NARRATIVE- CONTINUED

The site selected for the new academic building is located approximatelty 800 feet south of the current Culp Center, which is located at the southern edge of the University of Tennessee Health Science Center campus.

The current building design has a gross footprint area of 68,339 square feet and a total gross area of 163,404 square feet.

The building’s occupancy will be classified as Non-separated Mixed Occupancy: Business (B) & Assembly (A-3). The existing Four Hour separation between the DP Culp Center and the Martha Culp Auditorium will be maintained.

The building occupancy is calculated as follows:

- Lower Level - 1,789 Occupants
- Middle Level - 1,097 Occupants
- Upper Level - 2,556 Occupants
- Total Building - 5,442 Occupants

The building’s construction type will be classified as Type IB. Allowable Height & Building Areas [IBC, Table 503] – Type IB construction allows an unlimited building height and an unlimited building area for both business and assembly occupancies. No rating for occupancy separation will be required.

The building consists of 3 stories and a mechanical penthouse with a maximum height of approximately 58’-0”.

The building will be protected throughout with an automatic sprinkler system.

Fire Resistance Rating [IBC 2012, Table 601] and [2012 NFPA 220 Table 4.1.1, Type II-222] – the fire ratings of the building components for Type IB construction shall be:

- Structural Frame: 2 hour rating; (1 hour for roof support)
- Bearing Walls: 2 hour rating; (1 hour for interior wall roof support)
- Non-bearing interior partitions: 0 hour rating;
- Floor construction: 2 hour rating;
- Roof construction: 1 hour rating;
- Corridors [IBC, Table 1017.1]: 1 hr to 0 hour due to automatic sprinkler system.

Fire Separation Distance [IBC, Section 602] for Exterior Walls: No fire rating is required for exterior walls greater than 30 feet away from boundary lines.

Common path of egress travel [IBC, Section 1014.3]: 100 feet maximum due to automatic sprinkler system.

The exit access travel distance [IBC, table 1016.1] is allowed to be 300 feet due to the automatic sprinkler system. The building will have three (3) means of egress from the second story and six (6) primary means of egress to the exterior.

Dead Ends [IBC, Section 1017.3]: 50 feet maximum due to automatic sprinkler system.

Sustainability

The design will pursue as much sustainable practices and design as possible, but will not pursue LEED Certification. TBR standards will be followed while also noting that the mechanical systems were recently renovated and a full scale replacement is not planned for this renovation of an existing building.

END OF ARCHITECTURAL NARRATIVE

SITE CONSTRUCTION AND LANDSCAPE NARRATIVE

The site is less than one acre and a stormwater pollution prevention plan (SWPPP) will be provided but is not required to be submitted to TDEC. No stormwater storage is anticipated on this site. The road south of the site is listed as a Minimal Flood Hazard per FEMA maps however no construction of buildings, parking lots or roads are proposed in this area. If an area east of the existing building is to be developed then an Aquatic Resource Alteration Permit (ARAP) will be required due to the creek east of the building. The ARAP is required since any development would be inside the buffer zone required for creeks.

Numerous existing utilities are located under the proposed addition. These utilities will each be evaluated to determine if relocation is required based on their current location and column layout for the addition.

The building’s main floor at the addition is being set at elevation 1700.5’. This will require some backfill under the building and retaining walls on the north face of the addition. The existing ramp to the second floor will be demolished to construct the new addition.

Retaining walls will be required in some areas and will be concrete.

