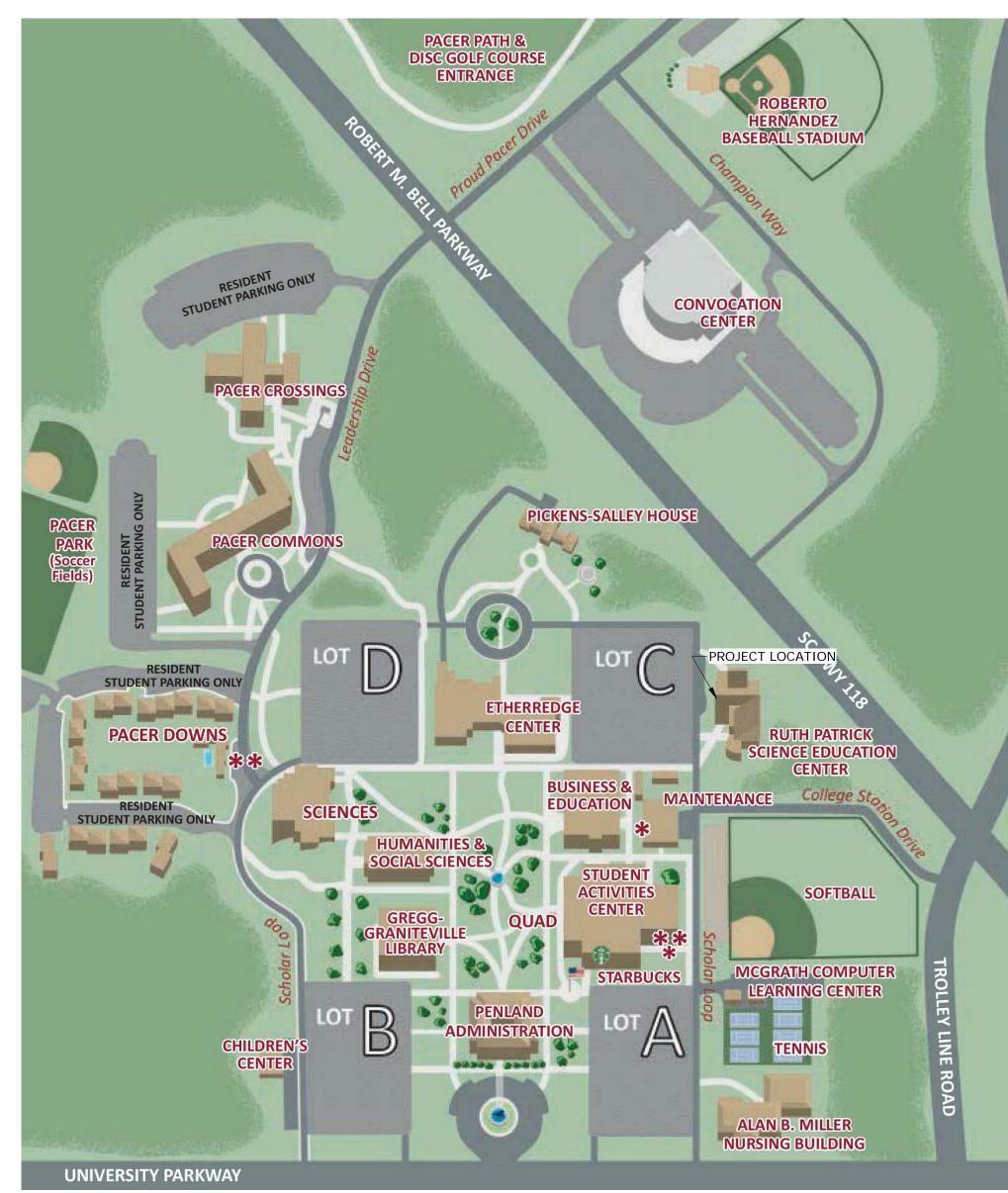
## PROJECT 50003278 USC-AIKEN RUTH PATRICK CLASSROOM RENOVATIONS

**USC AIKEN** 

471 UNIVERSITY PKWY, AIKEN, SC 29801



**PLAN NORTH** 

**PROJECT SCOPE:** MINOR INTERIOR RENOVATION OF EXISTING CLASSROOMS & OFFICES **INDEX OF DRAWINGS** 

EGRESS PLAN & CODE ANALYSIS G0.2

**ARCHITECTURAL** 

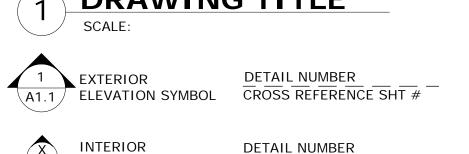
FIRST FLOOR PLAN - NEW WORK PLAN SECOND FLOOR PLAN - ADD ALTERNATE #1 REFLECTED CEILING PLAN SECTIONS & DETAILS

#### **MECHANICAL**

MECHANICAL SPECIFICATIONS MECHANICAL DETAILS AND SCHEDULE MECHANICAL DEMOLITION AND NEW WORK MECHANICAL DEMOLITION AND NEW WORK

#### **ELECTRICAL**

LEGEND NOTES AND FICTURE SCHEDULE E2.0 LIGHTING PLAN POWER AND SYSTEMS PLAN ELECTRICAL SPECIFICATIONS



SECTION SYMBOL DETAIL NUMBER

SYMBOL 9'-0" A.F.F.

**ELEVATION MARKER ROOM NAME** ROOM NUMBER

DETAIL NUMBER

CROSS REFERENCE SHT #

DOOR NUMBER WINDOW TYPE



ELECTRICAL DESIGN ELECTRICAL ENGINEERS

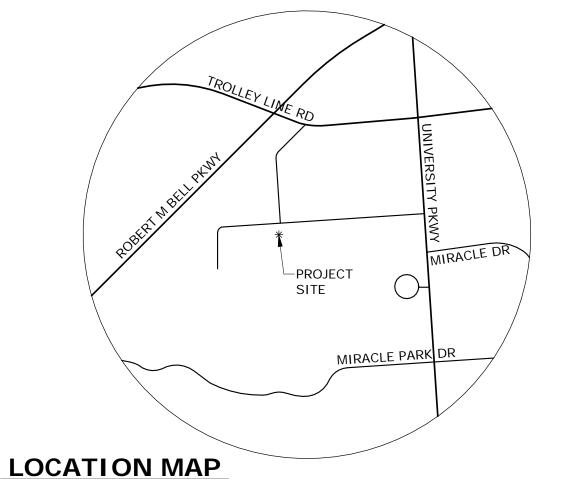
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вот, BRG. BTUH CARF CFM CON DIA.

DETAIL

EXHAUST FAN

ENAMEL PAINT

EACH WAY

ELECTRICAL CONDUIT

ELEVATION SYMBOL

COND. INSIDE DIAMETER INSULATION

S.S. NRY OPENING STD. TURE RESISTANT ONAL ELECTRICAL CODE SIDE DIAMETER THOLD. LAND CEMENT PLASTER TRANSL TYP. TIC LAMINATE 'OOD SURE TREATED VCT VINYL CHLORIDE RRY TILE FORCED CONCRETE PIPE W/O

STRUCTURAL TEMPERED TOP TOP OF FOOTING THRESHOLD TOP OF JOIST TRANSLUCENT TYPICAL **UNLESS NOTED** OTHERWISE VINYL COMPOSITION TILE WITH WITHOUT WOOD WATER METER

**FABRIC** 

SIMILAR

STANDARD

STATIC PRESSURE

STAINLESS STEEL

PROJECT NO. 17-17 02-19-2018 24"x36" CD

**CAMPUS MAP** 

CONSULTANTS, INC

**GENERAL LEGEND** DRAWING TITLE

CROSS REFERENCE SHT #

STORAGE 2104A 109

S.H.

X

#### **ABBREVIATIONS**

	AMPERAGE	E.S.	EACH SIDE	LGMF	LIGHT GAUGE METAL
,	AIR CONDITIONER	EWC	ELECTRICAL WATER		FRAMING
.F.	ABOVE FINISH FLOOR		COOLER	M.O.	MASONRY OPENING
	ALTERNATE	EXP.	EXPANSION	M/R	MOISTURE RESISTANT
	ALUMINUM	EXT.	EXTERIOR	MTL	METAL
	AT	F.D.	FLOOR DRAIN	NEC	NATIONAL ELECTRICA
	ACOUSTICAL TILE	FEC.	FIRE EXTINGUISHER	O.A.	OUTSIDE AIR
G.	AVERAGE WIRE GAUGE	F.F.L.	FINISH FLOOR LEVEL	O.C.	ON CENTER
	BOARD	FIN.	FINISH	O.D.	OUTSIDE DIAMETER
Г, В/	BOTTOM	FLR.	FLOOR	O.H.	OVERHEAD
3.	BEARING	FT.	FOOT	Р	POLE
JH	BRITISH THERMAL	F.V.	FIELD VERIFY	PCPL	PORTLAND CEMENT PL
	UNIT/ HOUR	G.	GROUND	PL.	PLATE
<b>/</b> .	BOTH WAYS	GA.	GAUGE	PLAM	PLASTIC LAMINATE
RP.	CARPET	G.C.	GENERAL	PLYWD.	PLYWOOD
Λ	CUBIC FEET PER MINUTE		CONTRACTOR	P.T.	PRESSURE TREATED
	CONSTRUCTION JOINT	GPDW	GYPSUM DRYWALL	PVC.	POLY VINYL CHLORIDI
	CENTER LINE	GPM	GALLONS PER MINUTE	Q.T.	QUARRY TILE
	CLEARANCE	H/C	HANDICAP	R.	RADIUS
NT.	CONTINUOUS	H.M.	HOLLOW METAL	R.C.P.	REINFORCED CONCRE
	CERAMIC TILE	H.P.	HORSE POWER	R.D.	ROOF DRAIN
١.	DIAMETER	HVAC	HEAT'G, VENT'G & AIR	RDL.	ROOF DRAIN LINE
	DOMM		COND	DEE	DEFEDENCE

INTERIOR

COLUMN

INCHES OF WATER

LD.

INSUL.

CROSS REFERENCE SHT #

S.P.

SOLID CORE

SPRINKLER HEAD

DRAIN LINE REFERENCE WATERPROOF REINFORCING WATER VALVE REVOLUTIONS PER MINUTE WELDED WIRE

DRAWING TITLE

INDEX

DRAWING NO. **G**0.1

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AUGUSTA, GEORGIA

**ADD ALTERNATE #1:** 

**INSTALLED WORK ASSOCIATED** WITH LEVEL 2 CLASSROOMS

**KEY PLAN: FIRST FLOOR** 

**KEY PLAN: SECOND FLOOR** 

-AREA OF WORK

-AREA OF WORK 1144 SF

Description

PROJECT 50003278

**USC-AIKEN RUTH** 

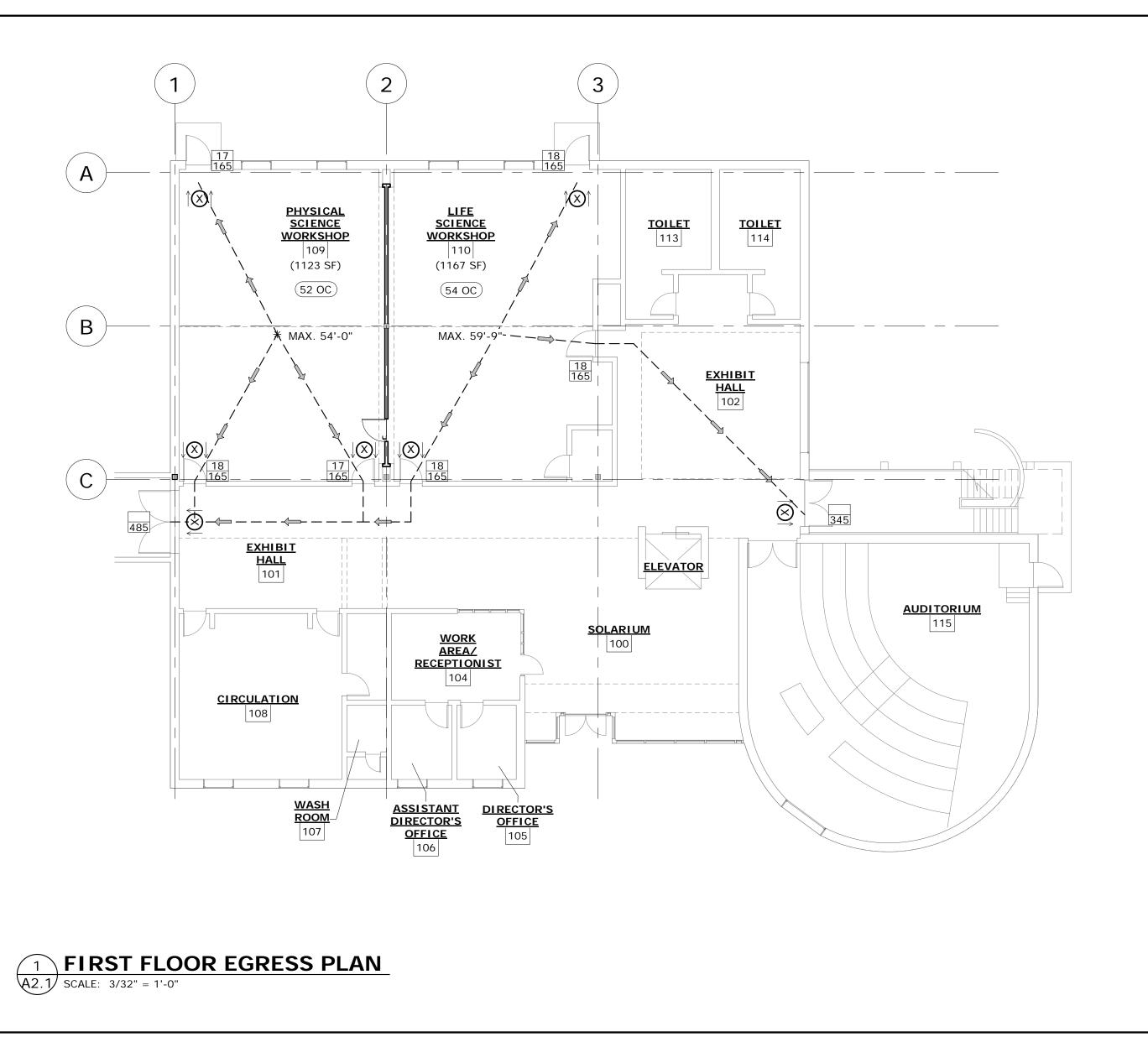
**PATRICK** 

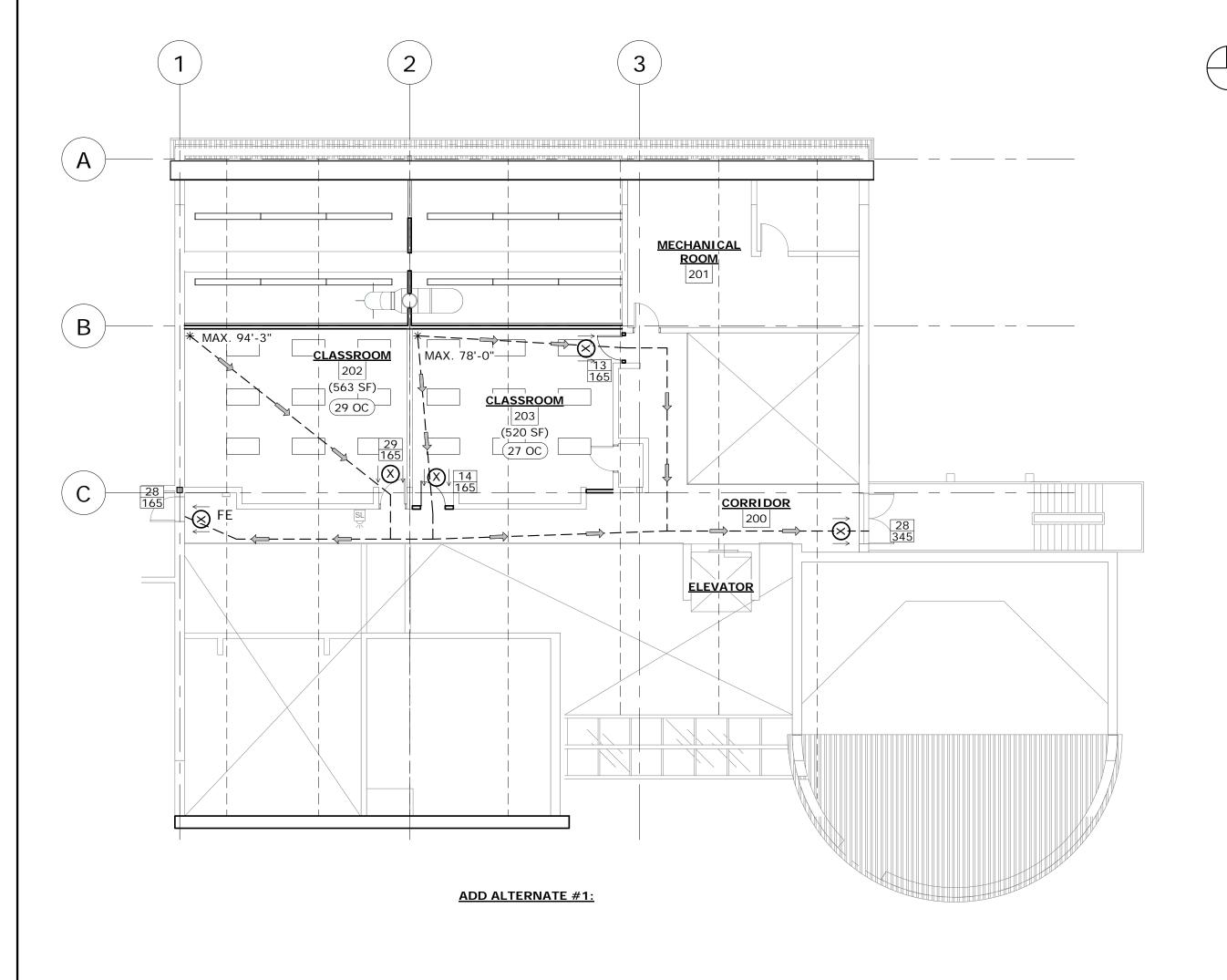
**CLASSROOM** 

**RENOVATIONS** 

**USC AIKEN** 

471 UNIVERSITY PKWY, AIKEN, SC 29801





#### SECOND FLOOR EGRESS PLAN A2.1/ SCALE: 3/32" = 1'-0"

#### CODE ANALYSIS

#### A. PROJECT SCOPE SUMMARY:

1. THE PURPOSE OF THIS PROJECT IS TO CREATE A SEPARATE SOUND ATTENUATED CLASSROOMS ON THE FIRST FLOOR AND TO REPURPOSE 2ND FLOOR AREAS FROM STORAGE TO CLASSROOMS.

