Upstate Smith Building Deferred Maintenance

Project #CP00174726

Addendum NO. 1

DATE: February 17, 2012

FROM: PERITUS ENGINEERS & ASSOCIATES, INC.

TO: ALL BIDDERS

The following items add to, modify, clarify, or otherwise alter the Drawings and will become a part of the Contract Documents. Where a portion of the Drawings is added to, modified, clarified, or otherwise altered, the portion not so affected shall remain. Bidder shall include all effects that these items may have on his proposal.

Pre-Bid Meeting

The attendance sign in sheet from the non-mandatory prebid meeting held Tuesday, 2/15/2012, at 10AM is included with this addendum

Drawings

Electrical Drawings (full size) E-1 and E-2 are included with this addendum.

Clarification

The scope of work to be performed on this project is to start and finish in conjunction with the shutdown of the laboratories scheduled for May 2^{nd} through May 25^{th} , 2012.

On Drawing M-1, existing supply fan module is 46.5" high. The scheduled new supply fan module is also 46.5" high. The existing supply duct, from adjacent AHU-702, which located above the existing and replacement supply fan modules shall not be removed or disturbed.

Existing control devices located in existing supply duct to be removed, including, but not limited to duct smoke detector, high limit temperature sensor and controlling temperature sensor, shall be removed and handed over to the owner. Owner shall provide reinstallation or replacement of these control devices in new supply duct.

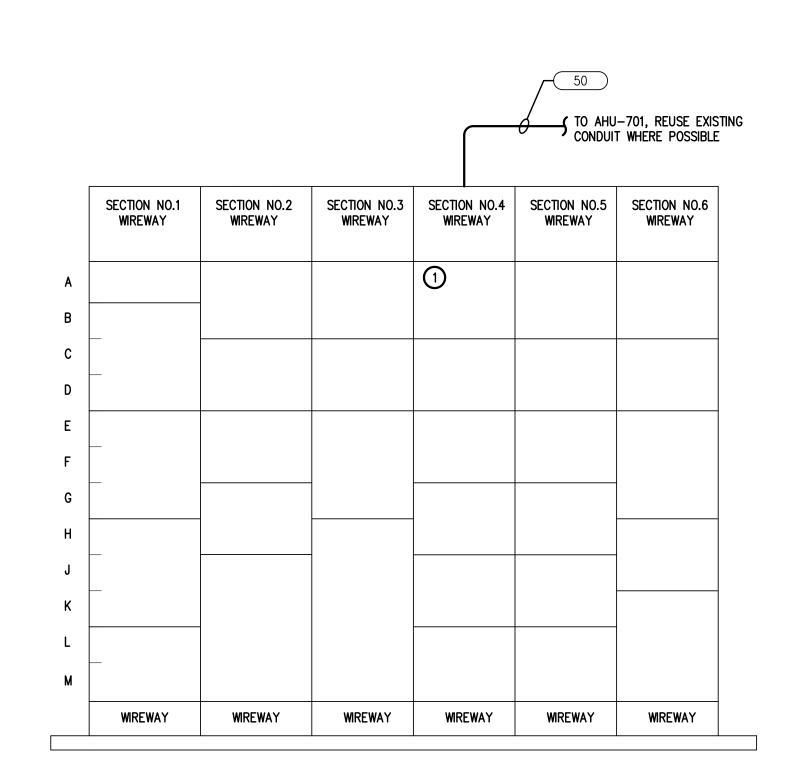
END OF ADDENDUM NO. 1

ELECTRICAL GENERAL NOTES:

- INSPECT SITE PRIOR TO SUBMITTING BID. DRAWINGS ARE INTENDED TO COVER THE REQUIRED ELECTRICAL SYSTEMS. DRAWINGS MAY NOT SHOW COMPLETE OR ACCURATE DETAILS OF THE BUILDING OR SYSTEM IN EVERY RESPECT. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN ANY ADDITIONAL INFORMATION AS REQUIRED.
- CONFORM TO THE NATIONAL ELECTRICAL CODE (2008), IBC (2009), APPLICABLE NEMA. ANSI AND IEEE PUBLICATIONS, U.L. AND ADA STANDARDS AND OSHA REQUIREMENTS. COMPLY WITH LOCAL, COUNTY, STATE AND NATIONAL CODES HAVING JURISDICTION.
- 3. FURNISH AND INSTALL ALL MATERIALS IN A NEAT AND WORKMANLIKE FASHION. ALL MATERIALS SHALL BE NEW, WITH FIRST QUALITY AND UL
- 4. VERIFY ALL DIMENSIONS AND CLEARANCES PRIOR TO INSTALLATION OF EQUIPMENT AND RACEWAYS. CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF WORK WITH THAT OF ALL OTHER TRADES AS REQUIRED.
- 5. CONDUIT SHALL BE EMT FOR BRANCH CIRCUIT WIRING AS ALLOWED BY NEC. EXCEPT THAT SET SCREW OR CRIMP FITTINGS ARE NOT ALLOWED. WHERE EXPOSED TO PHYSICAL DAMAGE CONDUITS SHALL BE RIGID GALVANIZED STEEL. MINIMUM CONDUIT SIZE SHALL BE 3/4". ALL CONDUCTORS SHALL BE TYPE THHN/THWN, STRANDED 600V COPPER BUILDING WIRE. MINIMUM SIZE SHALL BE #12 AWG COPPER UNLESS NOTED.
- 6. PROVIDE GROUNDING FOR ALL EQUIPMENT IN ACCORDANCE WITH ARTICLE 250 OF THE NATIONAL ELECTRICAL CODE.
- ALL ENCLOSURES SHALL BE OF THE NEMA TYPE WHICH IS SUITABLE FOR THE APPLICATION.
- 8. SEAL ALL CONDUIT PENETRATIONS TO MATCH RATING OF WALL BEING PENETRATED.
- 9. ALL WORK SHALL HAVE PROPER LABELING AND NAMEPLATES. ALL CIRCUITS SHALL BE LABELED AT PANELS AND BOXES AS INDICATED. ALL PANELS AND DISCONNECTS ARE TO BE PERMANENTLY MARKED WITH NAME OR EQUIPMENT SERVED.
- 10. THOROUGHLY CLEAN ALL EQUIPMENT AND SYSTEMS BEFORE PLACING IN OPERATION. RESTORE FINISHED SURFACES IF DAMAGED AND DELIVER THE ENTIRE INSTALLATION IN AN APPROVED CONDITION. INSTRUCT THE OWNERS' PERSONNEL IN THE PROPER OPERATION AND MAINTENANCE OF THE SYSTEMS. FURNISH TO THE OWNER THREE SETS OF OPERATION AND MAINTENANCE MANUALS FOR EACH SYSTEM.
- 11. GUARANTEE THE WORK INSTALLED FOR A PERIOD OF ONE YEAR AFTER DATE OF FINAL ACCEPTANCE. DEFECTS WHICH APPEAR AS A RESULT OF NORMAL USAGE SHALL BE REMEDIED BY THE CONTRACTOR TO THE COMPLETE SATISFACTION OF THE OWNER WITHOUT COST TO THE OWNER.
- 12. CONTRACTOR SHALL KEEP CURRENT A SET OF PLANS FOR THE DURATION OF CONSTRUCTION WITH ALL CHANGES TO WORK NEATLY AND ACCURATELY MARKED IN RED AND SHALL TURN OVER TO OWNER AT COMPLETION OF
- 13. ALL ELECTRICAL EQUIPMENT SHALL BE INSTALLED TO MEET SEISMIC REQUIREMENTS OF 2009 IBC.

SYMBOL	DESCRIPTION
	EXPOSED CONDUIT CONDUIT TURNING UP CONDUIT TURNING DOWN
	CONDON TORRING DOWN

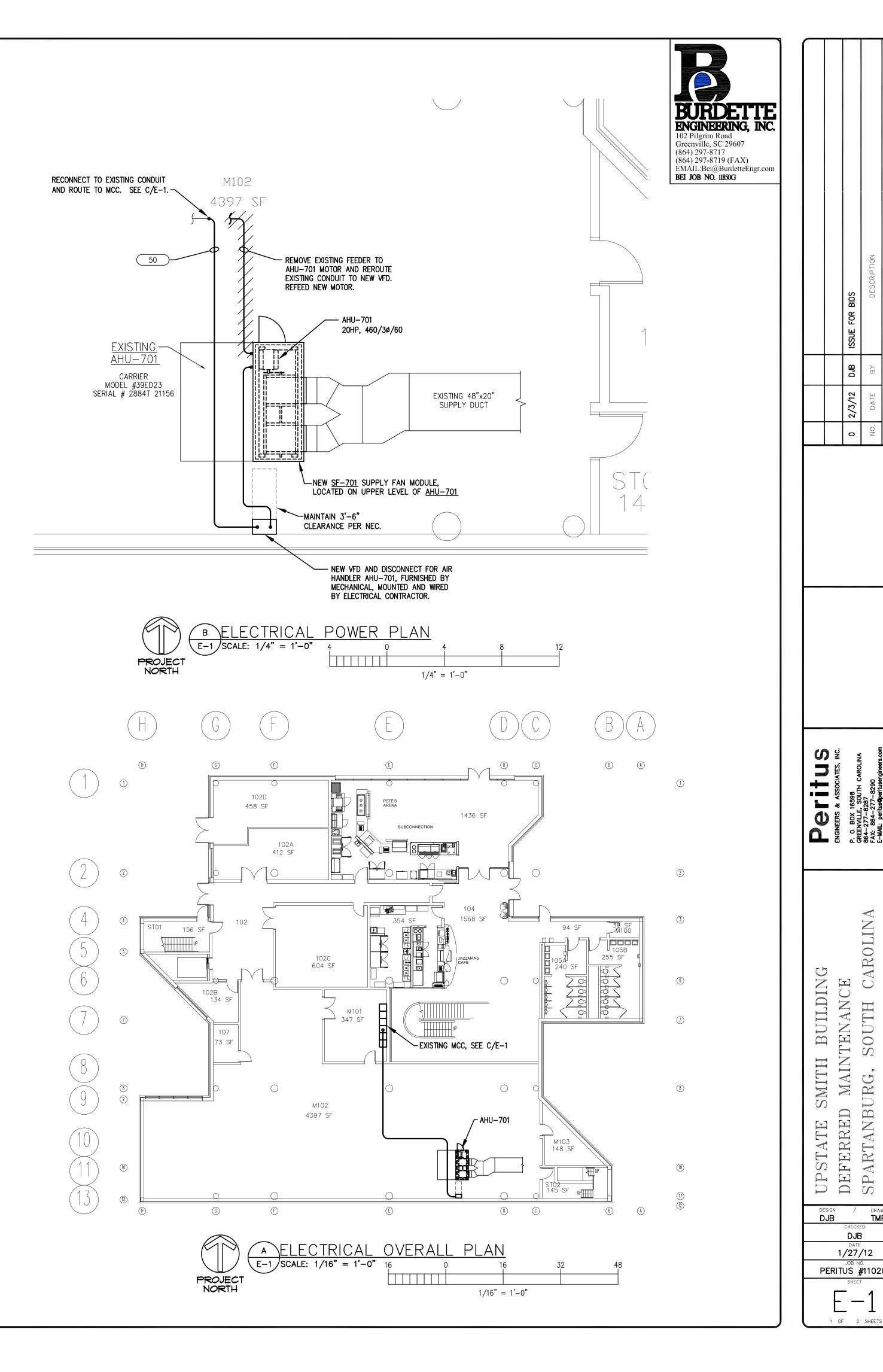
CABLE/CONDUIT SCHEDULE			
TAG	TAG WIRE AND CONDUIT		
50	3 #8, 1 #10G; 1"C		