Re-grading of the west side of the site will be required to tie in to the existing South Dossett Drive. Access to the west end of the building will be improved with a widened sidewalk along the edge of the road, the addition of a linear step system and ramps to a plaza at the entry into the addition. The plaza will wrap around the northwest corner of the building and extend to the diagonal walkway. Trees will be planted on the plaza to provide shade for people sitting on the seat walls and the site furniture. From the plaza lawn terraces will step down toward the existing amphitheater along the north building façade. The north side of the building will be planted with evergreen trees and shrubs of appropriate scale. On the south side of the plaza lawn terraces will step up the slope providing a finished landscape feel that is designed to be both useful as well as attractive. At the other end of the building a new entry terrace will wrap around the northeast corner of the building at the elevation of the building entry at 1695. Steps and ramps will connect the new terrace and the surrounding sidewalks. Table and chair sets in this area will provide outdoor dining opportunities. At the southeast corner of the building the accessible parking and surrounding sidewalks will be modified to comply with ADA requirements. Alternate planting enhancements can improve the appearance of the entire east end of the building. The south building entry to the middle level will be improved with the removal of parking, the addition of a widened sidewalk from the street, a louvered metal fence to screen mechanical units and the addition of landscape development. As a possible alternate, the kitchen loading area will be improved with re-configured parking separated from the street with a landscaped island, a screen wall to shield views of the dumpster area from the kitchen entrance and a louvered metal fence to screen mechanical and electrical equipment. At the southwest corner of the building, another alternate to add a new sidewalk will provide an accessible route connecting the sidewalk along Seehorn with the elevated ramp at the west end of the building. Landscape enhancements will screen the service functions of the loading area and improve the curb appeal from the street.

END OF SITE NARRATIVE

ETSU CULP CENTER EXPANSION AND RENOVATION

SBC: 166/005-01-2014A
### Structural Narrative

#### BUILDING CODE REQUIREMENTS

**2012 International Building Code**

**Live Loads:**
- Offices - 50 psf
- Meeting Rooms - 40 psf
- Lobbies - 100 psf
- Dining Hall - 100 psf
- Corridor - 100 psf
- Corridors (Upper level) - 100 psf
- Assembly Areas - 100 psf
- Mechanical Rooms - 125 psf
- Roof - 20 psf
- Terrace - 100 psf
- Stairs - 100 psf

**Wind Design:**
- ASCE 7-10
- Basic Wind Speed - 120 mph
- Risk Category - III
- Exposure Category - B

**Seismic Design:**
- Ss – 0.304
- SI – 0.104
- Risk Category – III
- Seismic Design Category – B
- Site Class – C (assumed)

### SITE CONDITIONS AND FOUNDATIONS

#### Foundations

The existing concrete structure is supported on concrete caissons ranging in size from 36” to 78” diameter. The new columns will be supported on drilled micropiles with rock end bearing. The micropiles will be tied together and tied to the existing caisson caps with new 20”x20” reinforced concrete tie beams. The ties will also span to the 20”x36” grade beam at the perimeter of the addition. The micropiles will be cast with 4000 psi concrete. The tie beams, grade beams and pile caps will be cast with 3000 psi concrete.

#### Slab on Grade

The new and modified slab-on-grade at the lower level will be 4” thick on a minimum 4” of gravel fill reinforced with WWF 6x6-W1.4xW1.4. diamond isolation joints will be placed around all and walls. At locations where the existing slab on grade is at a lower elevation than the new final elevation, the new slab-on-grade will be built up to a higher elevation using gravel fill or rigid polystyrene blocks depending on the change in elevation.

**Columns**

- New Columns Lower Floor to Roof will be W12x58 spaced approximately 25'-0" on center. Columns placed in the new bank of elevators located at the south side of the addition will be H50x80Ge/16. These will span from the lower level to the roof.

#### Elevated Floor Slabs

- **Addition:**
  - Mid-Level and Upper Level – 3 ½” Lightweight concrete slab on 3” composite metal deck (6 ½” total). The slab will be reinforced with one layer of 6x6-W1.4xW1.4. Additional #4 x 5'-0" top bars will be placed over all floor beams and girders. The slab will be supported by a combination of composite and non-composite wide flange beams. The typical floor framing will be W16x26 beams and W24x68 cantilevered girders.
  - Infill for Demolished Interior Ramp and Skylight:
    - 3 ½” Lightweight concrete slab on 3” composite metal deck (6 ½” total). The slab will be reinforced with one layer of 6x6-W1.4xW1.4. Additional #4 x 5'-0" top bars will be placed over all floor beams and girders. The slab will be supported by a combination of composite wide flange beams. The typical floor framing will be W14x22 beams and W21x44 girders.