2. THE MAJORITY OF THE AREA OF WORK IS TO ADD SOUND WALL, CREATE CLASSROOM SEPARATION.

NEITHER EXISTING BUILDING OCCUPANCY NOR EXISTING COMPONENTS OF MEANS OF EGRESS ARE AFFECTED BY THE WORK.

#### **GROSS RENOVATION AREA:**

B. 3,366 S.F. AREA AFFECTED

OCCUPANCY (NFPA 101-2012) C.1. EXISTING CLASSROOM 1. CLASSIFICATION (6.1.5)

#### CONSTRUCTION (NFPA 101-2012)

D.1. TWO (EXISTING) NUMBER OF FLOORS

D.2. TYPE II (222), NONE SPRINKLED TYPE OF CONSTRUCTION

(NFPA 101 - TABLE 20/21.3) (TABLE 19.1.6.1) D.3. BY AREA = 42 OCCUPANTS OCCUPANT LOAD (AFFECTED AREA) BY USE = 44 OCCUPANTS

(TABLE 7.3.1.2) 3051 (BUSINESS) / 100 = 312989 (INPATIENT TREATMENT) / 240 = 13)

#### MEANS OF EGRESS (NFPA 101-2012)

E.1. NOT AFFECTED (EXISTING = 96") CLEAR CORRIDOR WIDTH (18.2.3.4)

DOORS IN THE MEANS OF EGRESS (18.2.3.7) E.2. 32" CLR MIN. E.3. NOT AFFECTED STAIRS

E.4. NOT AFFECTED 4. FIRE BARRIERS (TABLE 18.3.2.1)

E.5. NOT AFFECTED ARRANGEMENT OF MEAN OF EGRESS

E.6. NOT AFFECTED DEAD END CORRIDOR LIMIT (TBL. A.7.6) E.7. NOT AFFECTED (156'-0" FROM MOST REMOTE 7. TRAVEL DISTANCE TO EXITS (TBL. A.7.6)

POINT IN A ROOM TO AN EXIT) (200' MAX, SPRINKLERED)

F. NOT AFFECTED

PROTECTION FROM HAZARDS (18.3.2)

G. N/A G. SPRINKLERS (NFPA 101-2012)

H. EXISTING H. FIRE ALARMS (NFPA 101-2012)

PROVIDED PORTABLE FIRE EXTINGUISHERS (NFPA 101-2012)

OCCUPANCY CLASSIFICATION AND HAZARD

CLASSROOM / EDUCATIONAL (6.2.2.3)/ ORDINARY HAZARD OF CONTENTS (NFPA 101- 2012)

CONSTRUCTION TYPE (IBC 2012/ NFPA IBC = TYPE 1-B (TBL-601)NFPA = TYPE II (222) (TBL.18.1.6.1) AND 101-2012)

(TBL A.8.2.1.2)

M. INTERIOR FINISH (TBL A10.2.2)

M.1. NOT AFFECTED EXITS - CLASS A OR B M.2. NOT AFFECTED ACCESS TO EXITS - CLASS A OR B

M.3. NOT AFFECTED OTHER SPACES - CLASS A OR B M.4. NOT AFFECTED 4. FLOOR FINISH - CLASS I OR II

#### APPLICABLE CODE W/ SOUTH CAROLINA AMENDMENTS

INTERNATIONAL BUILDING CODE WITH SOUTH CAROLINA MODIFICATIONS. INTERNATIONAL ENERGY CONSERVATION CODE.

IECC 2009

IFC 2015 INTERNATIONAL FIRE CODE WITH SOUTH CAROLINA MODIFICATIONS.

IFGC 2015 INTERNATIONAL FUEL GAS CODE WITH SOUTH CAROLINA MODIFICATIONS. IMC 2012 INTERNATIONAL MECHANICAL CODE.

IPC 2012 INTERNATIONAL PLUMBING CODE.

INTERNATIONAL RESIDENTIAL CODE (2014, 2015 AMENDMENTS) IRC 2012 NFPA 70 2014 NATIONAL ELECTRIC CODE (NEC) (PER 120-3-3) (PER DCA)

#### LEGEND:

1-HOUR RATED

SMOKE PARTITION

2-HOUR RATED **★** -⇒ - MAX TRAVEL DISTANCE / PATH

28 —ACTUAL NUMBER OF OCCUPANTS

165 ← CAPACITY OF DOOR OR EXIT

(32 OC) NUMBER OF OCCUPANTS

**EXIT SIGNS** 

FIRE ALARM PULL

HORN

FIRE ALARM STROBE LIGHT

W/ BATTERY PACK

SMOKE DETECTOR

FE □ FIRE EXTINGUISHER

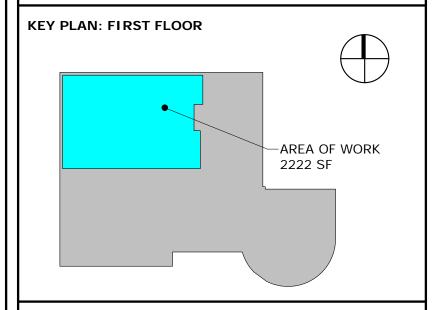
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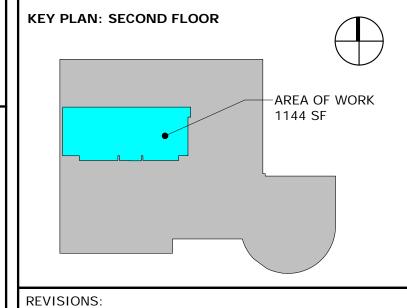
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**ADD ALTERNATE #1:** INSTALLED WORK ASSOCIATED WITH LEVEL 2 CLASSROOMS





Date	Description

PROJECT 50003278 **USC-AIKEN RUTH PATRICK CLASSROOM** 

**RENOVATIONS** 

**USC AIKEN** 

471 UNIVERSITY PKWY, AIKEN, SC 29801

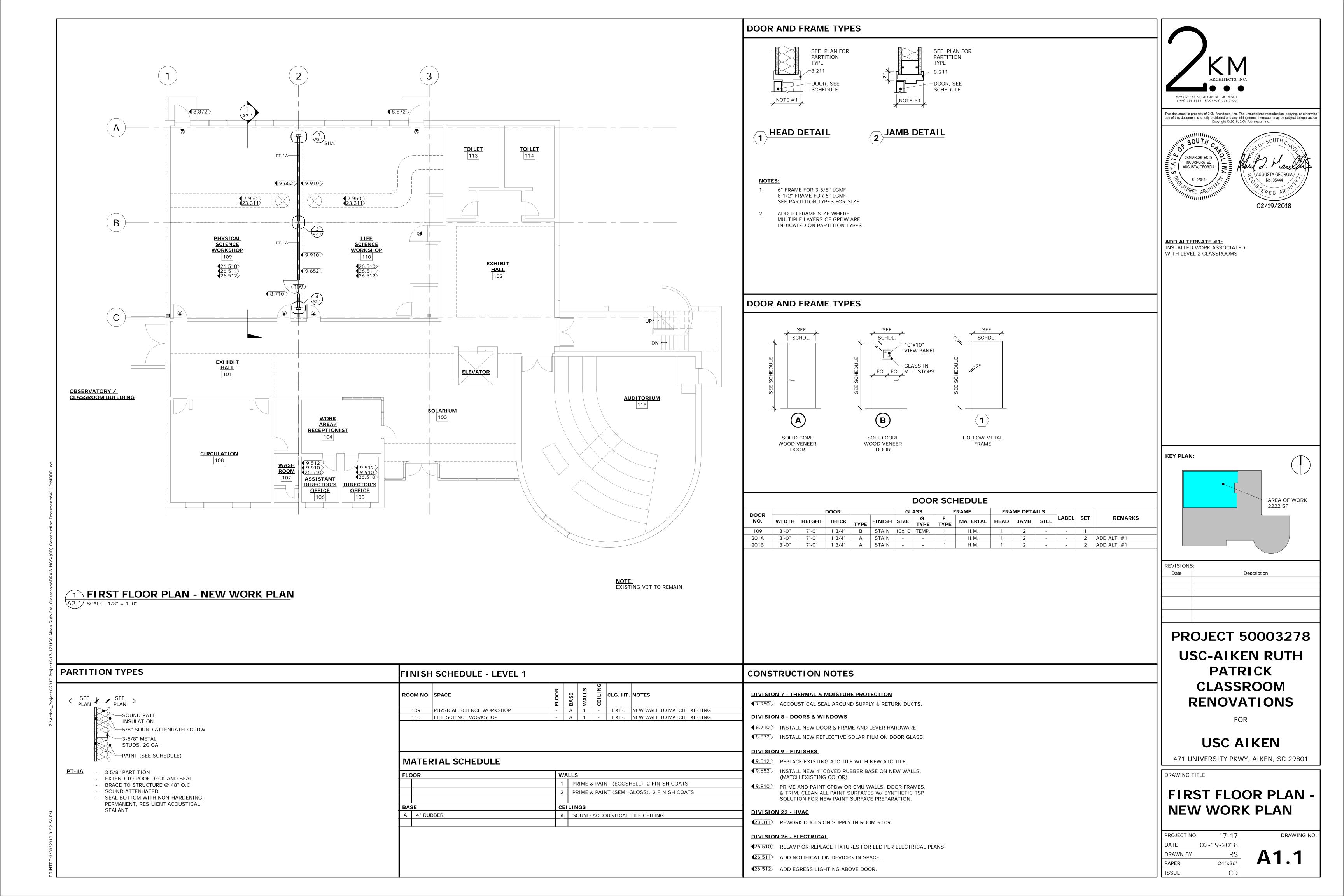
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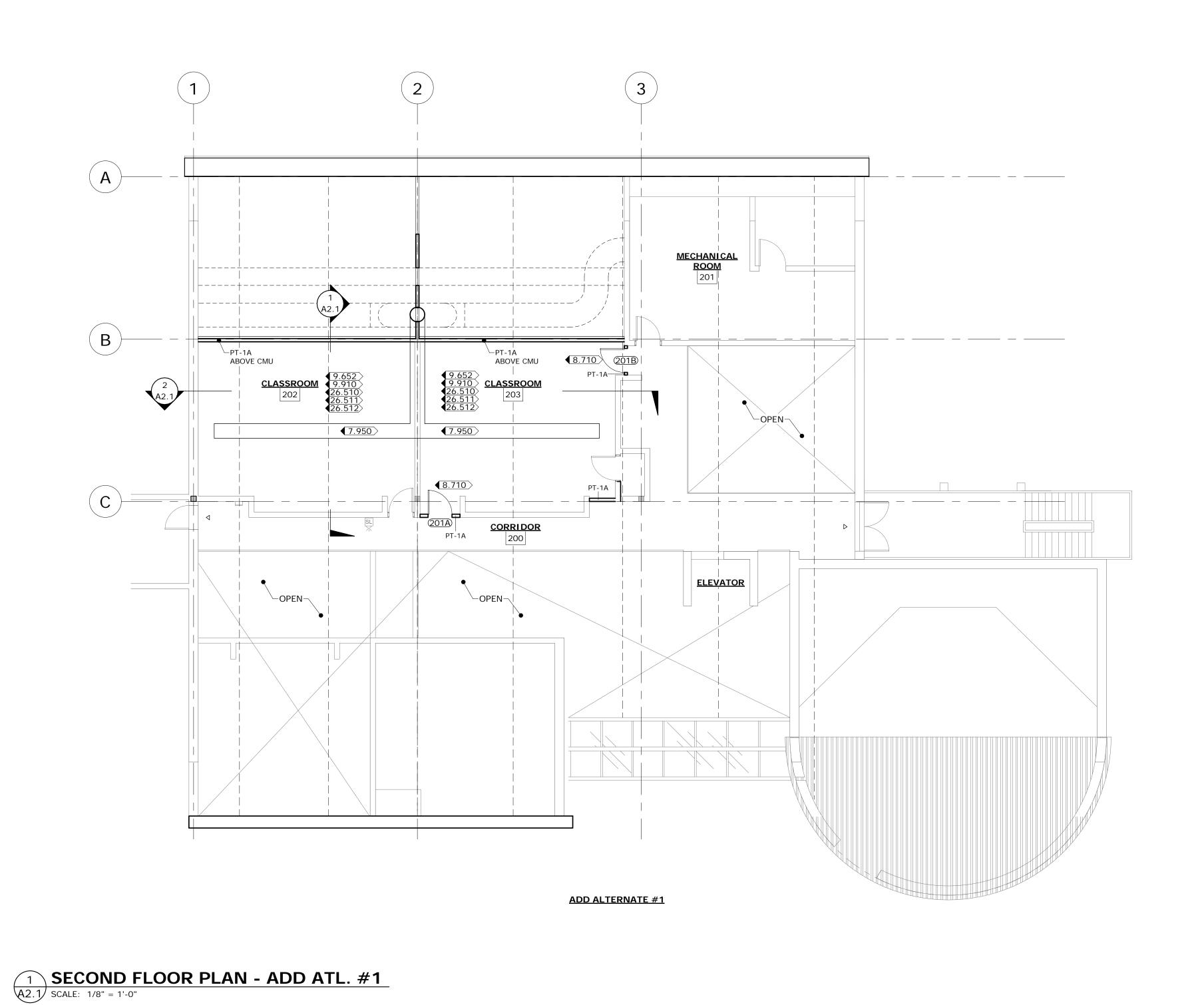
**EGRESS PLAN & CODE ANALYSIS** 

PROJECT NO.	17-17
DATE	02-19-2018
DRAWN BY	RS
PAPER	24"x36"
ISSUE	CD

G0.2

DRAWING NO.





FINISH SCHEDULE - LEVEL 2 **CONSTRUCTION NOTES** BASE CEILING CEILING **DIVISION 7 - THERMAL & MOISTURE PROTECTION** ROOM SPACE (7.950) ACCOUSTICAL SEAL AROUND SUPPLY & RETURN DUCTS. - A 1 A 9'-4" 202 CLASSROOM **DIVISION 8 - DOORS & WINDOWS** - A 1 A 9'-4" 203 CLASSROOM (8.710) INSTALL NEW DOOR & FRAME AND LEVER HARDWARE. **●**8.872 INSTALL NEW REFLECTIVE SOLAR FILM ON DOOR GLASS. **DIVISION 9 - FINISHES** (9.512) REPLACE EXISTING ATC TILE WITH NEW ATC TILE. MATERIAL SCHEDULE (9.652) INSTALL NEW 4" COVED RUBBER BASE ON NEW WALLS. (MATCH EXISTING COLOR) FLOOR PRIME & PAINT (EGGSHELL), 2 FINISH COATS 9.910 PRIME AND PAINT GPDW OR CMU WALLS, DOOR FRAMES, & TRIM. CLEAN ALL PAINT SURFACES W/ SYNTHETIC TSP PRIME & PAINT (SEMI-GLOSS), 2 FINISH COATS SOLUTION FOR NEW PAINT SURFACE PREPARATION. BASE CEILINGS **DIVISION 23 - HVAC** A 4" RUBBER A SOUND ACCOUSTICAL TILE CEILING (23.311) REWORK DUCTS ON SUPPLY IN ROOM #109.

**DIVISION 26 - ELECTRICAL** 

426.511 ADD NOTIFICATION DEVICES IN SPACE.

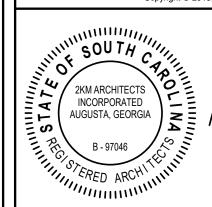
**◆**26.512 ADD EGRESS LIGHTING ABOVE DOOR.