1 = AHU-2 LAB L3 #701 REPLACE FUSES WITH FUSES SIZED FOR VFD NAMEPLATE PER NEC. DISABLE STARTER AND WIRE NEW FEEDER TO FUSE BLOCK

C EXISTING 'MCC' FRONT VIEW

E-1 NOT TO SCALE



AROLIN

1/27/12

PERITUS #110201

1 OF 2 SHEETS

THE CONTRACTOR SHALL PROVIDE AND INSTALL COMPLETE ELECTRICAL SYSTEMS INCLUDING ALL CONDUCTORS, RACEWAYS, FITTINGS, PROTECTIVE DEVICES, WIRING DEVICES, FIXTURES, SUPPORTS, AND ALL MISCELLANEOUS HARDWARE NECESSARY. ALL OF THE ABOVE EQUIPMENT SHALL BE COMPLETELY INSTALLED AND LEFT IN PROPER OPERATING CONDITION. ALL ELECTRICALLY POWERED EQUIPMENT WHETHER FURNISHED BY OTHERS OR BY THE CONTRACTOR SHALL BE WIRED BY THE CONTRACTOR.

- B. COMPLETE POWER DISTRIBUTION AND UTILIZATION SYSTEM SHALL BE INSTALLED, INCLUDING PANELBOARDS, UTILIZATION DEVICES AND EQUIPMENT AS INDICATED ON DRAWINGS.
- C. THE CONTRACTOR SHALL FURNISH AND INSTALL POWER AND WIRING AS SHOWN ON DRAWINGS FOR WIRING SYSTEMS FOR MECHANICAL SYSTEMS SPECIFIED IN DIVISION 15. TEMPERATURE CONTROL WIRING, EQUIPMENT CONTROL AND INTERLOCK WIRING ARE NOT INCLUDED IN THIS DIVISION UNLESS SPECIFICALLY NOTED IN THESE SPECIFICATIONS OR SHOWN ON THE PLANS.

1.2 REQUIREMENTS

- A. FIELD VERIFICATION OF SCALE ON ELECTRICAL PLANS IS DIRECTED SINCE ACTUAL LOCATIONS, DISTANCES AND LEVELS WILL BE GOVERNED BY ACTUAL FIELD CONDITIONS.
- B. IN CASE OF CONFLICTS OR DISCREPANCIES BETWEEN PLANS, PLANS AND SPECIFICATIONS AND/OR ACTUAL FIELD CONDITIONS, CONTRACTOR SHALL NOTIFY THE ENGINEER BEFORE WORK IS CONTINUED. COORDINATE WITH OTHER TRADES TO AVOID CONFLICTS.
- C. PERMITS AND TESTS THE CONTRACTOR SHALL PROCURE AND PAY FOR ALL PERMITS, FEES, AND LICENSES REQUIRED. PERFORM ALL TESTS TO ENSURE ALL SYSTEMS ARE IN GOOD OPERATING
- D. REVIEW OF MATERIAL; SPECIFIC REFERENCE IN THE SPECIFICATION TO ANY ARTICLE, DEVICE, PRODUCT, MATERIAL, FIXTURE, FORM OR TYPE OF CONSTRUCTION BY NAME, MAKE OR CATALOG NUMBER, WITH OR WITHOUT THE WORDS "OR EQUAL", SHALL BE INTERPRETED AS ESTABLISHING A STANDARD OF QUALITY AND SHALL NOT BE CONSTRUED AS LIMITING COMPETITION.
- E. BIDDERS SHALL BASE BIDS ON THE MATERIAL SPECIFIED OR ON EQUALS RECEIVING APPROVAL PRIOR TO BID OPENING. ANY INCREASE IN THE COST OF WORK RESULTING FROM SUBSTITUTION OF ANY PRODUCT SPECIFIED IS PART OF THIS CONTRACT AND SHALL BE ACCOMPLISHED IN AN APPROVED MANNER AT NO EXTRA COST TO THE OWNER.
- F. ALL MATERIALS SHALL BE NEW AND OF CURRENT MANUFACTURER. WHERE MORE THAN ONE OF A TYPE OF DEVICE IS USED, ALL SHALL BE BY THE SAME MANUFACTURER. ALL MATERIALS SHALL CONFORM TO THE GRADE, QUALITY AND STANDARDS OF THOSE SPECIFIED.
- G, INTERFERENCES THE DRAWINGS ARE GENERALLY DIAGRAMMATIC IN NATURE, AND ACCORDINGLY THE CONTRACTOR SHALL COORDINATE HIS WORK WITH THAT OF ALL OTHER TRADES TO AVOID INTERFERENCES. THE CONTRACTOR SHALL EXAMINE THE COMPLETE SET OF DRAWINGS AND SPECIFICATIONS FOR THE JOB BEFORE INSTALLATION OF ELECTRICAL WORK, COORDINATING LOCATIONS AND ROUTINGS WITH OTHER TRADES TO AVOID INTERFERENCES. WORK INSTALLED BY THE CONTRACTOR WHICH DOES INTERFERE WITH ANOTHER TRADE SHALL BE REMOVED AND REINSTALLED AT THE CONTRACTOR'S EXPENSE WHEN DIRECTED BY THE ENGINEER.
- H. WORKMANSHIP SHALL BE OF THE HIGHEST QUALITY AND ALL WORK SHALL BE DONE BY WORKMEN SKILLED IN THE TRADES INVOLVED.
- I. THE CONTRACTOR SHALL GUARANTEE ALL WORK UNDER THIS CONTRACT FOR ONE YEAR AND SHALL BE RESPONSIBLE FOR THE MAINTENANCE OF ALL ELECTRICAL EQUIPMENT FURNISHED AND INSTALLED UNDER THIS CONTRACT, FOR A PERIOD OF ONE YEAR FROM THE DATE OF SUBSTANTIAL COMPLETION.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.1 APPLICABLE CODES AND STANDARDS