**Roof**

- Roof Above Addition and Demolished Skylight:
  - Steel Bar joists at 6’-0" on-center maximum spacing with a 1-½" (20 ga.) metal roof deck. The typical bar joists will be 16K3 with 2 rows of diagonal bridging. The beams supporting the joists will be W18x40.

End of Structural Narrative
1. General Mechanical Requirements

Mechanical and plumbing systems shall be completed in accordance with the 2012 IMC, 2012 IPC, 2012 IGC, 2012 IBC, 2012 IF, 2012 IFC, NFPA and other applicable local codes and ordinances. The mechanical contractor shall obtain all necessary permits and pay all associated fees. All work shall be performed by qualified personnel in a neat and orderly workmanlike manner. All penetrations of fire rated assemblies shall be sealed per UL approved methods.

2. HVAC System

a. Chilled Water System

The current system utilizes a main campus chilled water loop with a dedicated building secondary loop. The existing chilled water system will be used to the greatest extent possible. The new building load will be evaluated against the current system capacity to determine what modifications can be made. Secondary loops pumps will be modified or replaced to meet the final system pressure. It is not recommended to make any changes to the campus plant or main distribution system due to distance from the building to the central plant.

b. Hot Water System

The current hot water system utilizes a campus steam loop with a steam heat exchanger. It is anticipated that the current campus system is adequate to account for any added heat load as a result of the building additions and renovations. The pumps will be evaluated against the final design and modifications or replacement will take place depending on the final system pressure. It is not recommended to make any changes to the campus plant or main distribution system due to distance from the building to the central plant and the overall system capacity.

c. Air Handling Units

The existing building contains four pipe central station air handling units, located in mechanical penthouses and a basement mechanical room. Downstream of the air handling units are hot water reheat coils to control individual zones. The air handling units were renovated in 2005 and will be reused to the greatest extent possible. New units will be utilized for the new building portions. Medium or single zone VAV air handling units will be used, assuming the added load is not in excess of the current chilled water capacity on site.

New medium pressure air handling units (AHU) will be exterior units with double wall construction and equipped with filter mixing section, MERV 8 filters, hot water pre-heat coil, chilled water coil, access sections, supply plenum fan, economizer section, return (or relief) fan and variable frequency drive control. The units will be capable of operating in 100% outside air economizer mode. Fresh air will be introduced to each unit through exterior louvers or roof intake hoods. The medium pressure system will serve variable volume (VAV) terminal units with hot water coils.

New single Zone VAV air handling units (AHU) will be double wall and equipped with filter mixing section, MERV 8 filters, hot water pre-heat coil, chilled water coil, hot water reheat coil, access sections, supply plenum fan and relief economizer fan and variable frequency drive control. The units will be capable of operating in 100% outside air economizer mode. Fresh air will be introduced to each unit through exterior louvers or roof intake hoods. Controls for the single zone VAV units may be controlled as a constant volume system during performances.

d. Variable Volume Terminal Unit

Air to individual spaces shall be supplied through pressure independent, variable volume (VAV) terminals with hot water reheat coils. Provide terminal units with a minimum of 22-gauge welded steel housing. Casing shall be internally lined with 1/2-inch thick fiberglass insulation. Where possible, existing VAV boxes will be reused.

e. Ductwork & Insulation

Existing ductwork will be reused where possible.

New supply ductwork between the VAV air handling units and VAV terminal units will be medium pressure galvanized sheet metal to comply with SMACNA HVAC Duct Construction Standards, 6”w.g. static pressure. Medium pressure supply ductwork shall be rectangular and lined with 1 inch thick anti-microbial 1.5 pcf density fiberglass liner. Liner shall have integral black mat facing from the air handling units to terminal units.

New supply ductwork downstream of the VAV terminal units; return duct and exhaust duct will be low pressure sheet metal construction. All low pressure supply and return ductwork will be insulated with 1 inch thick anti-microbial 1.5 pcf density fiberglass liner.

Exhaust and Relief ductwork located between fans shall be insulated with 1 inch thick anti-microbial 1.5 pcf density fiberglass liner. Liner shall have integral black mat facing from the exhaust or relief fan.

f. Air Distribution

Existing air distribution will be reused where possible.