**€**26.510 RELAMP OR REPLACE FIXTURES FOR LED PER ELECTRICAL PLANS.

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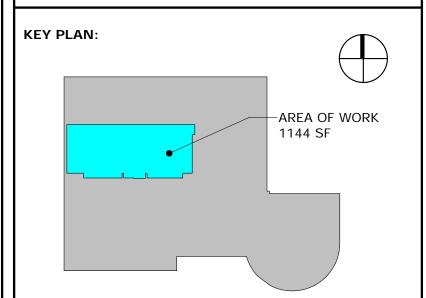
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ADD ALTERNATE #1:
INSTALLED WORK ASSOCIATED
WITH LEVEL 2 CLASSROOMS



Date Description

PROJECT 50003278

USC-AIKEN RUTH
PATRICK
CLASSROOM
RENOVATIONS

USC AIKEN

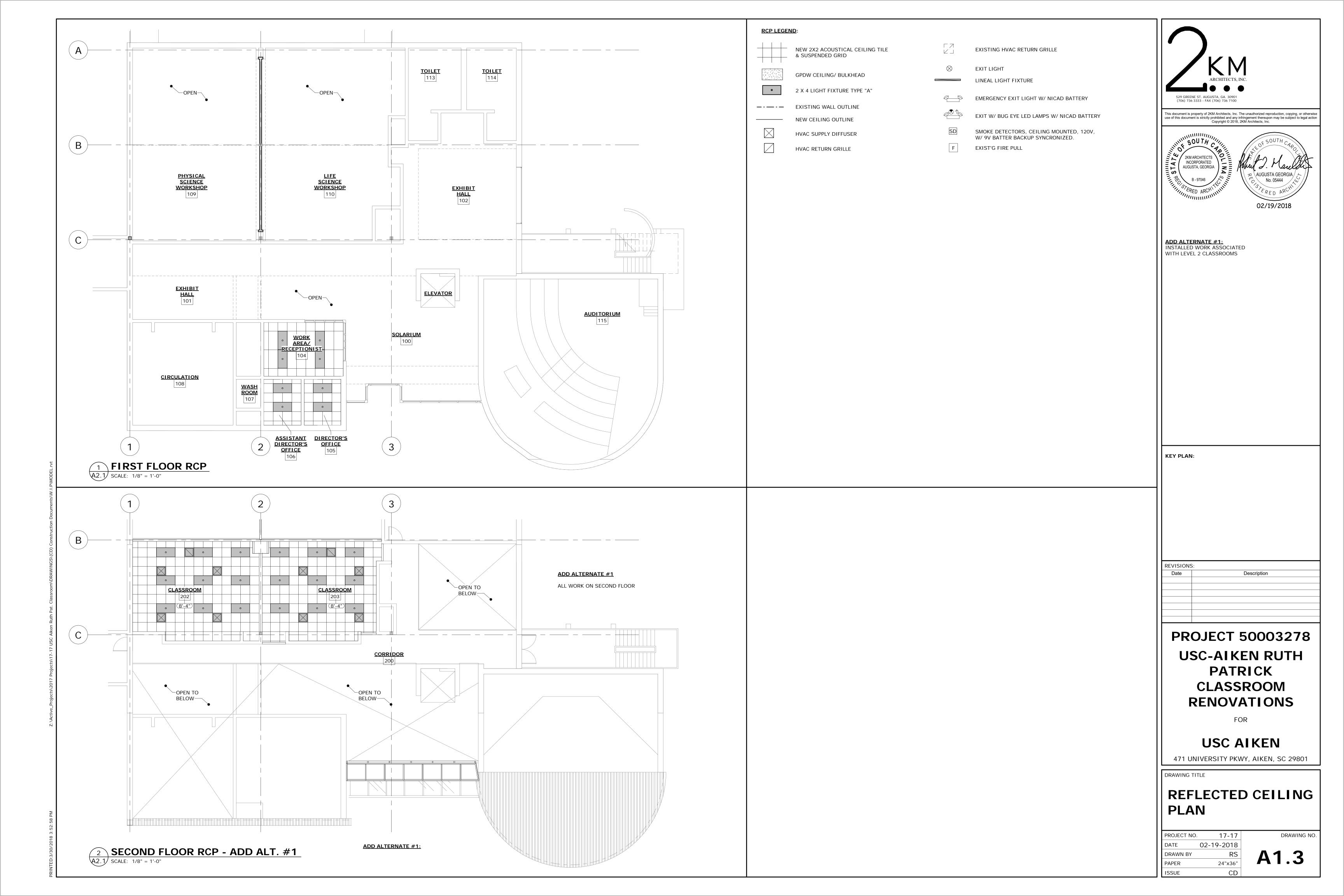
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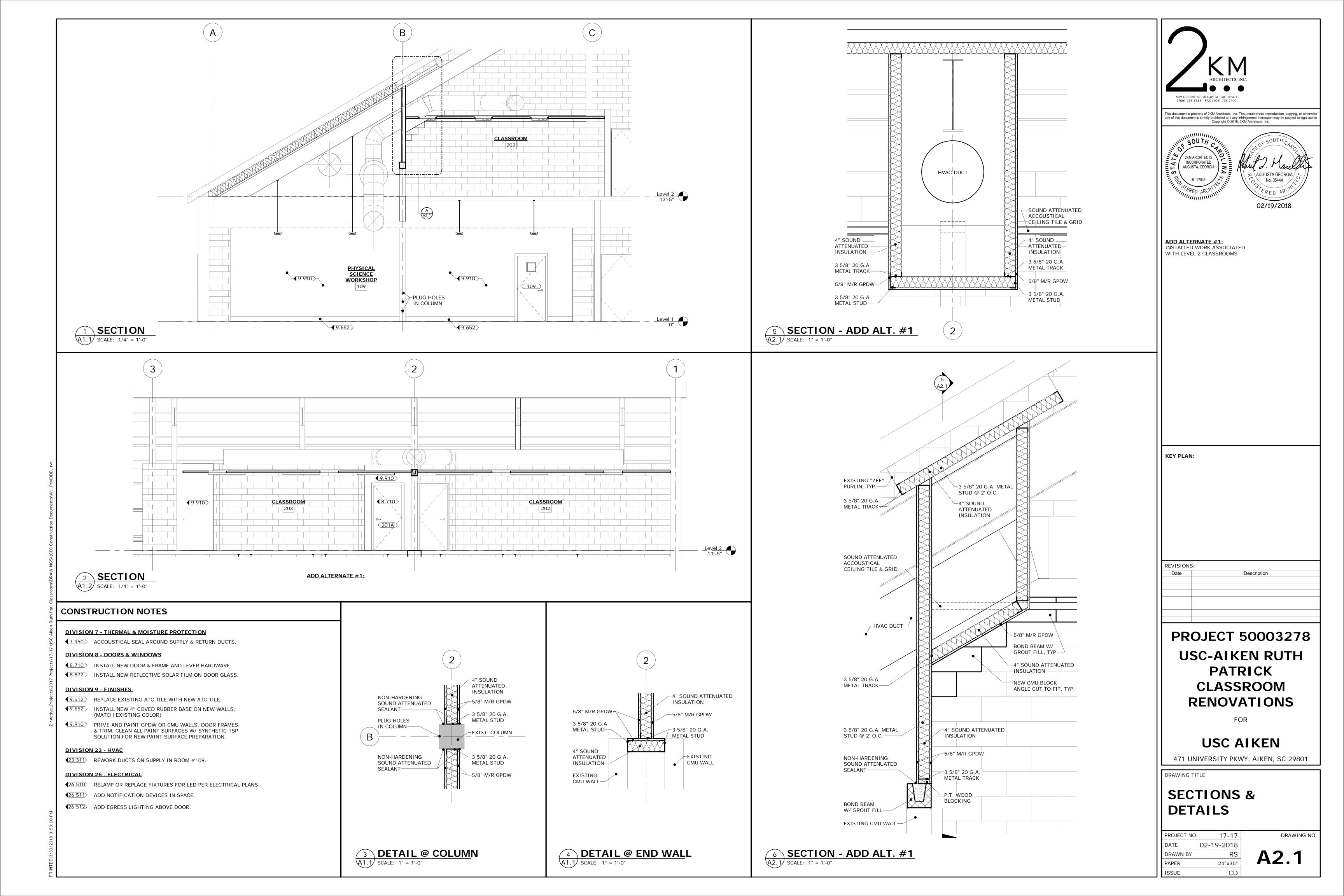
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SECOND FLOOR PLAN - ADD ALTERNATE #1

	PROJECT NO.	17-17
	DATE	02-19-2018
	DRAWN BY	RS
	PAPER	24"x36"
	ISSUE	CD

**A1.2** 





- 1.1 COORDINATION A. ARRANGE FOR DUCT SPACES, CHASES, SLOTS, AND OPENINGS IN BUILDING STRUCTURE DURING PROGRESS OF
- CONSTRUCTION, TO ALLOW FOR MECHANICAL INSTALLATIONS. 1.2 HVAC DEMOLITION
- A. COORDINATE WITH ARCHITECTURAL PHASING PLAN & SPECIFICATIONS TO DISCONNECT, DEMOLISH, AND REMOVE HVAC SYSTEMS, EQUIPMENT, AND COMPONENTS INDICATED TO BE REMOVED. PLAN DEMO WORK ACCORDINGLY
- AND PROVIDE TEMPORARY RECONNECTION OF SERVICE TO MINIMIZE OUTAGES TO OCCUPIED AREAS. B. DUCTS TO BE REMOVED: REMOVE PORTION OF DUCTS INDICATED TO BE REMOVED. C. IF INSULATION, OR EQUIPMENT TO REMAIN IS DAMAGED IN APPEARANCE OR IS UNSERVICEABLE, REMOVE
- DAMAGED OR UNSERVICEABLE PORTIONS AND REPLACE WITH NEW PRODUCTS OF EQUAL CAPACITY AND QUALITY. INSPECT AND DISCUSS CONDITION OF CONSTRUCTION TO BE SELECTIVELY DEMOLISHED. E. REVIEW AND FINALIZE SELECTIVE DEMOLITION SCHEDULE AND VERIFY AVAILABILITY OF MATERIALS, DEMOLITION
- PERSONNEL, EQUIPMENT, AND FACILITIES NEEDED TO MAKE PROGRESS AND AVOID DELAYS. F. REVIEW REQUIREMENTS OF WORK PERFORMED BY OTHER TRADES THAT RELY ON SUBSTRATES EXPOSED BY SELECTIVE DEMOLITION OPERATIONS
- G. REVIEW AREAS WHERE EXISTING CONSTRUCTION IS TO REMAIN AND REQUIRES PROTECTION
- H. OWNER WILL OCCUPY PORTIONS OF BUILDING IMMEDIATELY ADJACENT TO SELECTIVE DEMOLITION AREA.
- CONDUCT SELECTIVE DEMOLITION SO OWNER'S OPERATIONS WILL NOT BE DISRUPTED. I. CONDITIONS EXISTING AT TIME OF INSPECTION FOR BIDDING PURPOSE WILL BE MAINTAINED BY OWNER AS FAR
- NOTIFY ARCHITECT OF DISCREPANCIES BETWEEN EXISTING CONDITIONS AND DRAWINGS BEFORE PROCEEDING WITH SELECTIVE DEMOLITION. K. HAZARDOUS MATERIALS: IT IS NOT EXPECTED THAT HAZARDOUS MATERIALS WILL BE ENCOUNTERED IN THE
- L. IF SUSPECTED HAZARDOUS MATERIALS ARE ENCOUNTERED, DO NOT DISTURB; IMMEDIATELY NOTIFY ARCHITECT
- AND OWNER. HAZARDOUS MATERIALS WILL BE REMOVED BY OWNER UNDER A SEPARATE CONTRACT.
- M. STORAGE OR SALE OF REMOVED ITEMS OR MATERIALS ON-SITE IS NOT PERMITTED. N. UTILITY SERVICE: MAINTAIN EXISTING UTILITIES INDICATED TO REMAIN IN SERVICE AND PROTECT THEM AGAINST DAMAGE DURING SELECTIVE DEMOLITION OPERATIONS.
- O. MAINTAIN FIRE-PROTECTION FACILITIES IN SERVICE DURING SELECTIVE DEMOLITION OPERATIONS.
- 1.3 MECHANICAL SYSTEMS A. EXISTING SERVICES/SYSTEMS TO REMAIN: MAINTAIN SERVICES/SYSTEMS INDICATED TO REMAIN AND PROTECT
- THEM AGAINST DAMAGE. B. COMPLY WITH REQUIREMENTS FOR EXISTING SERVICES/SYSTEMS INTERRUPTIONS SPECIFIED. C. EXISTING SERVICES/SYSTEMS TO BE REMOVED, RELOCATED, OR ABANDONED: LOCATE, IDENTIFY, DISCONNECT, AND SEAL OR CAP OFF INDICATED UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS SERVING AREAS TO
- BE SELECTIVELY DEMOLISHED. D. CONTRACTOR SHALL CONTACT OWNER TO ARRANGE FOR SHUT OFF INDICATED SERVICES/SYSTEMS WHEN REQUESTED BY CONTRACTOR.
- ARRANGE TO SHUT OFF INDICATED UTILITIES WITH UTILITY COMPANIES
- F. IF SERVICES/SYSTEMS ARE REQUIRED TO BE REMOVED, RELOCATED, OR ABANDONED, PROVIDE TEMPORARY SERVICES/SYSTEMS THAT BYPASS AREA OF SELECTIVE DEMOLITION AND THAT MAINTAIN CONTINUITY OF SERVICES/SYSTEMS TO OTHER PARTS OF BUILDING.
- G. DISCONNECT, DEMOLISH, AND REMOVE FIRE-SUPPRESSION SYSTEMS, PLUMBING, AND HVAC SYSTEMS, EQUIPMENT, AND COMPONENTS INDICATED TO BE REMOVED.
- H. PIPING TO BE REMOVED: REMOVE PORTION OF PIPING INDICATED TO BE REMOVED AND CAP OR PLUG
- REMAINING PIPING WITH SAME OR COMPATIBLE PIPING MATERIAL I. PIPING TO BE ABANDONED IN PLACE: DRAIN PIPING AND CAP OR PLUG PIPING WITH SAME OR COMPATIBLE
- EQUIPMENT TO BE REMOVED: DISCONNECT AND CAP SERVICES AND REMOVE EQUIPMENT.
- K. EQUIPMENT TO BE REMOVED AND REINSTALLED: DISCONNECT AND CAP SERVICES AND REMOVE, CLEAN, AND STORE EQUIPMENT; WHEN APPROPRIATE, REINSTALL, RECONNECT, AND MAKE EQUIPMENT OPERATIONAL. EQUIPMENT TO BE REMOVED AND SALVAGED: DISCONNECT AND CAP SERVICES AND REMOVE EQUIPMENT AND
- M. DUCTS TO BE REMOVED: REMOVE PORTION OF DUCTS INDICATED TO BE REMOVED AND PLUG REMAINING DUCTS WITH SAME OR COMPATIBLE DUCTWORK MATERIAL.
- N. DUCTS TO BE ABANDONED IN PLACE: CAP OR PLUG DUCTS WITH SAME OR COMPATIBLE DUCTWORK MATERIAL. 1.4 ALL WORK SHALL COMPLY WITH 2015 INTERNATIONAL MECHANICAL CODE, BUILDING CODE AND FIRE CODE; LATEST AMENDMENTS AS ADOPTED BY THE STATE
- WELDING: QUALIFY PROCEDURES AND PERSONNEL ACCORDING TO ASME BOILER AND PRESSURE VESSEL CODE: SECTION IX.
- 2.2 STEEL PIPE HANGERS AND SUPPORTS
- A. DESCRIPTION: MSS SP-58, TYPES 1 THRU 58, FACTORY-FABRICATED COMPONENTS. REFER TO "HANGER AND SUPPORT APPLICATIONS" ARTICLE FOR WHERE TO USE SPECIFIC HANGER AND SUPPORT TYPES.
- B. GALVANIZED, METALLIC COATINGS: PREGALVANIZED OR HOT DIPPED. C. NONMETALLIC COATINGS: PLASTIC COATING, JACKET, OR LINER.
- A. DESCRIPTION: WELDED, SHOP- OR FIELD-FABRICATED EQUIPMENT SUPPORT MADE FROM STRUCTURAL-STEEL
- 2.4 MISCELLANEOUS MATERIALS
- A. STRUCTURAL STEEL: ASTM A 36/A 36M, STEEL PLATES, SHAPES, AND BARS; BLACK AND GALVANIZED.
- 2.5 HANGER AND SUPPORT APPLICATIONS A. USE HANGERS AND SUPPORTS WITH GALVANIZED, METALLIC COATINGS FOR EQUIPMENT THAT WILL NOT HAVE
- FIELD-APPLIED FINISH B. HANGER-ROD ATTACHMENTS: UNLESS OTHERWISE INDICATED AND EXCEPT AS SPECIFIED IN OTHER SECTIONS,
- **INSTALL THE FOLLOWING TYPES:** 1.) STEEL TURNBUCKLES (MSS TYPE 13): FOR ADJUSTMENT UP TO 6" FOR HEAVY LOADS.
- BUILDING ATTACHMENTS: UNLESS OTHERWISE INDICATED AND EXCEPT AS SPECIFIED IN OTHER SECTIONS, INSTALL THE FOLLOWING TYPES
- 1.) TOP-BEAM C-CLAMPS (MSS TYPE 19): FOR USE UNDER ROOF INSTALLATIONS WITH BAR-JOIST CONSTRUCTION TO ATTACH TO TOP FLANGE OF STRUCTURAL SHAPE.
- 2.) SIDE-BEAM OR CHANNEL CLAMPS (MSS TYPE 20): FOR ATTACHING TO BOTTOM FLANGE OF BEAMS, CHANNELS, OR ANGLES
- 3.) CENTER-BEAM CLAMPS (MSS TYPE 21): FOR ATTACHING TO CENTER OF BOTTOM FLANGE OF BEAMS.
- 4.) C-CLAMPS (MSS TYPE 23): FOR STRUCTURAL SHAPES. 5.) SIDE-BEAM BRACKETS (MSS TYPE 34): FOR SIDES OF STEEL BEAMS.
- D. COMPLY WITH MSS SP-69 FOR TRAPEZE HANGER SELECTIONS AND APPLICATIONS THAT ARE NOT SPECIFIED IN OTHER SECTIONS.
- E. COMPLY WITH MFMA-102 FOR METAL FRAMING SYSTEM SELECTIONS AND APPLICATIONS THAT ARE NOT
- F. USE MECHANICAL-EXPANSION ANCHORS INSTEAD OF BUILDING ATTACHMENTS WHERE REQUIRED IN CONCRETE CONSTRUCTION.
- 2.6 EQUIPMENT SUPPORTS
- A. FABRICATE STRUCTURAL-STEEL STANDS TO SUSPEND EQUIPMENT FROM STRUCTURE OVERHEAD. PROVIDE LATERAL BRACING, TO PREVENT SWAYING, FOR EQUIPMENT SUPPORTS.
- PROVIDE ALL THREAD ROD FASTEN TO CONCRETE STRUCTURE WITH ROD & ROD INSERTS SIZED FOR CORNER
- WEIGHT LOADS OF EQUIPMENT
- D. PROVIDE ALL THREAD RODS FASTEN TO BEAMS WITH ROD & BEAM CLAMPS SIZED FOR CORNER WEIGHT LOADS OF PROVIDE SPRING ISOLATORS, SIZED FOR CORNER WEIGHTS, AT EACH CORNER OF HORIZONTAL FAN COIL UNITS
- 2.7 METAL FABRICATIONS
- A. SHOP WELDING: COMPLY WITH AWS D1.1 PROCEDURES FOR SHIELDED METAL ARC WELDING, APPEARANCE AND QUALITY OF WELDS, AND METHODS USED IN CORRECTING WELDING WORK, AND WITH THE FOLLOWING:
- 1.) USE MATERIALS AND METHODS THAT MINIMIZE DISTORTION AND DEVELOP STRENGTH AND CORROSION
- RESISTANCE OF BASE METALS. 2.) OBTAIN FUSION WITHOUT UNDERCUT OR OVERLAP.
- 3.) REMOVE WELDING FLUX IMMEDIATELY.
- 4.) FINISH WELDS AT EXPOSED CONNECTIONS SO NO ROUGHNESS SHOWS AFTER FINISHING AND CONTOURS OF WELDED SURFACES MATCH ADJACENT CONTOURS.
- 3. MECHANICAL IDENTIFICATION
- 3.1 QUALITY ASSURANCE A. ASME COMPLIANCE: COMPLY WITH ASME A13.1, "SCHEME FOR THE IDENTIFICATION OF HVAC SYSTEMS," FOR
- LETTER SIZE, LENGTH OF COLOR FIELD, COLORS, AND VIEWING ANGLES OF IDENTIFICATION DEVICES. 3.2 EQUIPMENT IDENTIFICATION DEVICES A. EQUIPMENT MARKERS: ENGRAVED, COLOR-CODED LAMINATED PLASTIC. INCLUDE CONTACT-TYPE, PERMANENT
- ADHESIVE.
- 1.) TERMINOLOGY: MATCH SCHEDULES AS CLOSELY AS POSSIBLE 2.) DATA:
- a.) NAME AND PLAN NUMBER.
- b.) EQUIPMENT SERVICE. c.) DESIGN CAPACITY.
- 3.) SIZE: 2-1/2" BY 4" FOR CONTROL DEVICES AND DAMPERS, 4-1/2" BY 6" FOR EQUIPMENT. 3.3 DUCT IDENTIFICATION DEVICES
- A. DUCT MARKERS: PLASTIC WITH PRESSURE-SENSITIVE, PERMANENT-TYPE, SELF-ADHESIVE BACK.
- B. INCLUDE DIRECTION OF AIRFLOW AND DUCT SERVICE (SUCH AS SUPPLY AND EXHAUST).
- 4. HVAC INSULATION
- 4.1 QUALITY ASSURANCE