NOTE: THE MATERIALS AND INSTALLATION SHALL CONFORM TO THE MINIMUM REQUIREMENTS AND LATEST OUTSTANDING ISSUES AND REVISIONS OF THE FOLLOWING CODES, STANDARDS, AND REGULATIONS WHEREIN THEY APPLY:

NFPA NO. 70, NATIONAL ELECTRICAL CODE, (2008 EDITION).

IBC (2006), ICC (2006), IFC (2006)

AMERICAN NATIONAL STANDARD, NATIONAL ELECTRICAL SAFETY CODE, (2002).

APPLICABLE PUBLICATIONS OF NEMA, ANSI, IEEE AND IPCEA.

UNDERWRITER'S LABORATORIES, INC. STANDARDS
CITY, STATE AND LOCAL CODES AND REGULATIONS HAVING JURISDICTION.

OSHA REQUIREMENTS.
ADA REQUIREMENTS.

3.2 PROVIDE 3 COPIES OF CLOSE OUT DOCUMENTS TO INCLUDE SUBMITTALS, O&M MANUALS, WARRANTIES AND RED LINE RECORD DRAWINGS WITHIN 1 MONTH OF SUBSTANTIAL COMPLETION.

END OF SECTION 16010

SECTION 16100 - BASIC MATERIALS

PART 1 — GENERAL

1.1 RELATED SECTIONS

A. MATERIALS SPECIFIED IN THIS SECTION SHALL COMPLY WITH ALL APPLICABLE REQUIREMENTS OF SECTION 16010, GENERAL PROVISIONS.

- A. CONTRACTOR FURNISHED. UNLESS OTHERWISE NOTED ON THE DRAWINGS, EQUIPMENT LIST, OR SPECIFICATIONS, THE CONTRACTOR SHALL FURNISH AND INSTALL ALL MATERIALS, DEVICES, AND APPARATUS NECESSARY FOR THE COMPLETE ELECTRICAL SYSTEM. ALL MATERIALS AND EQUIPMENT SHALL BE OF TYPES AND MANUFACTURER SPECIFIED WHEREVER PRACTICAL. SHOULD MATERIALS OR EQUIPMENT SO SPECIFIED BE UNOBTAINABLE, THE CONTRACTOR SHALL SUBMIT THE DESCRIPTION AND MANUFACTURER'S LITERATURE, REASON FOR THE SUBSTITUTION REQUEST AND SHALL SECURE THE APPROVAL OF THE ENGINEERS BEFORE SUBSTITUTION OF OTHER MATERIAL OR EQUIPMENT. THIS SPECIFICATION ESTABLISHES PERFORMANCE REQUIREMENTS AND THE QUALITY OF EQUIPMENT ACCEPTABLE FOR USE AND SHALL IN NO WAY BE CONSTRUED TO LIMIT PROCUREMENT FROM OTHER MANUFACTURERS.
- B. EQUAL OR EQUIVALENT. THE TERM "OR EQUAL" AND SIMILAR TERMS AS USED ON THE DRAWINGS OR SPECIFICATIONS SHALL BE INTERPRETED TO MEAN "EQUAL OR EQUIVALENT" IN THE OPINION OF THE ENGINEERS.
- C. MANUFACTURER'S PRINTS. WHERE THE CONTRACTOR FURNISHES EQUIPMENT OTHER THAN STANDARD CONSTRUCTION ITEMS, HE SHALL FURNISH MANUFACTURER'S PRINTS AND REPRODUCIBLES OF ALL SUCH EQUIPMENT TO THE ENGINEERS.
- D. U.L. LISTING. ALL EQUIPMENT AND MATERIALS SHALL BE NEW AND CONFORM TO THE REQUIREMENTS OF THIS SPECIFICATION. ALL EQUIPMENT AND MATERIALS SHALL BE LISTED BY THE UNDERWRITER'S LABORATORIES, INC., AND SHALL BEAR THEIR LABEL WHENEVER STANDARDS HAVE BEEN ESTABLISHED AND LABEL SERVICE IS REGULARLY FURNISHED. ALL EQUIPMENT AND MATERIALS SHALL BE OF THE BEST GRADE OF THEIR RESPECTIVE KIND FOR THE BURDOSE