Square plaque face diffusers will serve supply to the rooms.

Return and exhaust registers and grilles will be 1/2 x 1/2 x 1 " egg crate style. Flexible ductwork will not be permitted within noise critical spaces.

Automatic Dampers shall be ultra low leak, airfoil type.

g. Exhaust Fans

Exhaust fans will be provided for the Restrooms. Exhaust fans will be roof mounted centrifugal, in-line centrifugal, and sidewall propeller fans. All fans will be equipped with backdraft dampers and bird screens. Roof mounted fans will be located on insulated roof curbs.

h. Outdoor Air- Ventilation

Outdoor air serving air handling units will be supplied by Roof mounted Outdoor Air Intake Hoods or Wall Louvers.

i. Chilled & Hot Water Piping

New piping for chilled and hot water piping shall be ASTM A-53 black steel, Schedule 40 seamless, Grade B. For pipe 2 inches and smaller, Type L seamless copper tubing and for piping 2-1/2 inches and larger, schedule 40 steel piping. All chilled water and hot water piping shall be insulated.

Exterior chilled water piping will be insulated with cellular foam glass insulation.
Mechanical Narrative- continued

j. Specialty Equipment
   New electrical rooms will each be cooled by a dedicated variable volume terminal unit.
   New elevator machine and IT data communication rooms will each be cooled by a dedicated Fan Coil Unit.

k. Fire Separation Penetrations
   All holes or voids created to extend mechanical systems through fire rated walls shall be sealed by the mechanical contractor with appropriate dampers and/or an intumescent material capable of expanding up to 8 to 10 times when exposed to temperatures beginning at 250 degrees F. It shall have approved ratings to 3 hours per ASTM E-814 (UL 1479). Acceptable Material: 3M Fire Barrier Caulk, Putty, Strip and Sheet forms.

l. Stage Smoke Vent
   Two (2) smoke vents (N+ 1 redundancy) shall be required to ventilate the stage in accordance with 2012 IBC. The vents shall open automatically by an approved heat-activated device. The vents shall be located near the center and above the highest part of the stage. The openings shall not be less than 5% of the area of the stage.

m. Testing & Balancing
   Water side and air side testing and balancing will be accomplished in accordance with AABC or NEBB Standards by a testing and balancing agency certified by AABC or NEBB.

n. Controls
   A web based Direct Digital Control (DDC) building automation system will be provided to monitor and control the air handling units, outdoor air ventilation, variable volume terminal units, exhaust fans & CO2 sensors. System to include a PC work station and color graphics.

3. PLUMBING
   a. The current building main water supply will not be changed. Branch piping due to renovations will be added to the current water system.
   b. Plumbing fixtures shall be commercial grade, white in color. Water closets and urinals shall be wall hung, low consumption, flush valve type. Lavatories shall be vitreous china with chrome-plated gooseneck faucets with wrist blades.
   c. Sensor operated hands free flush valves and faucets will be installed at the Owner’s discretion.
   d. The domestic water heater to be electric type with 80 gallon storage. The water heater will be located in the Mechanical Room located above the Public Restrooms. The water heater will supply the building with 120 degrees F.
   e. Water piping above grade shall be insulated with a product similar to Owens Corning Fiberglass 25 ASI/SSL with thickness as listed below:
      1. Domestic cold water - 1/2” thick.
      2. Domestic hot water & re-circulating – 1 1/2” thick.
      3. Interior condensate – 1 1/2” thick
      4. Horizontal storm drainage piping above grade - 1” thick.
   f. All water lines that are in exterior walls shall be routed on the conditioned side of the wall or ceiling/roof insulation.
   g. Plumbing fixtures shall be Kohler, Zurn, Eljer or American Standard. Mop sinks shall be floor mounted style such as Florestone Model 20.
   h. Soil, waste, vent, interior storm piping shall be Schedule 40 PVC.
   i. Soil, waste, storm and vent piping above ground shall be run concealed in walls, chases, pipe shafts and ceiling spaces, except in equipment rooms and similar unfinished areas. All soil and waste piping inside the building shall be run with a uniform drop of not less than 1/8” per foot, using 1/4” per foot where possible.
   j. Vertical vents shall be carried through the roof or connected to adjacent vent lines where practical to minimize the number of vents extending through roof. Vents shall terminate approximately 12” above finished roof line and shall be flashed per the requirements of the roof system warranty.
   k. A new grease trap will be installed for the new retail dining area.