- A. FIRE-TEST-RESPONSE CHARACTERISTICS: INSULATION AND RELATED MATERIALS SHALL HAVE FIRE-TEST-RESPONSE CHARACTERISTICS INDICATED, AS DETERMINED BY TESTING IDENTICAL PRODUCTS PER ASTM E 84, BY A TESTING AND INSPECTING AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION. FACTORY LABEL INSULATION AND JACKET MATERIALS AND ADHESIVE, MASTIC, TAPES, AND CEMENT MATERIAL CONTAINERS, WITH APPROPRIATE MARKINGS OF APPLICABLE TESTING AND INSPECTING AGENCY.
- 1.) INSULATION INSTALLED INDOORS: FLAME-SPREAD INDEX OF 25 OR LESS, AND SMOKE-DEVELOPED INDEX OF
- A. SCHEDULE INSULATION APPLICATION AFTER PRESSURE AND/OR LEAK TESTING SYSTEMS. INSULATION APPLICATION MAY BEGIN ON SEGMENTS THAT HAVE SATISFACTORY TEST RESULTS.
- 4.3 INSULATION MATERIALS A. PRODUCTS SHALL NOT CONTAIN ASBESTOS, LEAD, MERCURY, OR MERCURY COMPOUNDS.
- B. MINERAL-FIBER BLANKET INSULATION: MINERAL OR GLASS FIBERS BONDED WITH A THERMOSETTING RESIN. COMPLY WITH ASTM C 553, TYPE II AND ASTM C 1290, TYPE III WITH FACTORY-APPLIED FSK JACKET. FACTORY-APPLIED JACKET REQUIREMENTS ARE SPECIFIED IN "FACTORY-APPLIED JACKETS" ARTICLE.
- A. MINERAL-FIBER INSULATING CEMENT: COMPLY WITH ASTM C 195.
  - A. MATERIALS SHALL BE COMPATIBLE WITH INSULATION MATERIALS, JACKETS, AND SUBSTRATES AND FOR BONDING
- INSULATION TO ITSELF AND TO SURFACES TO BE INSULATED, UNLESS OTHERWISE INDICATED. B. MINERAL-FIBER ADHESIVE: COMPLY WITH MIL-A-3316C, CLASS 2, GRADE A.
- C. ASJ ADHESIVE, AND FSK AND PVDC JACKET ADHESIVE: COMPLY WITH MIL-A-3316C, CLASS 2, GRADE A FOR BONDING INSULATION JACKET LAP SEAMS AND JOINTS.
- A. MATERIALS SHALL BE COMPATIBLE WITH INSULATION MATERIALS, JACKETS, AND SUBSTRATES; COMPLY WITH MIL-
- C-19565C, TYPE II. B. VAPOR-BARRIER MASTIC: WATER BASED; SUITABLE FOR INDOOR AND OUTDOOR USE ON BELOW AMBIENT
- 1.) WATER-VAPOR PERMEANCE: ASTM E 96, PROCEDURE B, 0.013 PERM AT 43-MIL DRY FILM THICKNESS. 4.7 FACTORY-APPLIED JACKETS A. INSULATION SYSTEM SCHEDULES INDICATE FACTORY- APPLIED JACKETS ON VARIOUS APPLICATIONS. WHEN
  - FACTORY-APPLIED JACKETS ARE INDICATED, COMPLY WITH THE FOLLOWING: 1.) FSK JACKET: ALUMINUM-FOIL, FIBERGLASS- REINFORCED SCRIM WITH KRAFT-PAPER BACKING; COMPLYING WITH ASTM C 1136, TYPE II.
- 4.8 SECUREMENTS A. INSULATION PINS AND HANGERS:
- 1.) METAL, ADHESIVELY ATTACHED, PERFORATED-BASE INSULATION HANGERS: BASEPLATE WELDED TO PROJECTING SPINDLE THAT IS CAPABLE OF HOLDING INSULATION, OF THICKNESS INDICATED, SECURELY IN POSITION INDICATED WHEN SELF-LOCKING WASHER IS IN PLACE.
- A. EXAMINE SUBSTRATES AND CONDITIONS FOR COMPLIANCE WITH REQUIREMENTS FOR INSTALLATION AND OTHER
  - CONDITIONS AFFECTING PERFORMANCE OF INSULATION APPLICATION. 1.) VERIFY THAT SYSTEMS AND EQUIPMENT TO BE INSULATED HAVE BEEN TESTED AND ARE FREE OF DEFECTS. 2.) VERIFY THAT SURFACES TO BE INSULATED ARE CLEAN AND DRY.
- 3.) PROCEED WITH INSTALLATION ONLY AFTER UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED.
- A. INSTALL INSULATION MATERIALS, ACCESSORIES, AND FINISHES WITH SMOOTH, STRAIGHT, AND EVEN SURFACES; FREE OF VOIDS THROUGHOUT THE LENGTH OF EQUIPMENT, DUCTS AND FITTINGS, AND PIPING INCLUDING FITTINGS, VALVES, AND SPECIALTIES.
- B. INSTALL INSULATION MATERIALS, FORMS, VAPOR BARRIERS OR RETARDERS, JACKETS, AND THICKNESSES REQUIRED FOR EACH ITEM OF EQUIPMENT AND DUCT SYSTEM, AS SPECIFIED IN INSULATION SYSTEM SCHEDULES.
- INSTALL ACCESSORIES COMPATIBLE WITH INSULATION MATERIALS AND SUITABLE FOR THE SERVICE. INSTALL ACCESSORIES THAT DO NOT CORRODE, SOFTEN, OR OTHERWISE ATTACK INSULATION OR JACKET IN EITHER WET
- D. INSTALL INSULATION WITH LONGITUDINAL SEAMS AT TOP AND BOTTOM OF HORIZONTAL RUNS. 4.11 MINERAL-FIBER INSULATION INSTALLATION
- A. BLANKET INSULATION INSTALLATION ON DUCTS AND PLENUMS: SECURE WITH ADHESIVE AND INSULATION PINS. 1.) APPLY ADHESIVES ACCORDING TO MANUFACTURER'S RECOMMENDED COVERAGE RATES PER UNIT AREA, FOR 100% COVERAGE OF DUCT AND PLENUM SURFACES.
- 2.) APPLY ADHESIVE TO ENTIRE CIRCUMFERENCE OF DUCTS AND TO ALL SURFACES OF FITTINGS AND
- 3.) INSTALL CAPACITOR-DISCHARGE WELD PINS AND SPEED WASHERS ON SIDES AND BOTTOM OF HORIZONTAL DUCTS AND SIDES OF VERTICAL DUCTS LARGER THAN 18".
- 4.) AFTER INSULATION IS IN PLACE, JOINTS, SEAMS, AND FASTENERS SHALL BE POINTED UP WITH VAPOR BARRIER ADHESIVE, REINFORCED WITH GLASSFAB MEMBRANE FABRIC. WHERE VAPOR BARRIERS ARE INDICATED, APPLY VAPOR-BARRIER MASTIC ON SEAMS AND JOINTS AND AT ENDS ADJACENT TO DUCT AND
- 5.) REPAIR PUNCTURES, TEARS, AND PENETRATIONS WITH MASTIC AND GLASSFAB MEMBRANE FABRIC TO MAINTAIN VAPOR-BARRIER SEAL.
- 6.) INSTALL INSULATION ON RECTANGULAR DUCT ELBOWS AND TRANSITIONS WITH A FULL INSULATION SECTION FOR EACH SURFACE. INSTALL INSULATION ON ROUND AND FLAT-OVAL DUCT ELBOWS WITH
- INDIVIDUALLY MITERED GORES CUT TO FIT THE ELBOW. 7.) INSULATE DUCT STIFFENERS, HANGERS, AND FLANGES THAT PROTRUDE BEYOND INSULATION SURFACE WITH 6" WIDE STRIPS OF SAME MATERIAL USED TO INSULATE DUCT. SECURE ON ALTERNATING SIDES OF STIFFENER, HANGER, AND FLANGE WITH PINS SPACED 6" O.C.
- 4.12 DUCT INSULATION SCHEDULE, GENERAL A. DUCTS REQUIRING INSULATION:

5.4 HANGERS AND SUPPORTS

FLEXIBLE."

JOINT TYPES AND INTERVALS.

- 1.) MEDIUM & LOW PRESSURE SUPPLY, & RETURN DUCTS.
- 4.13 INDOOR DUCT AND PLENUM INSULATION SCHEDULE A. AIR DUCT INSULATION SHALL BE THE FOLLOWING:
- 1.) MINERAL-FIBER BLANKET: 2" THICK AND 0.75-LB/CU. FT. NOMINAL DENSITY.
- METAL DUCTS
  - 5.1 SYSTEM DESCRIPTION A. DUCT SYSTEM DESIGN, AS INDICATED, HAS BEEN USED TO SELECT SIZE AND TYPE OF AIR-MOVING AND -DISTRIBUTION EQUIPMENT AND OTHER AIR SYSTEM COMPONENTS. CHANGES TO LAYOUT OR CONFIGURATION OF DUCT SYSTEM MUST BE SPECIFICALLY APPROVED IN WRITING BY ARCHITECT/ENGINEER. ACCOMPANY REQUESTS FOR LAYOUT MODIFICATIONS WITH CALCULATIONS SHOWING THAT PROPOSED LAYOUT WILL PROVIDE ORIGINAL DESIGN RESULTS WITHOUT INCREASING SYSTEM TOTAL PRESSURE.
  - 5.2 SHEET METAL MATERIALS A. COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS--METAL AND FLEXIBLE" FOR ACCEPTABLE MATERIALS, MATERIAL THICKNESSES, AND DUCT CONSTRUCTION METHODS, UNLESS OTHERWISE INDICATED.
  - SHEET METAL MATERIALS SHALL BE FREE OF PITTING, SEAM MARKS, ROLLER MARKS, STAINS, DISCOLORATIONS, AND OTHER IMPERFECTIONS B. GALVANIZED SHEET STEEL: LOCK-FORMING QUALITY; COMPLYING WITH ASTM A 653 AND HAVING G90 COATING
  - DESIGNATION; DUCTS SHALL HAVE MILL-PHOSPHATIZED FINISH FOR SURFACES EXPOSED TO VIEW. C. REINFORCEMENT SHAPES AND PLATES: GALVANIZED-STEEL REINFORCEMENT WHERE INSTALLED ON GALVANIZED
  - D. TIE RODS: GALVANIZED STEEL, 1/4"Ø MINIMUM FOR LENGTHS 36" OR LESS; 3/8"Ø MINIMUM FOR LENGTHS LONGER THAN 36". 5.3 SEALANT MATERIALS
  - A. JOINT AND SEAM SEALANTS, GENERAL: THE TERM "SEALANT" IS NOT LIMITED TO MATERIALS OF ADHESIVE OR MASTIC NATURE BUT INCLUDES TAPES AND COMBINATIONS OF OPEN-WEAVE FABRIC STRIPS AND MASTICS. B. WATER-BASED JOINT AND SEAM SEALANT: FLEXIBLE, ADHESIVE SEALANT, RESISTANT TO UV LIGHT WHEN CURED, UL 723 LISTED, AND COMPLYING WITH NFPA REQUIREMENTS FOR CLASS 1 DUCTS.
  - A. BUILDING ATTACHMENTS: CONCRETE INSERTS OR STRUCTURAL STEEL FASTENERS APPROPRIATE FOR CONSTRUCTION MATERIALS TO WHICH HANGERS ARE BEING ATTACHED.

  - B. HANGER MATERIALS: GALVANIZED SHEET STEEL OR THREADED STEEL ROD. 1.) STRAP AND ROD SIZES: COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS--METAL AND FLEXIBLE" FOR STEEL SHEET WIDTH AND THICKNESS AND FOR STEEL ROD DIAMETERS.
  - C. DUCT ATTACHMENTS: SHEET METAL SCREWS, BLIND RIVETS, OR SELF-TAPPING METAL SCREWS; COMPATIBLE WITH
  - D. TRAPEZE AND RISER SUPPORTS: STEEL SHAPES COMPLYING WITH ASTM A 36. 1.) SUPPORTS FOR GALVANIZED-STEEL DUCTS: GALVANIZED-STEEL SHAPES AND PLATES 5.5 SINGLE-WALL ROUND DUCTS AND FITTINGS
  - A. GENERAL FABRICATION REQUIREMENTS: COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS -METAL AND FLEXIBLE," CHAPTER 3, "ROUND, OVAL, AND FLEXIBLE DUCT," BASED ON INDICATED STATIC-PRESSURE CLASS UNLESS OTHERWISE INDICATED B. TRANSVERSE JOINTS: SELECT JOINT TYPES AND FABRICATE ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE." FIGURE 3-1. "ROUND DUCT TRANSVERSE JOINTS." FOR STATIC-PRESSURE
  - CLASS, APPLICABLE SEALING REQUIREMENTS, MATERIALS INVOLVED, DUCT-SUPPORT INTERVALS, AND OTHER PROVISIONS IN SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE." C. LONGITUDINAL SEAMS: SELECT SEAM TYPES AND FABRICATE ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE," FIGURE 3-2, "ROUND DUCT LONGITUDINAL SEAMS," FOR STATIC-PRESSURE CLASS, APPLICABLE SEALING REQUIREMENTS, MATERIALS INVOLVED, DUCT-SUPPORT

INTERVALS, AND OTHER PROVISIONS IN SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND

- FLEXIBLE." D. TEES AND LATERALS: SELECT TYPES AND FABRICATE ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE," FIGURE 3-5, "90° TEES AND LATERALS," AND FIGURE 3-6, "CONICAL TEES," FOR STATIC-PRESSURE CLASS, APPLICABLE SEALING REQUIREMENTS, MATERIALS INVOLVED, DUCT-SUPPORT INTERVALS, AND OTHER PROVISIONS IN SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND
- 5.6 RECTANGULAR DUCT FABRICATION A. FABRICATE DUCTS, ELBOWS, TRANSITIONS, OFFSETS, BRANCH CONNECTIONS, AND OTHER CONSTRUCTION ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS--METAL AND FLEXIBLE" AND COMPLYING WITH REQUIREMENTS FOR METAL THICKNESS, REINFORCING TYPES AND INTERVALS, TIE-ROD APPLICATIONS, AND

- 1.) LENGTHS: FABRICATE RECTANGULAR DUCTS IN LENGTHS APPROPRIATE TO REINFORCEMENT AND RIGIDITY CLASS REQUIRED FOR PRESSURE CLASS.
- 2.) DEFLECTION: DUCT SYSTEMS SHALL NOT EXCEED DEFLECTION LIMITS ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS--METAL AND FLEXIBLE." B. TRANSVERSE JOINTS: PREFABRICATED SLIDE-ON JOINTS AND COMPONENTS CONSTRUCTED USING
- MANUFACTURER'S GUIDELINES FOR MATERIAL THICKNESS, REINFORCEMENT SIZE AND SPACING, AND JOINT
- C. FORMED-ON FLANGES: CONSTRUCT ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS- METAL AND FLEXIBLE," FIGURE 1-4, USING CORNER, BOLT, CLEAT, AND GASKET DETAILS.
- 1.) DUCT SIZE: MAXIMUM 30" WIDE AND UP TO 2" W.G. PRESSURE CLASS.
- 2.) LONGITUDINAL SEAMS: PITTSBURGH LOCK SEALED WITH NONCURING POLYMER SEALANT.
- D. CROSS BREAKING OR CROSS BEADING: CROSS BREAK OR CROSS BEAD DUCT SIDES 19" AND LARGER AND 0.0359"
- 5.7 ROUND DUCT AND FITTING FABRICATION A. ROUND, LONGITUDINAL-SEAM DUCTS: FABRICATE SUPPLY DUCTS OF GALVANIZED STEEL ACCORDING TO
- SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS--METAL AND FLEXIBLE." B. DUCT JOINTS: DUCTS UP TO 20"Ø: INTERIOR, CENTER- BEADED SLIP COUPLING, SEALED BEFORE AND AFTER

THICK OR LESS, WITH MORE THAN 10 SQ. FT. OF NONBRACED PANEL AREA UNLESS DUCTS ARE LINED.