PART 2 - PRODUCTS AND EXECUTION

2.1 BOXE

- A. CONTRACTOR FURNISHED. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL ELECTRICAL BOXES REQUIRED FOR THE PROPER INSTALLATION OF THE ELECTRICAL SYSTEMS. BOXES SHALL BE OF THE NEMA TYPE SUITABLE FOR THE LOCATION
- B. CONCEALED. FIXTURE, OUTLET, AND SWITCH BOXES INSTALLED CONCEALED IN WALLS OR CEILING AREAS SHALL BE GALVANIZED OR CADMIUM PLATED SHEET STEEL OF NOT LESS THAN THE MINIMUM SIZE AS RECOMMENDED IN THE NATIONAL ELECTRICAL CODE AND SHALL BE FURNISHED WITH APPROPRIATE COVERS AS SPECIFIED IN OTHER APPLICABLE SECTIONS OF THESE SPECIFICATIONS OR ON THE DRAWINGS. ALL BOXES SHALL BE ACCESSIBLE FOR MAINTENANCE
- C. ALL POWER WIRING SHALL BE CONTINUOUS, SPLICE AND TAP FREE, BETWEEN EQUIPMENT.
- D. PULL BOXES. PULL BOXES FOR INTERIOR, OR OUTDOOR EXPOSED POWER WIRING SHALL BE PROVIDED WHERE SHOWN OR REQUIRED TO FACILITATE THE INSTALLATION OF THE WIRING. PULL BOXES SHALL NOT BE LOCATED IN FINISHED ROOMS AND SHALL BE ACCESSIBLE FOR MAINTENANCE USE. FOR CONDUIT SIZES 3/4 AND 1 INCH, CONDUIT FITTINGS OF THE "C", "LB", "TB" AND SIMILAR TYPES MAY BE USED FOR "PULLING IN." UNLESS DESIGNATED OTHERWISE, ALL PULL BOXES SHALL BE THE STRAIGHT—THROUGH TYPE AND CHANGES IN DIRECTION SHALL NOT BE MADE IN THE BOX. THE BOXES SHALL BE OF THE MINIMUM SIZE AND TYPE AS REQUIRED BY THE NATIONAL ELECTRIC CODE OR AS SIZED ON THE DRAWINGS.

2.2 COVERS AND DEVICE PLATES

A. CONTRACTOR FURNISHED. THE CONTRACTOR SHALL FURNISH AND INSTALL THE APPROPRIATE COVER ON ALL BOXES, CONDUIT FITTINGS, PANELS, CABINETS, AND SIMILAR WIRING DEVICES AND OTHER EQUIPMENT THAT IS CONTRACTOR FURNISHED.

2.3 ENCLOSURES

A. ENCLOSURES AND HOUSINGS FOR ALL CONTRACTOR FURNISHED ELECTRICAL EQUIPMENT AND DEVICES SHALL BE SUITABLE FOR THE LOCATION AND ENVIRONMENTAL CONDITIONS AND SHALL BE OF NEMA TYPE AS SHOWN ON SYMBOL SHEET DRAWING.

END OF SECTION 16100

SECTION 16110-- ELECTRICAL RACEWAYS

PART 1 - GENERAL

1.1 RELATED SECTIONS

A. MATERIALS SPECIFIED IN THIS SECTION SHALL COMPLY WITH ALL APPLICABLE REQUIREMENTS OF SECTION 16010, GENERAL PROVISIONS.

1.2 SCOPE

- A. CONTRACTOR FURNISHED. THE CONTRACTOR SHALL PROVIDE ALL CONDUIT, FITTINGS, AND SUPPORTS REQUIRED AND NOT OTHERWISE SHOWN ON PLANS AS FURNISHED BY OTHERS.
- B. THE TYPES OF ELECTRICAL RACEWAYS REQUIRED FOR THE PROJECT INCLUDE THE FOLLOWING:
 1. ELECTRICAL METALLIC TUBING
- C. THE MINIMUM RACEWAY SIZE SHALL BE 3/4".

2. LIQUID-TIGHT FLEXIBLE METAL CONDUIT

D. PRODUCT DELIVERY, STORAGE, AND HANDLING. CONTRACTOR IS TO PROVIDE COLOR—CODED END—CAP THREAD PROTECTORS AND HANDLE CONDUIT AND TUBING CAREFULLY TO PREVENT DAMAGE. STORE PIPE AND TUBING INSIDE WHENEVER POSSIBLE. WHEN NECESSARY TO STORE OUTDOORS, ELEVATE WELL ABOVE GRADE AND ENCLOSE WITH DURABLE, WATERTIGHT WRAPPING.