4. FIRE PROTECTION
   a. The existing building contain an operable sprinkler system. The final building will be reevaluated and the final system shall be in accordance with the 2012 IBC, 2012 IEC, NFPA and other applicable local codes and ordinances
   b. A wet pipe sprinkler system to meet the applicable hazard Classification is intended for this project.
   c. All design, layout, work, and materials shall conform with the requirements of section 13 of the National Fire Protection Association and as approved by the Underwriters Association having jurisdiction over this geographical area
   d. Standpipe: A Class III standpipe with hose connections is required for stage in the 750 seat theater.
   e. Sprinkler Heads: Sprinkler heads shall be automatic and of the conventional (spray) type and shall be approved by a nationally recognized testing laboratory. The sprinkler heads shall be on the sidewall, recessed pendant, or pendant type and coordinated with the architect upon selection of finishes.
   f. All holes or voids created to extend mechanical systems through fire rated floors and walls shall be sealed by the mechanical contractor with appropriate dampers and/or an intumescent material capable of expanding up to 8 to 10 times when exposed to temperatures beginning at 250 degrees F. It shall have approved ratings to 3 hours per ASTM E-814 (UL 1479). Acceptable Material: 3M Fire Barrier Caulk, Putty, Strip and Sheet forms.

End of Mechanical Narrative

ETSU Culp Center Expansion and Renovation
SBC: 166/005-01-2014A
1. General Electrical
   a. Complete lightning, power distribution, and fire alarm systems shall be installed along with infrastructure and cabling for communications systems. All work shall be completed in accordance with the current applicable editions of NEC, NFPA, IBC, IFC, IEC, and other applicable local codes and ordinances.
   b. The electrical contractor shall obtain all necessary permits and pay all associated fees, included utility company aid to construction costs. All work shall be performed by qualified personnel in a neat and orderly workman-like manner.
   c. Temporary lighting and power shall be provided during construction. All power outages shall be coordinated and scheduled with the owner and applicable utility company.
   d. All conduit penetrating fire rated assemblies shall be sealed per UL approved methods.

2. Electrical Power Service Entrance & Distribution
   a. The electrical service is existing underground from an existing utility company pad mounted transformer. The existing service voltage is 480Y/277 volts, 3 phase, 4 wire. The service size is 3000 amperes and is served via an outdoor NEMA3R switchboard located at the rear of the building along L.J. Seehorn Jr. Road.
   b. Power service entrance and significant switchgears located on the lower level shall be existing to remain, this includes two switchboards that are fed from the main exterior unit and associated panelboards in those same rooms. Feeder breakers within the existing switchboards feed existing satellite electrical rooms located strategically throughout the building. Satellite electric rooms shall be existing to remain where practical. However, some will need to be relocated or reworked to accommodate the new areas and renovated spaces. Generally, the satellite electrical rooms have distribution type and branch panelboards as required at 480Y/277V, 3 phase, 4-wire for general lighting and HVAC equipment. Large mechanical loads (greater than 100 amperes) shall be fed from distribution type panelboards or the switchboards depending on proximity. HVAC loads shall be existing to remain where practical, but replaced or re-worked in renovated areas. All panelboards in the renovated kitchen area will be replaced.
   c. All panelboards shall be dead front type with concealed hinges and copper bussing. Panelboards rated for 480Y277 volts, 208Y120 volts, and 120/240 volts are required. All branch circuit panelboards shall utilize 42 circuit construction with bolt-on type circuit breakers. Provide main and sub-feeder breaker or lug combinations as required. Branch circuit panelboards shall be installed on each floor and located to minimize the length of branch circuit wiring. Branch circuit panelboards shall be similar and equal to Square-D “NF” or “NQ”. Distribution panelboards shall be provided for all panelboards with bus ratings 600 amperes and higher. Distribution panelboards shall be similar and equal to Square-D, J-Line type. Provide TVSS equipment on main 480Y277 service and on all 208Y120Volt panelboards located directly downstream of dry-type transformers. TVSS for service entrance shall be UL 1449, 3rd Edition listed Category “C”, 300KA rated. TVSS for distribution and branch panels shall be UL 1449, 3rd Edition listed Category “B”, 80KA rated. TVSS units shall be integrally mounted in the panelboards as applicable.
   d. A series of dry-type transformers shall be utilized to create the required 208Y120V, 3-phase, 4-wire and 120/240 volt power power throughout the facility for sound equipment, convenience receptacles, and 208 volt power needs. 208Y120V branch panelboards shall be located in satellite electrical rooms with their transformer source from an adjacent 480Y277V panel. In areas renovated areas where practical dry-type transformers and 208Y120V panelboards will be existing to remain. However, where required for renovation and in new areas, new transformers and panelboards shall be provided. All panelboards in the renovated kitchen areas will be replaced. Circuits shall be provided for elevator sump pumps, mechanical DDC control panels, all fire alarm, security panels, etc. Primary voltage shall be 480 volts, 3-phase or 1-phase as