- FASTENING, ATTACHED WITH SHEET METAL SCREWS. C. 90° TEES AND LATERALS AND CONICAL TEES: FABRICATE TO COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS--METAL AND FLEXIBLE," WITH METAL THICKNESSES SPECIFIED FOR LONGITUDINAL-
- SEAM STRAIGHT DUCTS. D. DIVERGING-FLOW FITTINGS: FABRICATE WITH REDUCED ENTRANCE TO BRANCH TAPS AND WITH NO EXCESS
- MATERIAL PROJECTING FROM FITTING ONTO BRANCH TAP ENTRANCE. E. FABRICATE ELBOWS USING DIE-FORMED, GORED, PLEATED, OR MITERED CONSTRUCTION. BEND RADIUS OF DIE-FORMED, GORED, AND PLEATED ELBOWS SHALL BE 1-1/2 TIMES DUCT DIAMETER. UNLESS ELBOW CONSTRUCTION
- TYPE IS INDICATED, FABRICATE ELBOWS AS FOLLOWS: 1.) ROUND ELBOWS 8"Ø AND LESS: FABRICATE DIE- FORMED ELBOWS FOR 45° AND 90° ELBOWS AND PLEATED ELBOWS FOR 30° & 60° ONLY. FABRICATE NONSTANDARD BEND-ANGLE CONFIGURATIONS OR
- NONSTANDARD DIAMETER ELBOWS WITH GORED CONSTRUCTION. 2.) ROUND ELBOWS 9"Ø THRU 14"Ø: FABRICATE GORED OR PLEATED ELBOWS FOR 30°, 45°, 60°, AND 90°. FABRICATE NONSTANDARD BEND-ANGLE CONFIGURATIONS OR NONSTANDARD DIAMETER ELBOWS WITH
- GORED CONSTRUCTION. 3.) ROUND ELBOWS LARGER THAN 14"Ø AND ALL FLAT-OVAL ELBOWS: FABRICATE GORED ELBOWS. 4.) DIE-FORMED ELBOWS FOR SIZES THRU 8"Ø AND ALL PRESSURES 0.040" THICK WITH 2-PIECE WELDED
- 5.) ROUND GORED-ELBOW METAL THICKNESS: SAME AS NON-ELBOW FITTINGS SPECIFIED ABOVE. 6.) PLEATED ELBOWS FOR SIZES THRU 14"Ø AND PRESSURES THRU 10" W.G.: 0.022".
- 5.8 DUCT APPLICATIONS A. STATIC-PRESSURE CLASSES: UNLESS OTHERWISE INDICATED, CONSTRUCT DUCTS ACCORDING TO THE FOLLOWING:
  - 1.) SUPPLY DUCTS (BEFORE AIR TERMINAL UNITS): 3" W.G. 2.) SUPPLY DUCTS (AFTER AIR TERMINAL UNITS): 1" W.G.
- 3.) RETURN DUCTS (NEGATIVE PRESSURE): 1" W.G. 5.9 DUCT INSTALLATION
- A. CONSTRUCT AND INSTALL DUCTS ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS--METAL AND FLEXIBLE," UNLESS OTHERWISE INDICATED. B. INSTALL DUCTS WITH FEWEST POSSIBLE JOINTS.
- C. INSTALL FABRICATED FITTINGS FOR CHANGES IN DIRECTIONS, SIZE, AND SHAPE AND FOR CONNECTIONS. D. INSTALL COUPLINGS TIGHT TO DUCT WALL SURFACE WITH A MINIMUM OF PROJECTIONS INTO DUCT. SECURE COUPLINGS WITH SHEET METAL SCREWS. INSTALL SCREWS AT INTERVALS OF 12", WITH A MINIMUM OF 3 SCREWS
- IN EACH COUPLING. E. INSTALL DUCTS, UNLESS OTHERWISE INDICATED, VERTICALLY AND HORIZONTALLY AND PARALLEL AND PERPENDICULAR TO CLOSEST COLUMN LINES; AVOID DIAGONAL RUNS, EXCEPT WHERE SHOWN ON DRAWINGS, OR
- REQUIRED TO MATE UP WITH EXISTING DUCTWORK. F. INSTALL DUCTS CLOSE TO WALLS, OVERHEAD CONSTRUCTION, COLUMNS, AND OTHER STRUCTURAL AND PERMANENT ENCLOSURE ELEMENTS OF BUILDING. COORDINATE DUCT LOCATIONS WITH EXISTING OPENINGS IN STRUCTURAL STEEL, WHERE REQUIRED. UNDER NO CIRCUMSTANCES ARE ANY NEW OPENINGS TO BE CUT INTO, NOR ARE ANY EXISTING OPENINGS TO BE ENLARGED IN. STRUCTURAL STEEL
- ACCORDANCE WITH BUILDING CONDITIONS. H. CONCEAL DUCTS FROM VIEW IN FINISHED SPACES. DO NOT ENCASE HORIZONTAL RUNS IN SOLID PARTITIONS UNLESS SPECIFICALLY INDICATED

G. INSTALL DUCTS WITH A CLEARANCE OF 1", PLUS ALLOWANCE FOR INSULATION THICKNESS, WHERE POSSIBLE IN

- I. COORDINATE LAYOUT WITH SUSPENDED CEILING, LIGHTING LAYOUTS, AND SIMILAR FINISHED WORK. J. SEAL ALL JOINTS AND SEAMS. APPLY SEALANT TO MALE END CONNECTORS BEFORE INSERTION, AND AFTERWARD TO COVER ENTIRE JOINT AND SHEET METAL SCREWS K. PAINT INTERIORS OF METAL DUCTS, THAT DO NOT HAVE DUCT LINER, FOR 24" UPSTREAM OF REGISTERS AND
- GRILLES. APPLY ONE COAT OF FLAT, BLACK, LATEX FINISH COAT OVER A COMPATIBLE GALVANIZED-STEEL PRIMER.
- A. SEAL DUCT SEAMS AND JOINTS ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS--METAL AND FLEXIBLE" FOR DUCT PRESSURE CLASS INDICATED. 1.) SUPPLY-AIR DUCTS IN PRESSURE CLASSES 2" W.G. AND GREATER: SEAL CLASS A
- 2.) SUPPLY-AIR DUCTS IN PRESSURE CLASSES 1" W.G. AND LOWER: SEAL CLASS C. 3.) EXHAUST DUCTS: SEAL CLASS B. U.N.O.

OUTLET, INLET, AND EQUIPMENT CONNECTIONS.

- B. SEAL DUCTS BEFORE EXTERNAL INSULATION IS APPLIED. 5.11 HANGING AND SUPPORTING SUPPORT HORIZONTAL DUCTS WITHIN 24" OF EACH ELBOW AND WITHIN 48" OF EACH BRANCH INTERSECTION.
- STRUCTURE TO SUPPORT DUCTWORK IS PROHIBITED. A. COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS--METAL AND FLEXIBLE" FOR BRANCH,

B. ENSURE THAT ALL DUCTWORK IS ISOLATED FROM BUILDING INTERIOR WALL MEMBERS. THE USE OF WALL

- DUCT ACCESSORIES A. GENERAL DESCRIPTION: FACTORY FABRICATED, WITH REQUIRED HARDWARE AND ACCESSORIES. STIFFEN DAMPER
  - WITHOUT VIBRATION. CLOSE DUCT PENETRATIONS FOR DAMPER COMPONENTS TO SEAL DUCT CONSISTENT WITH PRESSURE CLASS. B. STANDARD VOLUME DAMPERS: MULTIPLE- OR SINGLE-BLADE (SINGLE IF NOT INDICATED), PARALLEL- OR OPPOSED-

BLADES FOR STABILITY. INCLUDE LOCKING DEVICE TO HOLD SINGLE-BLADE DAMPERS IN A FIXED POSITION

- BLADE (PARALLEL IF NOT INDICATED) DESIGN AS INDICATED, STANDARD LEAKAGE RATING, AND SUITABLE FOR HORIZONTAL OR VERTICAL APPLICATIONS. 1.) STEEL FRAMES: HAT-SHAPED, GALVANIZED SHEET STEEL CHANNELS, MINIMUM OF 0.064" THICK, WITH MITERED AND WELDED CORNERS; FRAMES WITH FLANGES WHERE INDICATED FOR ATTACHING TO WALLS
- AND FLANGELESS FRAMES WHERE INDICATED FOR INSTALLING IN DUCTS. 2.) ROLL-FORMED STEEL BLADES: 0.064" THICK, GALVANIZED SHEET STEEL.

1.) PRESSURE RATING: 10" W.G. POSITIVE AND 1.0" W.G. NEGATIVE.

- 3.) BLADE AXLES: GALVANIZED STEEL. 4.) BEARINGS: OIL-IMPREGNATED BRONZE.
- 5.) TIE BARS AND BRACKETS: GALVANIZED STEEL. C. DAMPER HARDWARE: ZINC-PLATED, DIE-CAST CORE WITH DIAL AND HANDLE MADE OF 3/32" THICK ZINC-PLATED STEEL, AND A HEXAGON LOCKING NUT. INCLUDE CENTER HOLE TO SUIT DAMPER OPERATING-ROD SIZE. INCLUDE
- ELEVATED PLATFORM FOR INSULATED DUCT MOUNTING. A. INSULATED-DUCT CONNECTORS: UL 181, CLASS 1, 2-PLY VINYL FILM SUPPORTED BY HELICALLY WOUND, SPRING-STEEL WIRE; FIBROUS-GLASS INSULATION; ALUMINIZED VAPOR BARRIER FILM.
- 3.) TEMPERATURE RANGE: -10° TO +160 °F.

3.) TEMPERATURE RANGE: -20° TO +210 °F.

2.) MAXIMUM AIR VELOCITY: 4000 FPM.

DUCT INSULATION THICKNESS.

- B. INSULATED-DUCT CONNECTORS: UL 181, CLASS 1, MULTIPLE LAYERS OF ALUMINUM LAMINATE SUPPORTED BY HELICALLY WOUND, SPRING-STEEL WIRE; FIBROUS-GLASS INSULATION; ALUMINIZED VAPOR BARRIER FILM. 1.) PRESSURE RATING: 10" W.G. POSITIVE AND 1.0" W.G. NEGATIVE. 2.) MAXIMUM AIR VELOCITY: 4000 FPM.
- 6.3 DUCT ACCESSORY HARDWARE A. INSTRUMENT TEST HOLES: CAST IRON OR CAST ALUMINUM TO SUIT DUCT MATERIAL, INCLUDING SCREW CAP AND GASKET. SIZE TO ALLOW INSERTION OF PITOT TUBE AND OTHER TESTING INSTRUMENTS AND OF LENGTH TO SUIT
- B. ADHESIVES: HIGH STRENGTH, QUICK SETTING, NEOPRENE BASED, WATERPROOF, AND RESISTANT TO GASOLINE AND GREASE 6.4 APPLICATION AND INSTALLATION

A. INSTALL DUCT ACCESSORIES ACCORDING TO APPLICABLE DETAILS IN SMACNA'S "HVAC DUCT CONSTRUCTION

- B. PROVIDE DUCT ACCESSORIES OF MATERIALS SUITED TO DUCT MATERIALS; USE GALVANIZED-STEEL ACCESSORIES IN GALVANIZED-STEEL DUCTS C. PROVIDE BALANCING DAMPERS AT POINTS ON SUPPLY AND EXHAUST SYSTEMS WHERE BRANCHES LEAD FROM LARGER DUCTS AS REQUIRED FOR AIR BALANCING. INSTALL AT A MINIMUM OF TWO DUCT WIDTHS FROM BRANCH
- D. CONNECT DIFFUSERS TO LOW PRESSURE DUCTS DIRECTLY OR WITH RIGID 45°-90° ELBOW & MAXIMUM 48" LENGTHS OF FLEXIBLE DUCT CLAMPED OR STRAPPED IN PLACE.
- E. CONNECT FLEXIBLE DUCTS TO METAL DUCTS WITH DRAW BANDS. F. INSTALL DUCT TEST HOLES WHERE REQUIRED FOR TESTING AND BALANCING PURPOSES. 6.5 ADJUSTING

A. ADJUST DUCT ACCESSORIES FOR PROPER SETTINGS.

STANDARDS--METAL AND FLEXIBLE" FOR METAL DUCTS

TESTING, ADJUSTING, AND BALANCING

B. FINAL POSITIONING OF MANUAL-VOLUME DAMPERS IS SPECIFIED IN "TESTING, ADJUSTING, AND BALANCING."

AABC CERTIFIED CONTRACTOR REQUIRED B. TAB REPORT FORMS: USE STANDARD FORMS FROM AABC STANDARDS FOR TESTING, ADJUSTING, AND BALANCING.

- C. INSTRUMENTATION CALIBRATION: CALIBRATE INSTRUMENTS AT LEAST EVERY SIX MONTHS OR MORE FREQUENTLY IF REQUIRED BY INSTRUMENT MANUFACTURER.
- 7.2 COORDINATION
- A. NOTICE: PROVIDE SEVEN DAYS' ADVANCE NOTICE TO ARCHITECT/ENGINEER AND OWNER FOR EACH TEST. INCLUDE SCHEDULED TEST DATES AND TIMES.
- A. EXAMINE THE CONTRACT DOCUMENTS TO BECOME FAMILIAR WITH PROJECT REQUIREMENTS AND TO DISCOVER CONDITIONS IN SYSTEMS' DESIGNS THAT MAY PRECLUDE PROPER TAB OF SYSTEMS AND EQUIPMENT. 1.) VERIFY THAT BALANCING DEVICES, SUCH AS MANUAL VOLUME DAMPERS, ARE REQUIRED BY THE CONTRACT
- DOCUMENTS. VERIFY THAT QUANTITIES AND LOCATIONS OF THESE BALANCING DEVICES ARE ACCESSIBLE AND APPROPRIATE FOR EFFECTIVE BALANCING AND FOR EFFICIENT SYSTEM AND EQUIPMENT OPERATION.
- B. EXAMINE APPROVED SUBMITTAL DATA OF HVAC SYSTEMS AND EQUIPMENT. C. EXAMINE EQUIPMENT PERFORMANCE DATA INCLUDING FAN CURVES. RELATE PERFORMANCE DATA TO PROJECT CONDITIONS AND REQUIREMENTS, INCLUDING SYSTEM EFFECTS THAT CAN CREATE UNDESIRED OR UNPREDICTED
- CONDITIONS THAT CAUSE REDUCED CAPACITIES IN ALL OR PART OF A SYSTEM D. EXAMINE SYSTEM AND EQUIPMENT INSTALLATIONS TO VERIFY THAT THEY ARE COMPLETE AND THAT TESTING,
- ADJUSTING, AND COMMISSIONING SPECIFIED IN INDIVIDUAL SECTIONS HAVE BEEN PERFORMED. E. EXAMINE SYSTEMS FOR FUNCTIONAL DEFICIENCIES THAT CANNOT BE CORRECTED BY ADJUSTING AND BALANCING. F. EXAMINE AUTOMATIC TEMPERATURE SYSTEM COMPONENTS TO VERIFY THE FOLLOWING:
- 1.) DAMPERS, AND OTHER CONTROLLED DEVICES ARE OPERATED BY THE INTENDED CONTROLLER. 2.) DAMPERS ARE IN THE POSITION INDICATED BY THE CONTROLLER.
- 3.) INTEGRITY OF DAMPERS FOR FREE AND FULL OPERATION AND FOR TIGHTNESS OF FULLY CLOSED AND FULLY
- 4.) THERMOSTATS ARE LOCATED TO AVOID ADVERSE EFFECTS OF SUNLIGHT, DRAFTS, AND COLD WALLS. 5.) SENSORS ARE LOCATED TO SENSE ONLY THE INTENDED CONDITIONS.

REPORT DEFICIENCIES DISCOVERED BEFORE AND DURING PERFORMANCE OF TAB PROCEDURES. OBSERVE AND

6.) CONTROLLER SETPOINTS ARE SET AT INDICATED VALUES. INTERLOCKED SYSTEMS ARE OPERATING.

8.) CHANGEOVER FROM HEATING TO COOLING MODE OCCURS ACCORDING TO INDICATED VALUES.

- RECORD SYSTEM REACTIONS TO CHANGES IN CONDITIONS. RECORD DEFAULT SETPOINTS IF DIFFERENT FROM
- A. VERIFY THAT EXISTING CONTROLLERS ARE CALIBRATED AND COMMISSIONED. CALIBRATE AND COMMISSION THE EXISTING CONTROLLERS THAT ARE NOT AND THE NEW CONTROLLER. B. CHECK TRANSMITTER AND CONTROLLER LOCATIONS AND NOTE CONDITIONS THAT WOULD ADVERSELY AFFECT
- RECORD CONTROLLER SETTINGS AND NOTE VARIANCES BETWEEN SETPOINTS AND ACTUAL MEASUREMENTS. D. CHECK FREE TRAVEL AND PROPER OPERATION OF CONTROL DEVICES.
- E. NOTE OPERATION OF ELECTRIC ACTUATORS USING SPRING RETURN FOR PROPER FAIL-SAFE OPERATIONS.
- A. SET HVAC SYSTEM AIRFLOW RATES WITHIN THE FOLLOWING TOLERANCES: 1.) AIR OUTLETS: +5 TO -5 %.
- A. GENERAL: COMPUTER PRINTOUT IN LETTER-QUALITY FONT, ON STANDARD BOND PAPER, IN THREE-RING BINDER. B. FINAL REPORT CONTENTS: IN ADDITION TO CERTIFIED FIELD REPORT DATA, INCLUDE THE FOLLOWING:
- 1.) INFORMATION RELATIVE TO EQUIPMENT PERFORMANCE, BUT DO NOT INCLUDE SHOP DRAWINGS AND PRODUCT DATA C. GENERAL REPORT DATA: IN ADDITION TO FORM TITLES AND ENTRIES, INCLUDE THE FOLLOWING DATA IN THE
  - FINAL REPORT, AS APPLICABLE: 1.) ON TITLE PAGE:
  - a.) NAME AND ADDRESS OF TAB FIRM OR CONTRACTOR.
  - b.) PROJECT NAME. c.) PROJECT LOCATION
  - d.) ENGINEER'S NAME AND ADDRESS. e.) REPORT DATE.
- 2.) TABLE OF CONTENTS. NUMBER EACH PAGE IN THE REPORT. 3.) DATA FOR TERMINAL UNITS, INCLUDING MANUFACTURER, TYPE SIZE, AND FITTINGS. 4.) NOTES TO EXPLAIN WHY CERTAIN FINAL DATA IN THE BODY OF REPORTS VARIES FROM INDICATED VALUES. D. SYSTEM DIAGRAMS WHERE VARIATIONS OCCUR BETWEEN FINAL SYSTEMS AND CONTRACT DOCUMENTS: INCLUDE
- SCHEMATIC LAYOUTS OF AIR DISTRIBUTION SYSTEMS. PRESENT EACH SYSTEM WITH SINGLE-LINE DIAGRAM AND INCLUDE THE FOLLOWING:
- 2.) DUCT SIZES (INCH).