PART 2 - PRODUCTS

2.1 MATERIALS AND COMPONENTS

- A. ELECTRICAL METALLIC TUBING. GALVANIZED, THIN WALL TUBING, FITTINGS SHALL BE HEX-NUT, EXPANSION GLAND TYPE, ZINC PLATED, AND U.L. LISTED AS "RAINTIGHT." NO CRIMP, SPRING, OR SET-SCREW TYPE FITTINGS WILL BE ACCEPTED.
- B. LIQUID-TIGHT FLEXIBLE METAL CONDUIT. GALVANIZED SINGLE STEEL STRIP, FLEXIBLE, INTERLOCKED, DOUBLE WRAPPED, WITH LIQUID-TIGHT PVC JACKET.
- C. CONDUIT, TUBING AND DUCT ACCESSORIES INCLUDING STRAPS, HANGERS, EXPANSION AND DEFLECTION FITTINGS AS RECOMMENDED BY CONDUIT, TUBING, AND DUCT MANUFACTURERS.

PART 3 - EXECUTION

3.1 APPLICATIO

- A. ELECTRICAL METALLIC TUBING. BRANCH CIRCUITS RUN IN HOLLOW DRY WALLS AND ABOVE CEILINGS. NOT TO BE
- B. LIQUID—TIGHT FLEXIBLE METAL CONDUIT. CONNECTION OF MOTORS AND FOR OTHER ELECTRICAL EQUIPMENT WHERE SUBJECT TO MOVEMENT AND VIBRATION. FLEXIBLE CONDUIT IS NOT TO EXCEED 60" IN LENGTH FOR ANY ONE
- C. RIGID GALVANIZED. WHERE SPECIFIED ON PLANS FOR CERTAIN UNDERGROUND OR EXPOSED RUNS, OR WHERE STUBBED UP AT FLOOR LEVEL.

3.2 INSTALLATION

- A. INSTALL CONDUIT AND TUBING IN ACCORDANCE WITH NEC AND NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION'S "STANDARD OF INSTALLATION", AND WITH RECOGNIZED INDUSTRY PRACTICES. WHERE NECA AND NEC STANDARDS DIFFER, USE THE MORE STRINGENT REQUIREMENT.
- B. COMPLETE THE INSTALLATION OF RACEWAYS BEFORE STARTING INSTALLATION OF WIRES.
- C. WHEREVER POSSIBLE, INSTALL HORIZONTAL RACEWAY RUNS ABOVE WATER AND STEAM PIPING.
- D. CARE SHALL BE TAKEN TO KEEP THE INTERIOR OF CONDUITS CLEAN, AND EACH CONDUIT RUN SHALL BE THOROUGHLY CLEANED AND DRIED BEFORE ANY CABLE IS PULLED THROUGH.
- E. UNLESS INDICATED OTHERWISE ON DRAWINGS, ALL EXPOSED CONDUITS SHALL BE RUN PARALLEL WITH OR PERPENDICULAR TO BUILDING STRUCTURAL MEMBERS.
- F. CONDUITS ENTERING SHEET METAL ENCLOSURES SHALL BE MADE UP WITH DOUBLE LOCKNUT AND INSULATING BUSHING. LOCKNUT SHALL BE OF THE TYPE WHICH WILL BITE INTO THE METAL OF THE BOX.
- G. CONDUITS ENTERING THREADED OPENINGS IN EQUIPMENT ENCLOSURES, BOXES, ETC., SHALL HAVE AT LEAST FIVE FULL THREADS ENGAGED. IN OUTDOOR AND UNDERGROUND LOCATIONS, THREADED JOINTS SHALL BE MADE UP WITH A THIN APPLICATION OF CONDUCTING JOINT COMPOUND. THE INSIDE OF THE FITTING SHALL BE THOROUGHLY CLEANED OF ANY EXCESS COMPOUND.
- H. ALL CONDUIT RUNS SHALL BE CONTINUOUS FROM OUTLET TO OUTLET WITH ALL JOINTS AND CONNECTIONS PULLED TIGHT TO INSURE AN ELECTRICALLY CONTINUOUS AND MECHANICALLY SECURE RACEWAY SYSTEM.

3.3 CONDUIT OPENINGS

- A. SEALING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SEALING ALL WALL AND FLOOR OPENINGS AND ALL FLOOR AND WALL SLEEVE OPENINGS UTILIZED BY THE CONTRACTOR WHETHER FURNISHED BY OTHERS OR BY THE CONTRACTOR.
- B. SLEEVES AND OPENINGS SHALL BE SEALED WITH MATERIALS THAT WILL WITHSTAND FIRE AND HEAT TO THE SAME RATING AS THE WALL, FLOOR, OR CEILING THROUGH WHICH THE CONDUIT OR TRAY PASSES AND SHALL NOT BE LESS THAN A 30-MINUTE BARRIER.

END OF SECTION 16110

SECTION 16130 -- CONDUCTORS

PART 1 – GENERAL

1.1 RELATED SECTIONS

A. MATERIALS SPECIFIED IN THIS SECTION SHALL COMPLY WITH ALL APPLICABLE REQUIREMENTS OF SECTION 16010, GENERAL PROVISIONS.