   d. (cont.) appropriate. All transformers shall be rated for 115 degree C rise and shall have copper windings. Insulation systems rating shall be Class 220 or higher per UL1561, totally enclosed with ventilation openings only. Isolation transformers shall be K-13 rated with electrostatic shield and 200% neutral lugs. Dedicated isolation type, K-13 rated transformers and associated feeders shall be provided for power service to Performance/Stage Lighting, Performance/Stage Sound, and Performance/Stage Miscellaneous Power. Single phase transformers shall be used for Sound and Miscellaneous Power. Secondary feeders to these panels shall have 200% neutrals and an isolated ground bus. Multiple sub-feeders and branch circuits shall be extended from these panels. These include but are not limited to dimming rack feeders and branch circuits, company switches for lighting and hoists, sequenced panelboard(s) for sound, and company switches for sound.

   e. All transformers shall be installed with vibration isolation pads for mechanical noise isolation from building structure. Vibration isolation pads shall be combination spring and neoprene rubber isolation units.

   f. Provide all code required disconnecting means at mechanical equipment, fused as recommended by the equipment manufacturer.

   g. The existing life safety stand-by generator shall be re-used, unless further code investigation or owner direction requires a size increase to add more load such as an elevator, fire pump, etc. The existing unit is 24kW/30kVA at 480V277V and in adequate to serve life safety loads (emergency lighting and Fire Alarm). This distribution is existing to remain with existing panelboards to remain. A new life safety panel will be installed from this existing system in both the renovated main kitchen area and the new addition. Emergency power for life safety and owner’s stand-by usage shall be distributed via separate systems, panelboards, and circuity. Conductors from the separate normal, life safety, and stand-by branches shall not share conduit runs.

3. Wiring Methods
   a. All wiring shall be installed in conduit. In interior locations, EMT conduit with steel set-screw fittings shall be utilized. In exterior locations, Schedule 40 PVC shall be utilized underground and Schedule 80 PVC shall be utilized where exposed. GRS conduit shall be installed in areas exposed to physical damage.
   b. All conductors shall be copper, minimum #12AWG with THHN/THWN insulation. Use solid conductors for sizes #10 AWG and smaller, stranded conductors for sizes #8 AWG and larger. All conductors shall be color coded. Dedicated neutrals shall be installed for all branch wiring circuits. An insulated, code sized, ground wire shall be provided in each conduit.
   c. Branch circuits shall originate from 42 circuit panelboards located throughout the facility for both 208Y120 volt loads and 480Y277 volt loads. All branch circuits shall be a minimum of 20 amperes and shall be protected by individual circuit breakers. Provide all code required disconnecting means at equipment, fused as recommended by the equipment manufacturer.
   d. All junction boxes shall be labeled indicating the circuits contained. Panelboard circuit schedules shall be typewritten. Phenolic tags shall be provided at all distribution panel/switchboard breakers and at all disconnect switches and starters. All equipment (panel, disconnect, starter, etc.) shall be identified to indicate the voltage, phase, supply panel and circuit. All panels shall have typewritten directories. Warning labels, caution tape, etc. shall be provided in accordance with the NEC.
   e. A system of cable tray shall be installed to support voice and data cabling throughout the renovated areas of the facility. The tray shall be basket type, steel construction, 18” wide by 4” deep. The tray shall be grounded in accordance with NEC articles 250 and 392.
Electrical Narrative - continued