7.4 TEMPERATURE-CONTROL VERIFICATION

- E. AIR-DEVICE REPORTS: 1.) UNIT DATA:
- a.) AIR-DEVICE MANUFACTURER, TYPE, SIZE, AND MODEL NUMBER. 2.) TEST DATA (INDICATED AND ACTUAL VALUES):
- c.) FINAL AIRFLOW RATE (CFM). d.) SPACE TEMPERATURE (°F).
- a.) AIRFLOW RATE (CFM). b.) ENTERING- & LEAVING-AIR TEMPERATURE (°F).
- TERMINAL UNITS DIFFUSERS & GRILLES

DUCT SEALER

DUCTWORK

**INSULATIONS & MASTICS** DAMPERS & TAKE-OFFS FLEX DUCT

H. AABC CONTRACTOR QUALIFICATIONS

AIR TEST AND BALANCE REPORT

529 GREENE ST. AUGUSTA, GA. 3090

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**REVISIONS** Description

**PROJECT 50003278 USC-AIKENRUTH PATRICK RENOVATIONS** 

**USC AIKEN** 

471 UNIVERSITY PKWY, AIKEN, SC 29801

**MECHANICAL SPECIFICATIONS** 

ISSUE Project Status

DRAWING NO. 24"x36"

1.) QUANTITIES OF SUPPLY AIRFLOW (CFM).

- a.) AIRFLOW RATE (CFM). b.) PRELIMINARY AIRFLOW RATE, AS NEEDED, (CFM).
- F. SYSTEM HEATING OR COOLING COIL REPORTS: INCLUDE THE FOLLOWING: 1.) UNIT DATA: 2.) TEST DATA (INDICATED AND ACTUAL VALUES):

c.) ENTERING- & LEAVING-WATER TEMPERATURE (°F)

d.) FLUID PRESSURE DROP THROUGH COIL (IN-WG) 8. SUBMITTALS

8.1 PROVIDE SUBMITTALS FOR THE FOLLOWING:

DRAWING TITLE

PROJECT NO. 100-1802 DRAWN BY

PHASE HATCHING

NEW DUCT/PIPE

EXISTING DUCT/PIPE

TO BE DEMOLISHED DUCT/PIPE

DUCT TYPES

[12"x12"] [3][3] RECTANGULAR

□12"ø□⊗⊘⊗ ROUND

DUCT SYSTEMS

SA SUPPLY AIR
RETURN AIR

SYMBOLS

NEW / EXISTING WORK SYMBOL

AIR DEVICE SCHEDULE

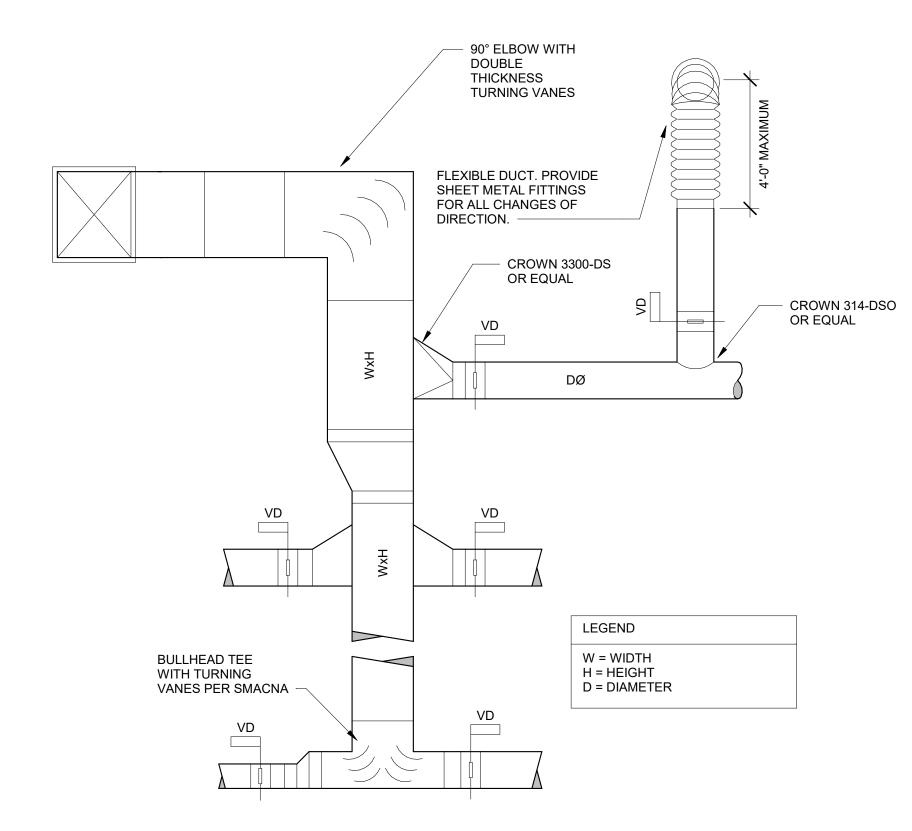
MARK MANUFACTURER MODEL MODULE SIZE BORDER TYPE OPTIONS

A TITUS OMNI 24 x 24 LAY-IN 2,3

B TITUS 50F 24 x 24 LAY-IN 1,2

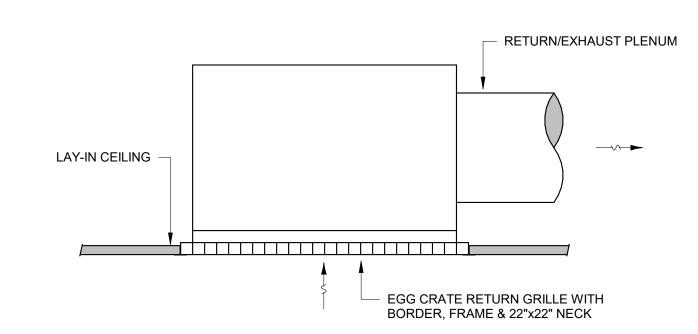
OPTIONS

1- ACOUSTICALLY LINED GRILLE PLENUM
2- MANUFACTURER'S STANDARD WHITE FINISH
3- MIN R-6 BACK PAN INSULLATION



#### 1 TYPICAL DUCTWORK AND ACCESSORY INSTALLATION

M0.2 NOT TO SCALE

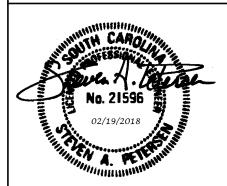


#### 2 RETURN/EXHAUST GRILLE

M0.2 NOT TO SCALE



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EY PLAN:

REVISIONS:

Date Description

## PROJECT 50003278 USC-AIKENRUTH PATRICK RENOVATIONS

FOR

**USC AIKEN** 

471 UNIVERSITY PKWY, AIKEN, SC 29801

DRAWING TITLE

#### MECHANICAL DETAILS AND SCHEDULE

PROJECT NO. 100-1802

DATE 02/19/18

DRAWN BY JKF

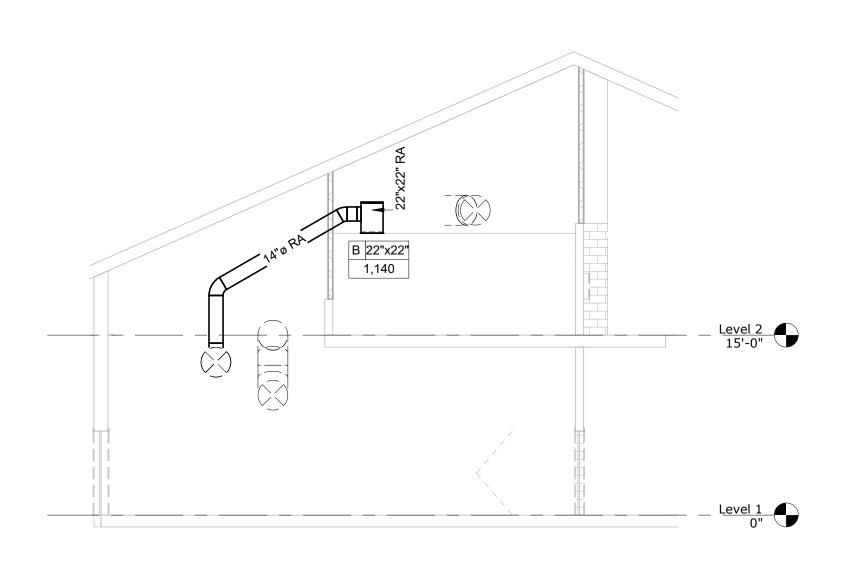
PAPER 24"x36"

ISSUE Project Status

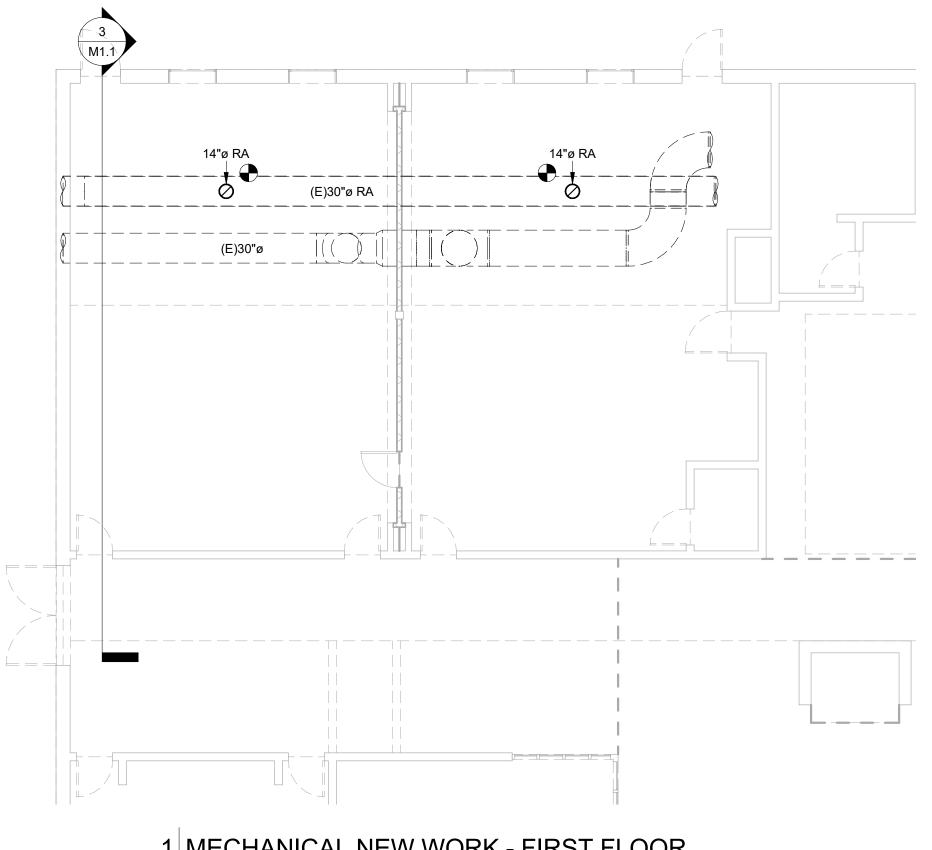
tus MO.

DRAWING NO.

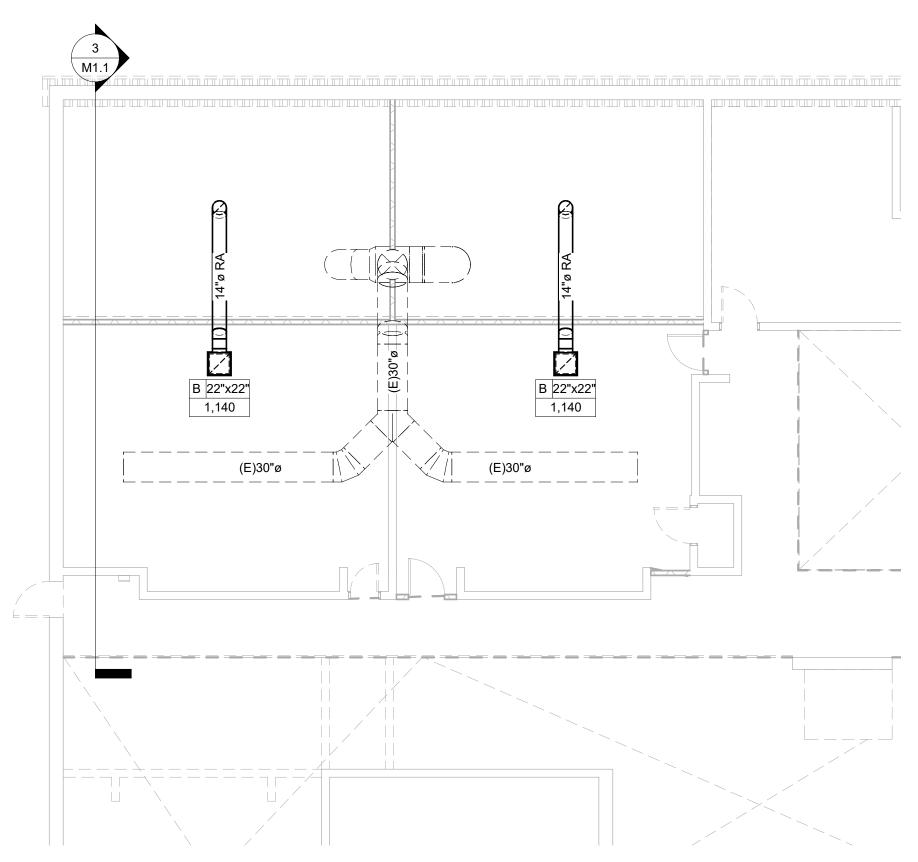
Q:\100 - 2KM Architects\100-1802 - USCA Ruth Patri



3 Section 1 M1.1 NOT TO SCALE



1 MECHANICAL NEW WORK - FIRST FLOOR M1.1 1/8" = 1'-0"



2 MECHANICAL NEW WORK - SECOND FLOOR M1.1 1/8" = 1'-0"



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KEY PLAN:

REVISIONS: Description

PROJECT 50003278 **USC-AIKENRUTH PATRICK RENOVATIONS** 

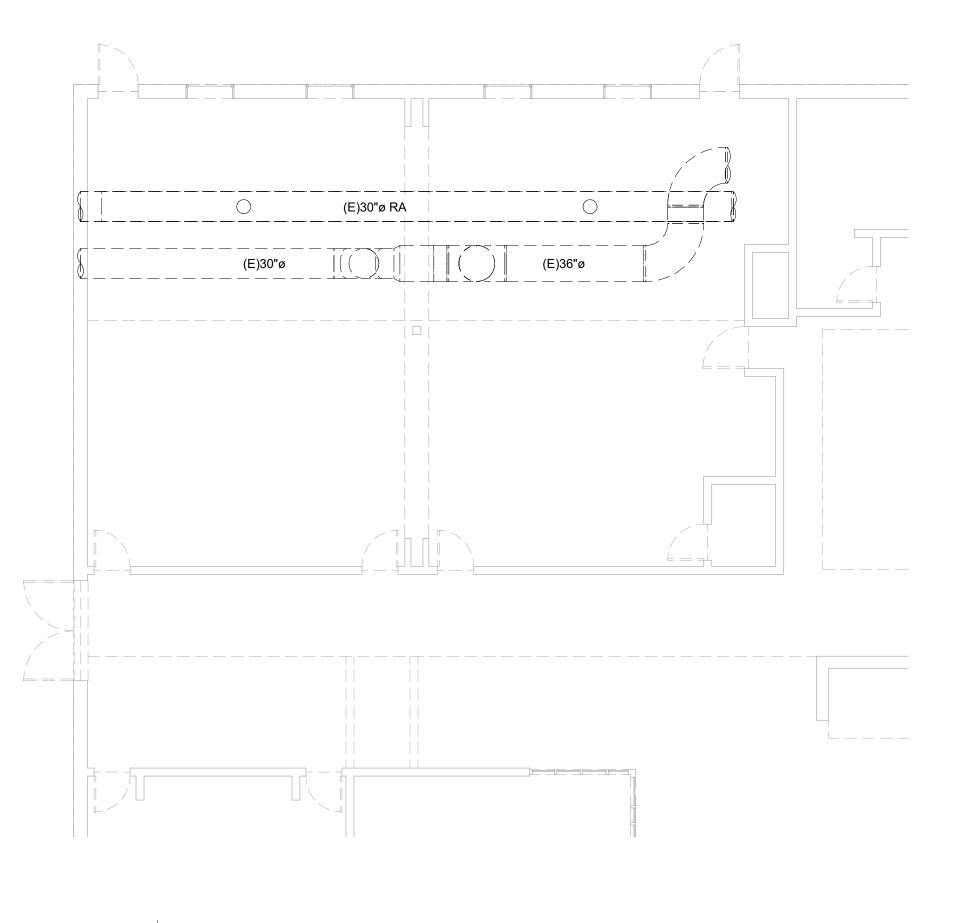
**USC AIKEN** 

471 UNIVERSITY PKWY, AIKEN, SC 29801

**MECHANICAL DEMOLITION AND NEW WORK** 

PROJECT NO. 100-1802 JKF 24"x36" DRAWN BY ISSUE Project Status

M1.1



3 MECHANICAL DEMOLITION - FIRST FLOOR

M1.2 1/8" = 1'-0"