1.2 SCOPE

- A. THIS SPECIFICATION COVERS THE REQUIREMENTS FOR ALL WIRE AND CABLE TO BE USED IN THE INSTALLATION OF THE ELECTRICAL SYSTEMS FOR THE PROJECT, INCLUDING ALL POWER, LIGHTING, CONTROL AND INSTRUMENTATION SYSTEMS.
- B. WIRE AND CABLE WILL NORMALLY BE FURNISHED BY THE CONTRACTOR FOR INSTALLATION. DRAWINGS WILL INDICATE WHERE CABLE IS NOT TO BE FURNISHED.
- C. ALL CABLE IS TO BE "CONTRACTOR-FURNISHED", THE CONTRACTOR SHALL SUBMIT FOR APPROVAL BY THE OWNER ANY DEVIATIONS ANTICIPATED OR PROPOSED WITH RESPECT TO THE CABLE MANUFACTURER, CABLE TYPE, OR SPECIFICATION CONTAINED HEREIN.

PART 2 - PRODUCTS

- 21 MATERIAL
- A. ALL WIRE AND CABLE SHALL BE UNDERWRITERS' LABORATORIES (UL) LISTED. IN ADDITION TO OTHER STANDARD LABELING, ALL WIRE AND CABLE SHALL BE MARKED UL ON THE OUTER SURFACE INDICATING UNDERWRITERS' LABORATORIES, INC. CERTIFICATION.
- B. GROUNDING CONDUCTORS, WHERE INSULATED, SHALL BE COLORED SOLID GREEN. CONDUCTORS INTENDED AS A NEUTRAL SHALL BE COLORED SOLID WHITE.
- C. FOR ALL CIRCUITS 600 VOLT AND LESS, WIRES AND CABLES SHALL HAVE CODE GRADE, 600 VOLT TYPE THWN—THHN, 75 DEGREES C., WET OR DRY LOCATIONS, MOISTURE AND HEAT RESISTANT THERMOPLASTIC INSULATION. INSULATION THICKNESS SHALL BE PER NATIONAL ELECTRICAL CODE, TABLE 310—13.
- D. CONDUCTOR SIZES ARE EXPRESSED IN AMERICAN WIRE GAGE (AWG) OR IN CIRCULAR MILS. CONDUCTORS SHALL BE ANNEALED COPPER WIRE, MINIMUM SIZE #12 AWG, EXCEPT THAT #14 AWG MAY BE USED FOR CONTROL. ALL CONDUCTORS SHALL BE STRANDED.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. SEPARATION OF USAGE. LIGHTING AND POWER WIRING SHALL BE ROUTED IN CONDUITS, OR OTHER RACEWAYS AS SHOWN ON THE DRAWINGS. LIGHTING AND POWER WIRING SHALL NOT BE ROUTED IN A COMMON RACEWAY EXCEPT WHERE SHOWN ON DRAWINGS. PUSH—BUTTON WIRING SHALL BE ROUTED IN SEPARATE RACEWAYS EVEN THOUGH RELATED TO A PARTICULAR MOTOR CIRCUIT.
- B. PULLING. WHERE MECHANICAL ASSISTANCE IS USED FOR PULLING CONDUCTORS, PATENTED WIRE PULLING COMPOUNDS HAVING INERT QUALITIES THAT DO NOT HARM THE WIRE INSULATION OR COVERING SHALL BE APPLIED TO THE CONDUCTORS AS THEY ARE PULLED INTO RACEWAYS. INTERIOR OF ALL RACEWAYS SHALL BE FREE FROM GREASE, FILINGS OR FOREIGN MATTER BEFORE CONDUCTORS ARE PULLED IN.

3.2 IDENTIFICATION

- A. WIRE, CABLE, RACEWAYS, AND CONDUITS.
- B. CIRCUIT IDENTIFICATION NUMBERS SHALL BE PLACED ON EACH END OF THE CONDUCTOR INVOLVED BY USING SELF—LAMINATING MARKER TAGS, T&B COMPANY E-Z CODE TYPE WSL OR EQUAL. CIRCUIT NUMBERS SHALL BE AS SHOWN ON THE PLAN AND PANEL SCHEDULE DRAWINGS.
- C. PHASE IDENTIFICATION. PHASE SEQUENCE THROUGHOUT THE INSTALLATION SHALL BE STANDARDIZED WHEREVER PRACTICAL IN ALL ELECTRICAL POWER EQUIPMENT AS FOLLOWS:

	FRASE A	FUASE D	FRASE C
POSITION OCCUPIED	FRONT TOP LEFT	CENTER CENTER CENTER	REAR BOTTOM RIGHT
COLOR CODE: 480/277V, 3-PHASE	BROWN	ORANGE	YELLOW

- 3.3 SPLICES AND TERMINATIONS
- A. LIGHTING CONDUCTORS. SPLICES IN LIGHTING CONDUCTORS SHALL BE MADE WITH SPLICING CAPS WITH METAL INSERTS ONLY, SUCH AS 3M COMPANY'S "SCOTCHLOCK" SPRING CONNECTORS. THE SPLICES SHALL BE FIRMLY AND NEATLY TAPED TO PREVENT ENTRY OF MOISTURE.
- B. POWER CONDUCTORS SHALL BE CONTINUOUS FROM OUTLET TO OUTLET. NO POWER CABLE SHALL BE SPLICED EXCEPT ON EXPLICIT INSTRUCTIONS OF THE OWNER'S REPRESENTATIVE.