4. Wiring Devices
   a. All wiring devices (toggle switches and convenience receptacles) shall be minimum 20 ampere rated, specification grade, with stainless steel cover plates. Nylon colored device cover plates may be required in certain areas by the architect. In those areas device and cover plate finish shall be selected by the architect.
   b. All devices shall be installed in accordance with ADA. GFCI devices shall be installed at locations required by the NEC, including weatherproof in-use covers in exterior applications. Receptacles shall be spaced approximately every 12 to 14 feet and per the NEC, provide one per wall in all office spaces. Receptacles shall be provided in all utility closets, lobbies, 25’ on center in corridors, at stair entrances, perimeter exits and adjacent to mechanical equipment. Receptacles in public areas, corridors, and conference rooms shall also be built in USG Charging Ports. Combination power/data/av floor boxes shall be installed in all conference rooms, lobbies, and conference areas per ETSU standards. Boxes shall contain two duplex power receptacles along with data, CATV, and HDMI cables.

5. Grounding
   a. Grounding/bonding shall be installed in accordance with NEC article 250. All interior metallic piping systems shall be bonded. The lightning protection system shall be bonded. All dry type transformers and generators shall be grounded as separately derived systems per NEC. All conduit runs shall be provided with a code-sized green insulated grounding conductor.
   b. Provide a grounding back-bone system for all added or renovated MDF/IDF rooms. Install in a “star” topology with the main telecom ground bar (MTGB) located in the MDF (Main IT Room) and smaller telecom ground bars (TGB) in each IDF. Interconnect each TGB back to the MTGB with an insulated #3/0 green ground conductor. Extend an insulated #4/0 green ground conductor from the MTGB to the service ground bar in the main electrical room.

6. Lighting
   a. General illumination shall be provided with fixtures containing energy efficient LED sources and electronic drivers. Appropriate commercial lighting shall be installed throughout the facility. Linear suspended or recessed indirect fixtures shall be utilized in office areas, while recessed acrylic lensed fixtures or pendant industrial fixtures shall be provided in work areas. Acrylic wall brackets shall be installed at each floor landing in the stairwells. The public restrooms shall have in-lay style acrylic lensed fixtures and recessed cans. Storage/utility closets shall have acrylic wraparound fixtures. Other support areas shall have in-lay style acrylic lensed fixtures and/or LED can lights. In prominent areas, lobbies, entries, conference rooms, etc. LED accent lights, sconces, and special decorative lighting will also be provided. Kitchen lighting shall be LED type lensed troffers with painted aluminum doors for wipe down.
   b. Dual technology occupancy sensors, wall and/or ceiling mounted, shall be installed in the majority of locations for general lighting control. Dimming will be provided in conference rooms, and daylight harvesting controls will be provided in areas with significant glass or clear-story areas.
   c. Exit lighting signs shall be installed. All signs shall be connected to an unswitched lighting circuit and shall be connected to the life safety power system (generator). Exit signs shall have acrylic panels with LED illumination. Emergency lighting shall be provided predominantly by normal fixtures connected as “night lights” to the emergency power system. Some UL924 by-pass transfer relays will be required where local fixture control and emergency function is necessary, such as conference rooms, ballrooms, etc. Some standard twin-head emergency lighting fixtures with integral battery packs connected to the normal power system may be required, and those shall illuminate upon loss of normal power.
   d. All site lighting shall be full cut-off type, dark-sky compliant. Site lighting shall consist of soft corner shoe box style fixtures with LED illumination installed on 20’ tall aluminum poles. A concrete base shall be installed at each. Fixtures shall have two levels of illumination. A programmable lighting control panel shall be installed to control the fixtures. Panel shall have astronomical time clock and photocell control. Accent lighting, including bollards, landscape lighting, etc. shall be provided at entries and exterior transition spaces. Wall packs with LED lamp source shall be provided 25’ on center around the loading dock area.