14°6 RA
(E)30°6 RA
(E)36°6

4 MECHANICAL NEW WORK - FIRST FLOOR

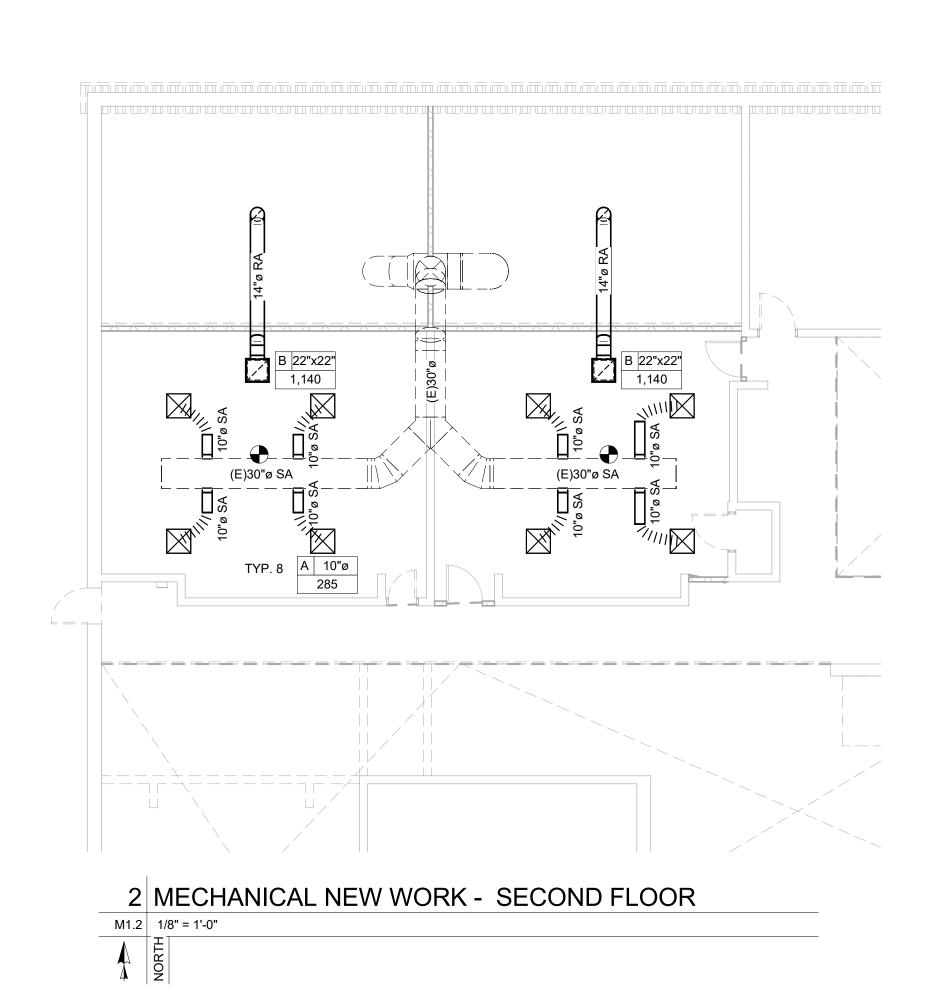
M1.2 1/8" = 1'-0"

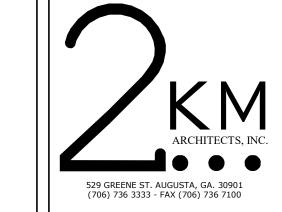
ADD ALT DEMOLITION KEYNOTES

DEMO AND REMOVE EXISTING SUPPLY DIFFUSER. PATCH WILTH LIKE MATERIALS AND METHODS.

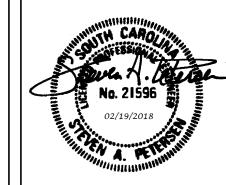
1 MECHANICAL DEMOLITION - SECOND FLOOR

M12 187 = 1-0\*





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KEY PLAN

REVISIONS:

Date Description

PROJECT 50003278
USC-AIKENRUTH
PATRICK
RENOVATIONS

**USC AIKEN** 

471 UNIVERSITY PKWY, AIKEN, SC 29801

DRAWING TI

MECHANICAL
DEMOLITION AND
NEW WORK ADD ALT

PROJECT NO. 100-1802

DATE 02/19/18

DRAWN BY JKF

PAPER 24"x36"

ISSUE Project Status

M1.2

RINTED:4/2/2018 10:24:38 AM

#### LEGEND

#### LIGHTING AND POWER

CONDUIT RUN CONCEALED ABOVE CEILING OR IN WALL CONTAINING 3 NUMBER 12 CONDUCTORS UNLESS SHOWN OTHERWISE. HASH MARKS, IF SHOWN, INDICATE QUANTITY OF NUMBER 12 CONDUCTORS. WHERE DRAWING SPACE PROHIBITS HASH MARKS BEING SHOWN REFER TO CIRCUIT NUMBERS AND PROVIDE REQUIRED NUMBER OF CONDUCTORS PER CIRCUIT TYPE.

CONDUIT RUN CONCEALED IN OR BELOW FLOOR SLAB, OR UNDERGROUND.

HOMERUN TO PANELBOARD, LETTER OR LETTERS INDICATE PANELBOARDS, NUMBERS INDICATE CIRCUIT NUMBERS.

CIRCUIT NUMBERS.

EXPOSED CONDUIT RUN.

LIGHTING FIXTURE, "2" INDICATES THE CIRCUIT NUMBER AND "E" THE FIXTURE TYPE.

SEE FIXTURE SCHEDULE FOR DIMENSIONS AND MOUNTING TYPE.
L.E.D. FIXTURE, SURFACE OR STEM MOUNTED.

L.E.D. TROFFER FIXTURE. SEE FIXTURE SCHEDULE FOR DIMENSIONS

AND MOUNTING TYPE.

EMERGENCY LIGHT FIXTURE.

-LIVERGENCY LIGHT

A-2,4,6

5 €

EXIT LIGHT

JUNCTION BOX LOCATED ABOVE CEILING OR BELOW GRADE.

JUNCTION BOX, FLUSH WALL MOUNTED.

DUPLEX CONVENIENCE OUTLET, +18" TO CENTER LINE OF OUTLET UNLESS OTHERWISE NOTED. 5" INDICATES THE CIRCUIT NUMBER.

GFCI DUPLEX CONVENIENCE OUTLET MOUNTED +18" TO CENTER LINE UNLESS OTHERWISE

DUPLEX CONVENIENCE OUTLET MOUNTED ABOVE COUNTER, AT +46" TO CENTERLINE OF OUTLET.

NOTED. "WP" WHERE SHOWN INDICATES WEATHER-RESISTENT DEVICE WITH METAL IN-USE WEATHERPROOF COVER.

GFCI DUPLEX CONVENIENCE OUTLET MOUNTED ABOVE COUNTER AT +46" TO CENTERLINE OF

RECEPTACLE UNLESS NOTED OTHERWISE.

SPECIAL RECEPTACLE TO SUIT EQUIPMENT FURNISHED.

QUADRUPLEX RECEPTACLE, +18" TO CENTER LINE OF OUTLET UNLESS OTHERWISE NOTED.

QUADRUPLEX RECEPTACLE, +46" TO CENTER LINE OF OUTLET UNLESS OTHERWISE NOTED.

SINGLE POLE TOGGLE SWITCH, 3'-6" MOUNTING HEIGHT.

THREE OR FOUR WAY SWITCH AS INDICATED. +3-6" MOUNTING HEIGHT.

0-10 VOLT, LOW-VOLTAGE DIMMER FOR L.E.D. FIXTURES. MOUNT AT +46" ABOVE FINISHED FLOOR.

0-10 VOLT, LOW-VOLTAGE DIMMER WITH OCCUPANCY SENSOR FOR L.E.D. FIXTURES. MOUNT AT +46" ABOVE FINISHED FLOOR.

PANELBOARD, SEE SCHEDULE.

DISCONNECT SWITCH, SIZE AS NOTED ON DRAWINGS. FUSED PER MANUFACTURER'S NAME PLATE

DATA OF EQUIPMENT SERVED.

SINGLE OR DOUBLE POLE, MINIMUM 20 AMP MOTOR RATED ENCLOSED SWITCH WITH "LOCK-OUT" OPTION. MOUNTED NEAR EQUIPMENT BEING SERVED.

MOTOR

#### FIRE ALARM SYSTE

SL STROBE LIGHT, 6'-10" MOUNTING HEIGHT TO CENTER OF DEVICE.

SMOKE DETECTOR, CEILING MOUNTED.

#### TELECOMMUNICATION SYSTEMS

PLYWOOD BACKBOARD "T.B." INDICATES TELECOMMUNICATIONS BOARD.

TELECOMMUNICATIONS OUTLET WITH (2) CAT 6 CABLE DROPS, +18" TO CENTER LINE OF OUTLET UNLESS NOTED OTHERWISE. STUB UP 3/4"C. TO CEILING SPACE ABOVE.

TELECOMMUNICATIONS OUTLET WITH (2) CAT 6 CABLE DROPS, +46" TO CENTER LINE OF OUTLET UNLESS NOTED OTHERWISE. STUB UP 3/4"C. TO CEILING SPACE ABOVE.

OCCUPANCY SENSORS

DUAL TECHNOLOGY OCCUPANCY SENSOR. CEILING MOUNTED AT CORNER UNLESS SHOWN OTHERWISE. INFRARED/ULTRASONIC (WATTSTOPPER "DT" SERIES OR EQUAL). PROVIDE ALL NECESSARY COMPONENTS TO INSURE PROPER OPERATION (POWER PACKS, SLAVE PACKS, ETC.)

#### **GENERAL NOTES:**

- 1. DO NOT SCALE DRAWINGS TO LOCATE EQUIPMENT OR OUTLETS.
- 2. MOUNTING HEIGHTS AS INDICATED ON THE DRAWINGS SHALL BE FROM THE FINISHED FLOOR TO THE CENTER LINE OF THE OUTLET BOX.
- 3. THE ELECTRICAL DRAWINGS ARE ONLY A PART OF THE CONTRACT DOCUMENTS. ALL OF THE DRAWINGS AND SPECIFICATIONS MUST BE REVIEWED FOR THEIR INTERRELATIONSHIP AND REQUIRED COORDINATION BETWEEN DISCIPLINES.
- 4. 112 SYMBOL INDICATING ROOM OR SPACE NUMBER.
- 5. FLUSH RECESSED OUTLET BOXES INSTALLED IN NON-COMBUSTIBLE MATERIAL SHALL BE INSTALLED SUCH THAT FRONT EDGE OF BOX WILL NOT BE SET BACK OF THE FINISHED SURFACE MORE THAN 1/4". FLUSH RECESSED OUTLET BOXES INSTALLED IN COMBUSTIBLE MATERIAL SHALL BE INSTALLED SUCH THAT FRONT EDGE OF BOX IS FLUSH WITH THE THE FINISHED SURFACE". COMPLY WITH N.E.C. 314-20. SUPPORT OF OUTLET BOX BY RECEPTACLE AND COVERPLATE IS NOT ACCEPTABLE.
- 6. ALL CONDUIT, OUTLET BOXES, AND LOW VOLTAGE CABLING SHALL BE APPROPRIATELY SUPPORTED THROUGHOUT THE PROJECT. SUPPORT OF THESE ITEMS BY CEILING GRID OR GRID SUPPORT WIRES IS
- 7. ALL RECEPTACLES LOCATED WITHIN 6'-0"TO THE EDGE SINK OR OTHER WATER SOURCE SHALL BE GFCI TYPE DEVICE IN ACCORDANCE WITH N.E.C 210-8.A.7. COORDINATE LOCATIONS WITH ARCHITECTURAL AND PLUMBING DRAWINGS PRIOR TO ROUGH-IN.

#### **DEMOLITION NOTES:**

- THE CONTRACTOR SHALL FIELD VERIFY EXACT ROUTINGS OF EXISTING RACEWAYS BEFORE STARTING ANY WORK AND NOTIFY THE ARCHITECT OF ANY KNOWN DISCREPANCIES.
- 2. THE CONTRACTOR SHALL UTILIZE AS MUCH OF THE EXISTING OUTLETS AND RACEWAYS AS POSSIBLE TO RECONNECT EXISTING AND NEW CIRCUITS.
- 3. THE CONTRACTOR SHALL REMOVE EXISTING CONDUCTORS AND INSTALL NEW CONDUCTORS AS SHOWN OR AS REQUIRED TO COMPLETE REVISED CIRCUITS AND TO CONFORM TO N.E.C.
- 4. ALL EXISTING EQUIPMENT REMOVED FROM SERVICE AND NOT INTENDED FOR REUSE SHALL REMAIN THE PROPERTY OF OWNER AND SHALL BE STORED OR DISPOSED OF AS DIRECTED BY THE OWNER.
- 5. MAINTAIN SERVICE TO ALL EXISTING CIRCUITS THAT ARE NOT SCHEDULED FROM REMOVAL.
- 6. PROVIDE BLANK COVERS ON ALL JUNCTION BOXES AND OUTLET BOXES NOT INTENDED FOR REUSE.
- 7. EXISTING CEILING, WALLS AND FLOORS DISTURBED OR DISFIGURED BY THE ELECTRICAL RENOVATIONS SHALL BE PATCHED, MENDED OR REPLACED BY TRADES ACTIVELY PARTICIPATING IN THIS TYPE OF WORK. RESPONSIBILITY FOR REPAIRS SHALL BE COORDINATED BETWEEN GENERAL CONTRACTOR AND ELECTRICAL SUBCONTRACTOR.
- 8. EXISTING EQUIPMENT SHOWN ON ARCHITECTURAL, MECHANICAL PLUMBING AND ELECTRICAL DRAWINGS THAT WILL REMAIN SHALL HAVE SERVICE MAINTAINED OR RECONNECTED TO EXISTING OR NEW PANELBOARD AS NECESSARY.
- ALL EXISTING LIGHT FIXTURES REMOVED FROM AREAS WHERE NEW CEILINGS AND LIGHT FIXTURES
  ARE TO BE INSTALLED SHALL REMAIN THE PROPERTY OF THE OWNER.
- 10. TO MAINTAIN SERVICE, TO EXTEND, OR TO RECONNECT CIRCUITS WHERE CONDUIT CANNOT BE CONCEALED, SURFACE METAL RACEWAY (WIREMOLD) SHALL BE USED. VERIFY WITH ARCHITECT PRIOR TO INSTALLATION.
- 11. ELECTRICAL CONTRACTOR SHALL REVIEW ARCHITECTURAL DRAWINGS FOR DOOR SWINGS, CABINETS, COUNTERS AND OTHER BUILT-IN EQUIPMENT. CONDITIONS INDICATED ON ARCHITECTURAL DRAWINGS SHALL GOVERN.
- 12. COORDINATE ELECTRICAL WITH ARCHITECTURAL DETAILS, FLOOR PLANS, ELEVATIONS, STRUCTURAL MECHANICAL AND PLUMBING DRAWINGS. PROVIDE FITTINGS, JUNCTION BOXES AND ACCESSORIES TO MEET CONDITIONS.
- 13. DEVICES LOCATED AT COUNTERS SHALL BE MOUNTED ABOVE COUNTER TOPS UNLESS KNEE SPACE IS PROVIDED WITH DRILLED HOLE IN COUNTER TOP FOR SERVICE CORDS. VERIFY WITH ARCHITECT.
- 14. ELECTRICAL CONTRACTOR SHALL PROVIDE PLUGS OR RECEPTACLES TO MATCH DEVICES FURNISHED WITH OWNER FURNISHED EQUIPMENT AND EQUIPMENT FURNISHED BY OTHERS. (VERIFY)

#### — PHASE A NEUTRAL -WHITE WITH BLACK TRACER PHASE A - BLACK — PHASE B - RED -- AUTOMATIC GROUND. PHASE B NEUTRAL - WHITE WITH RED TRACER 4" SQUARE BOX DEPTH SHALL BE AS REQUIRED FOR CONDUCTOR FILL -PLASTER RING EQUIPMENT GROUND - GREEN BOND TO BACKBOX. (PROVIDE PIGTAIL ATTACHED SCOTCHLOCK ELECTRICAL TO GROUND SCREW ON RECEPTACLE). SPRING CONNECTORS.— STEEL E.M.T. CONNECTOR WITH NYLON INSULATED THROAT OR 1. EACH CONDUCTOR IN BOX SHALL BE OF SUFFICIENT LOCKNUT AS REQUIRED. -LENGTH (MIN. 6") FOR MAKING UP SPLICES. 2. DO NOT BACK WIRE DEVICES. LOOP AROUND P.V.C., E.M.T. OR TERMINAL SCREWS. RIGID AS REQUIRED 3. FACE OF PLASTER RING SHALL BE FLUSH WITH WALL.

FIXTURE SCHEDULE

MANUFACTURER

LITHONIA "GRAD LED"

SERIES OR APPROVED

LITHONIA "GRAD LED"

SERIES OR APPROVED

LITHONIA "VTL" SERIES

EMERGI-LITE "PROVIDER"

EMERGI-LITE "PREMIER"

EQUAL

METALUX

SERIES

SURE-LITE

DUAL-LITE

LITHONIA

CHLORIDE

SURE-LITE

LITHONIA

DUAL-LITE

CHLORIDE LIGHTGUARD

LIGHTGUARD

COLUMBIA DAY-BRITE

DESCRIPTION

8'-0" LINEAR 8"x2" RECTANGULAR FIXTURE WITH 80% DIRECT / 20%

TO ARCHITECTURAL ELEVATIONS FOR EXACT MOUNTING HEIGHT.

LAMPS: L.E.D. AT MINIMUM 1000 LUMENS/FT & MAX 65 WATT, 3500°K

SAME AS TYPE "A" EXCEPT 4'-0" LINEAR HOUSING AND MAX 32 WATT.

REFLECTOR. LED DRIVER DELIVERS FULL-RANGE DIMMING FROM 0-10V

SELF-CONTAINED EMERGENCY FIXTURE WITH INTEGRAL BATTERY PACK

L.E.D. EXIT & EMERGENCY LIGHT COMBO FIXTURE WITH WHITE HOUSING, SERIES

DUAL HEAD, AND SEALED NI-CAD BATTERIES. PROVIDE WITH TEST

SWITCH, INDICATOR LAMP, AND 4 WATTS MR16 L.E.D. LAMPS. WHITE

RED LETTERING, UNIFORM LAMP DIFFUSER AND 120/277 VOLT INPUT.