3.4 LUGS

- A. ALL LUGS SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR WHERE REQUIRED.
- B. LUGS FOR COPPER POWER WIRING, SIZES NO. 12 AND NO. 10 AWG, SHALL BE T&B "STA-KON" UN-INSULATED RING TYPE LUGS. LUGS FOR COPPER POWER WIRING FROM NO. 10 AWG TO SIZE 1/0 AWG SHALL BE T&B 1-HOLE TYPE 54100 SERIES. SIZE 2/0 AWG AND LARGER LUGS SHALL BE 2-HOLE TYPE 54200 SERIES (EXCEPT WHERE 1-HOLE IS REQUIRED TO MATCH MOTOR LEAD LUGS). SIZES ABOVE 1/0 ARE TO BE APPLIED USING HYDRAULIC PUMP TOOL.
- B. WHERE MOTOR LEADS ARE FURNISHED WITHOUT LUGS, T&B 54500 SERIES 2—WAY CONNECTORS (SPLICING SLEEVES) SHALL BE USED. SPLICE SLEEVES MAY BE DESIRABLE WHERE LIMITED SPACE FOR TERMINATION EXISTS.
- C. THE PROPER LUGS WILL NORMALLY BE FURNISHED WITH EQUIPMENT IN ALL OWNER-FURNISHED EQUIPMENT. ALL OTHER LUGS SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR. NO MECHANICAL TYPE LUGS SHALL BE USED EXCEPT IN PANELBOARDS. IF ANY MECHANICAL TYPE LUGS ARE FURNISHED WITH OWNER-FURNISHED EQUIPMENT, THE CONTRACTOR SHALL REPLACE THEM WITH PROPER COMPRESSION TYPE LUGS WHERE PRACTICAL.
- 3.5 TAPING
- A. ALL VOIDS, SHARP CORNERS AND BOLT PROJECTIONS SHALL BE MADE SMOOTH BY FILLING WITH OKONITE OR SCOTCH FILL BEFORE APPLYING THE LAPS OF TAPE REQUIRED FOR INSULATION. ALL LOOSE STRANDS OF WIRE SHALL BE REMOVED BEFORE TAPING. DUXSEAL WILL NOT BE PERMITTED.
- B. JOINTS AND OTHER SECTIONS OF WIRING REQUIRING TAPE SHALL BE HALF LAP AND AT LEAST TWO LAYERS. TAPING SHALL BE NEATLY DONE AND SHALL FORM A PERMANENT INSULATION EQUAL IN MECHANICAL AND ELECTRICAL STRENGTH TO THE INSULATION OF THE CONDUCTOR. TAPING SHALL BE AS FOLLOWS:
- 1. 600 VOLT INSULATION A MINIMUM OF 1-1/2 LAP LAYER VARNISHED CAMBRIC AND 2-1/2 LAP LAYERS OF 3M NO. 33 VINYL PLASTIC ELECTRICAL TAPE.
- C. ALL TAPING, SPLICING AND TERMINATION MATERIALS SHALL BE FURNISHED BY THE CONTRACTOR.

END OF SECTION 16130

TES, INC.

O 2/3/12 DJB ISSUE FOR BIDS

NO. DATE BY DESCRIPTION

DESCR

ENGINEERS & ASSOCIATES, INC.
P. O. BOX 16598
GREEN/ILE, SOUTH CAROLINA
864-277-8287

UPSTATE SMITH BUILDING
DEFERRED MAINTENANCE
SPARTANBURG, SOUTH CAROLI

DJB
DATE
1/27/12
JOB NO.
PERITUS #110201
SHEET

2 OF 2 SHEETS

DJB

TMP



Upstate Smith Building Repairs Project Number: CP00174726 Pre-Bid Conference

February 15, 2012 @ 10:00am – USC Upstate Facilities Conference Room, Spartanburg, SC

ATTENDEE'S NAME	COMPANY NAME & MAILING ADDRESS
Jody Parker	Peritus Engineers & Associates, Inc.
1	Po Box 16598 Greenville, & 29606
	PHONE# 864-277-8287
	FAX# 864-277-8290
P-0	EMAIL parker @ peritus engineers. com
Rodney Jones	(5 Constant 3 476
	7606 FRATEST SATES SC
	PHONE# 503-0337
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	EMAIL Palney & CTLS OF SIGNATION CO
	Bus Mack Contosching donc
	PO Bor 4424)
	W.Columbia SC 29171
	PHONE# 803 - 261 - 1331
	FAX# 803 - 461 - 4933
, 1	EMAIL wince og bernack contracting com
JUSTIN CALHOW	Ruther foul Heating + Ar Conditioning
	737 F Main St Spindak NC 28160
	PHONE# 828-287-2240
	FAX# 827- 287- 1352
	EMAIL Justin Cal @ hellsouth. net
	The state of the s



Upstate Smith Building Repairs Project Number: CP00174726 Pre-Bid Conference

February 15, 2012 @ 10:00am – USC Upstate Facilities Conference Room, Spartanburg, SC

ATTENDEE'S NAME	COMPANY NAME & MAILING ADDRESS
Church STEffens	[h/Mm Serville, 50 29681 121 webb 37, 50 29681 PHONE# 864-226-8571 FAX# 864-967-2490 EMAIL STOPPERSCO CHIMPINGCOP
	PHONE#
	FAX#
	EMAIL
	PHONE#
	FAX#
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