   a. (cont.) at entries and exterior transition spaces. Wall packs with LED lamp source shall be provided 25’ on center around the loading dock area.
   b. LED sources shall be 3500 deg Kelvin with electronic drivers for dimming control at 0-10VDC and minimum CRI of 80. Drivers shall be solid state with a maximum THD of 10%.

DIVISION 27 – COMMUNICATIONS INFRASTRUCTURE

a. All work shall be accomplished in accordance with the current NEC, IFC, IBC, EIA/TIA and BISCSI standards for communications cabling, and other applicable local codes and ordinances.
   b. Conduits for telephone and cable television shall be provided for service providers into the building (2) 4” to utility line along Harris Drive. MDF and IDF terminal spaces shall be provided on each floor of new and renovated areas with racks and plywood backboards around entire perimeter per EIA/TIA standards. Existing demarcation room and MDF shall remain, and satellite IDF rooms will also remain where practical.
   c. Extend copper (25 pair CATS), fiber (12 strand single mode), and COAX (RG11) back-bone cables from the existing MDF to each new or renovated IDF and terminate. All fiber back-bone cables shall be terminated in patch panels at equipment racks per EIA/TIA and ETSU standards. Copper and Coax back-bone cables shall be terminated with taps on each room perimeter plywood backboards.
   d. Workstation outlets consisting of a 4” square x 2-1/8” deep junction boxes with plaster ring and conduit stub-ups shall be provided for installation of data or voice cabling. Provide a minimum of two workstation outlets in all offices and support spaces. Four or more workstation outlets shall be provided in all performance, conference, and practice areas. All empty conduits shall be terminated with a bushing and a pull string shall be provided in each. Conduits shall extend to cable tray in all areas where accessible ceilings are not present, and in all performance spaces. Each workstation outlet shall be provided with one voice and one data cable, all cables shall be CAT 6, terminated point to point from a wall mounted faceplate to a rack mounted patch panel each forming a complete channel. CATV (Television) outlets shall be provided in conference rooms, break and lounge areas, lobbies, etc. RG-6 coaxial cable (Quad-Shield) with 2.5GHz “snap-n-seal” connectors shall be installed to the nearest communications room. Floor boxes shall be installed in conference rooms, classrooms, and performance spaces where required, with (2) data, (1) CATV, and (2) HDMI cables. Larger floor pockets will be installed at multiple locations on the stage areas for both sound cabling as well as communications cabling, provide a data and CATV cable to each.
   e. All cables shall be terminated in rack mounted patch panels located in MDF and IDF rooms. Four post racks shall be installed in each MDF and IDF. All racks and equipment shall be grounded per EIA/TIA and NEC standards.
   f. Rough-in (conduit and pull-cord) for access control systems shall be provided at all exterior doors, and interface to the elevators. Rough-in (conduit and pull-cord) for video surveillance systems shall be at locations to be determined, estimate of 40. The head end equipment to be located to be determined.

1. Fire Alarm System
   a. A complete addressable voice fire alarm system is existing and shall remain. New addition and renovation areas will have new devices installed in accordance with IBC, IFC, and NFPA 70, 72, and 110. Notification shall be provided as a pre-recorded voice message. Audible/visual notification and initiation devices shall be provided throughout, where required.
   b. Initiation devices shall be provided throughout renovated and addition areas and shall include manual pull stations, smoke, heat, dust/smoke, and water flow detectors, etc. Auxiliary functions of the system shall include sprinkler system and fire pump monitoring (if required), HVAC shutdown, smoke evacuation control, access control release, and elevator recall.
   c. The panel shall contain a digital communicator for remote monitoring as well as a microphone for manual announcements. Install a remote annunciator at the main entry location as directed by the AHJ.