PROVIDE BACK-UP BATTERY PACK WITH TEST BUTTON, 6 WATT MR16

L.E.D. LAMPS AND MAINTENANCE FREE NI-CAD BATTERIES FOR MINIMUM

DRIVER: MINIMUM 1% DIMMABLE 0-10V MULTIVOLT ELECTRONIC

L.E.D. FIXTURE, 2' x 4' LAY-IN WITH VOLUMETRIC SYMMETRIC

LUMEN OUTPUT: 4800 LUMENS AT 3500°K

FINISH AND 120/277 VOLT INPUT.

90 MINUTES OF ILLUMINATION.

DRIVER: MULTI VOLT, 0-10V DIMMING, 1% MINIMUM

CONTROL SIGNAL.

(39.1 INPUT WATTS)

DISTRIBUTION AND MATTE-WHITE POLYESTER POWDER PAINTED

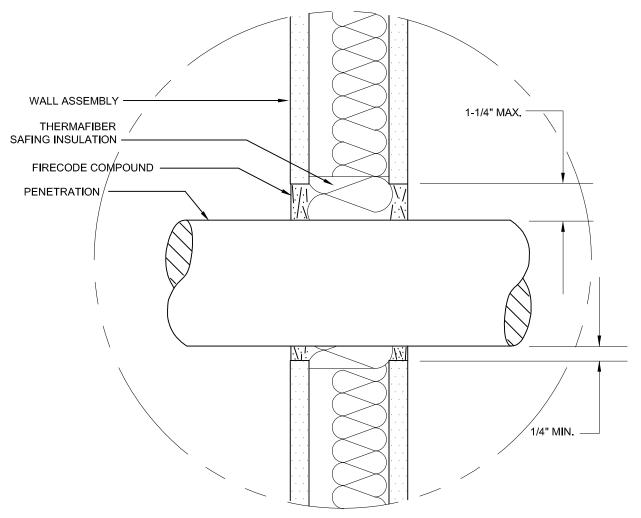
INDIRECT LIGHT DISTRIBUTION. HOUSING TO BE COLD ROLLED STEEL

WITH WHITE GLOSS FINISH. PROVIDE WITH 96" ADJUSTABLE MOUNTING

FROM HARD CEILING WITH MATCHING CEILING CANOPY MOUNTS. REFER

TYPE





NOTES:

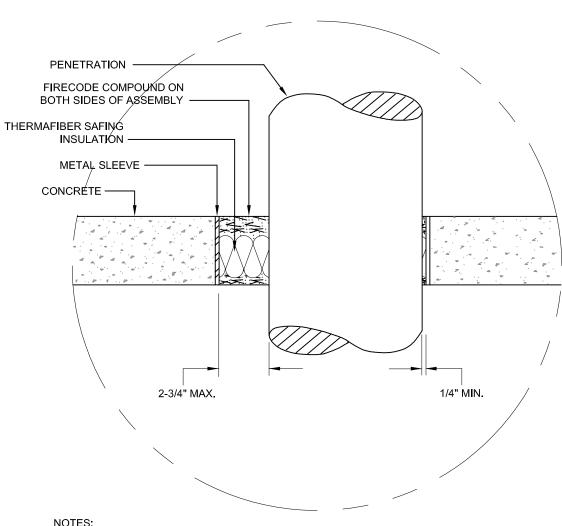
1. GYPSUM BOARD WALL PENETRATIONS SHALL BE SEALED IN ACCORDANCE WITH U.L. SYSTEM NO.

2. WHERE CONDUIT IS USED AS A SLEEVE FOR ROUTING LOW-VOLTAGE CABLES, LOCATE CONDUCTORS IN CENTER OF SLEEVE AND FILL OPENING WITH FIRE RATED PUTTY AT EACH END OF SLEEVE.

GYPSUM WALLBOARD

2 ASSEMBLY PENETRATION DETAIL

SCALE: NONE



NOTES:
1. CONCRETE FLOOR AND WALL PENETRATIONS SHALL BE SEALED IN ACCORDANCE WITH U.L. SYSTEM

2. WHERE CONDUIT IS USED AS A SLEEVE FOR ROUTING LOW-VOLTAGE CABLES, LOCATE CONDUCTORS IN CENTER OF SLEEVE AND FILL OPENING WITH FIRE RATED PUTTY AT EACH END OF

CONCRETE FLOOR / WALL

3 ASSEMBLY PENETRATION DETAIL

E1.1 SCALE: NONE





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REVISIONS:

Date Description

PROJECT 50003278
USC-AIKEN RUTH
PATRICK
CLASSROOM
RENOVATIONS

471 UNIVERSITY PKWY, AIKEN, SC 29801

USC AIKEN

DRAWING TITLE

**KEY PLAN:** 

LEGEND NOTES AND FIXTURE SCHEDULES

CD

 PROJECT NO.
 17-17

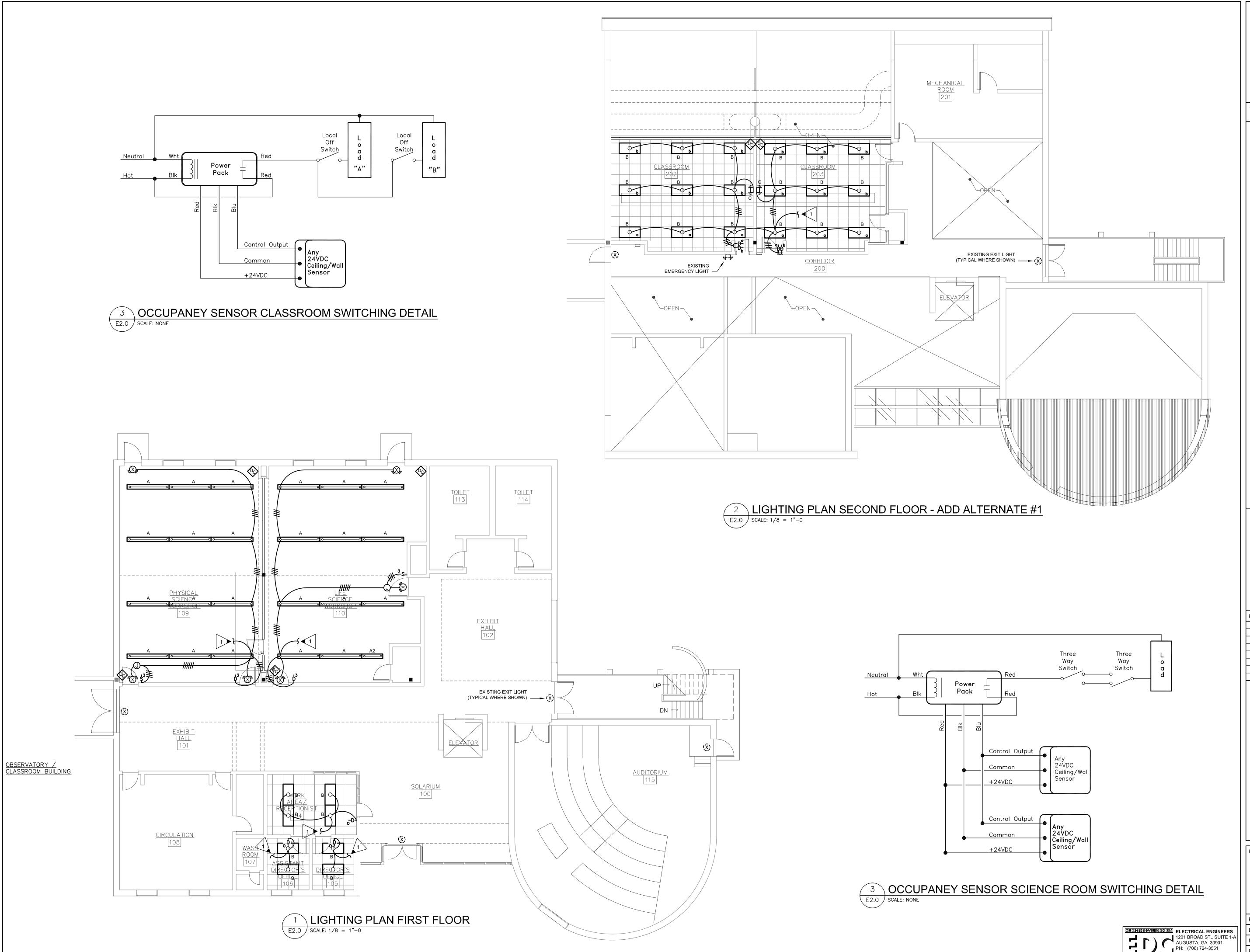
 DATE
 02-19-2018

 DRAWN BY
 ALG

 PAPER
 24"x36"

E1.1

DRAWING NO.





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#### **KEYED NOTES:**

1 CONNECT NEW FIXTURES TO EXISTING LIGHTING CIRCUIT CURRENTLY SERVING THIS SPACE.

#### **GENERAL NOTES:**

ALL NEW DEVICES LOCATED ON EXISTING CONCRETE BLOCK WALLS
 SHALL BE SURFACE MOUNTED USING EXPOSED CONDUIT AND
 OUTLET BOXES. PAINT CONDUIT RACEWAY SYSTEM TO MATCH
 EXISTING.

KEY PLAN:

REVISIONS:

Date Description

# PROJECT 50003278 USC-AIKEN RUTH PATRICK CLASSROOM RENOVATIONS

TOK

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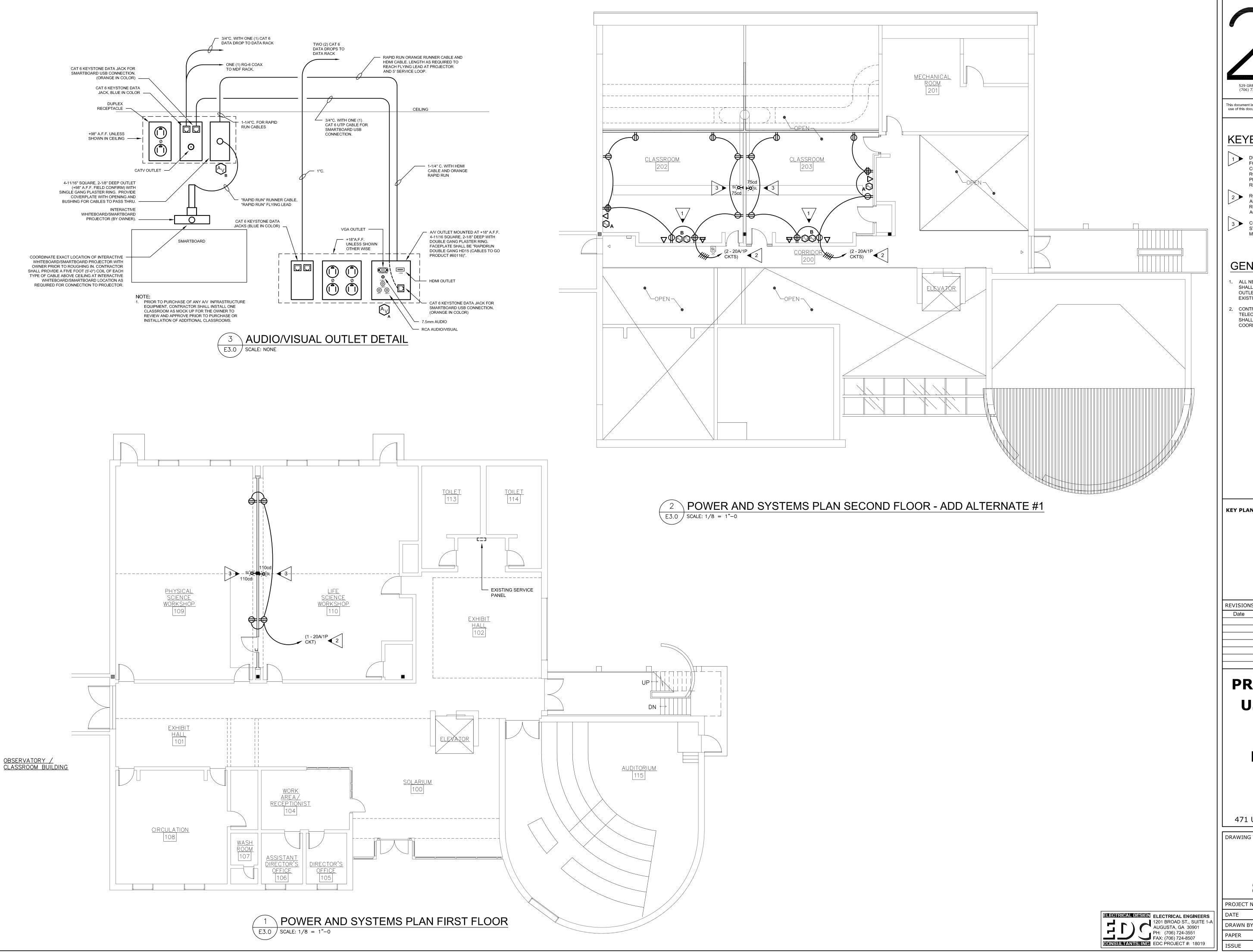
DRAWING TITLE

LIGHTING PLAN

	PROJECT NO.	17-17
	DATE	02-19-2018
-A	DRAWN BY	ALG
	PAPER	24"x36"
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**E2.0** 

DRAWING NO.





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#### **KEYED NOTES:**

- DUPLEX RECEPTACLE, A/V OUTLET, TV JACK, AND DATA OUTLET FOR WALL MOUNTED PROJECTOR AND SMARTBORAD. COORDINATE EXACT MOUNTING HEIGHT WITH OWNER PRIOR TO ROUGHING IN. A/V EQUIPMENT AND MOUNTING BRACKET PROVIDED BY OWNER. REFER TO DETAIL 3/E3.0 FOR A/V OUTLET REQUIREMENTS.
- ROUTE TO EXISTING ELECTRICAL PANEL SERVING THIS SPACE AND CONNECT TO SPARE 20 AMP BREAKER(S) TO SERVE NEW RECEPTACLE CIRCUITS. REVISE PANELBOARD SCHEDULE ACCORDINGLY.
- 3 CONNECT NEW FIRE ALARM STROBE LIGHT TO EXISTING SYSTEM. SET STROBE CANDELA (cd) INTENSITY AS NOTED. MATCH EXISTING DEVICES UNLESS DEVICE IS OBSOLETE.

#### **GENERAL NOTES:**

- . ALL NEW DEVICES LOCATED ON EXISTING CONCRETE BLOCK WALLS SHALL BE SURFACE MOUNTED USING EXPOSED CONDUIT AND OUTLET BOXES. PAINT CONDUIT RACEWAY SYSTEM TO MATCH
- 2. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL A/V AND TELECOMMUNICATIONS CABLING AS SHOWN ON DRAWINGS. CABLING SHALL MATCH CAMPUS STANDARD UNLESS NOTED OTHERWISE. COORDINATE EXACT LOCATION OF NETWORK RACK WITH OWNER.

**KEY PLAN:** 

Description

#### PROJECT 50003278 **USC-AIKEN RUTH PATRICK CLASSROOM RENOVATIONS**

#### **USC AIKEN**

471 UNIVERSITY PKWY, AIKEN, SC 29801

#### **POWER AND SYSTEMS PLAN**

	PROJECT NO.	17-17
1	DATE	02-19-2018
	DRAWN BY	ALG
	PAPER	24"x36"
1	, and the second	

E3.0

#### SECTION 16000 - GENERAL

- 1.01 WORK INCLUDED
- A. THIS DIVISION OF THE SPECIFICATIONS (16000) COVERS THE COMPLETE INTERIOR AND EXTERIOR ELECTRICAL SYSTEM FOR ALL WORK SHOWN ON THE DRAWINGS AS SPECIFIED HEREIN PROVIDING ALL MATERIAL, LABOR AND EQUIPMENT REQUIRED FOR THE INSTALLATION OF THE ELECTRICAL SYSTEMS COMPLETE AND IN OPERATING
- B. INCLUDE IN THE ELECTRICAL WORK ALL THE NECESSARY SUPERVISION AND THE ISSUING OF ALL COORDINATING INFORMATION TO ANY OTHER TRADES WHO ARE SUPPLYING WORK TO ACCOMMODATE THE ELECTRICAL INSTALLATIONS.
- C. THE DRAWINGS FOR ELECTRICAL WORK UTILIZE SYMBOLS AND SCHEMATIC DIAGRAMS WHICH HAVE NO DIMENSIONAL SIGNIFICANCE. THE WORK SHALL THEREFORE, BE INSTALLED TO FULFILL THE DIAGRAMMATIC INTENT EXPRESSED ON THE ELECTRICAL DRAWINGS.
- D. REVIEW ARCHITECTURAL DRAWINGS FOR DOOR SWINGS, CABINETS, COUNTERS, MOLDINGS AND BUILT-IN EQUIPMENT, CONDITIONS INDICATED ON ARCHITECTURAL DRAWINGS SHALL GOVERN, PRIOR TO ROUGH-IN OF RECEPTACLES AND SYSTEMS OUTLETS. REFER TO ARCHITECTURAL CASEWORK DRAWINGS FOR ROUGH-IN
- E. SUBMIT FOR APPROVAL BY THE ARCHITECT ALL MATERIALS AND EQUIPMENT TO BE INCORPORATED IN THE ELECTRICAL WORK.
- F. SUBMIT ONLY SHOP DRAWINGS WHICH COMPLY WITH THE CONTRACT DOCUMENTS.
- G. MARK EACH INDIVIDUAL SUBMITTAL ITEM TO SHOW SPECIFICATION SECTION WHICH PERTAINS TO THE ITEM.
- H. WHEN SHOP DRAWINGS ARE REVIEWED. SOME ERRORS MAY BE DETECTED BUT OTHERS MAY BE OVERLOOKED. THIS DOES NOT GRANT THE CONTRACTOR PERMISSION TO PROCEED IN ERROR. REGARDLESS OF ANY INFORMATION CONTAINED IN THE SHOP DRAWINGS, THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS SHALL BE FOLLOWED AND ARE NOT WAIVED OR SUPERSEDED IN ANY WAY BY THE SHOP DRAWING REVIEW.
- I. ONE COMPLETE SET OF ELECTRICAL DRAWINGS SHALL BE RESERVED FOR AS-BUILT DRAWINGS. ANY APPROVED DEVIATION FROM THE CONTRACT DRAWINGS SHALL BE RECORDED ON THESE DRAWINGS.
- J. COMPLETED AS-BUILT DRAWINGS SHALL BE PRESENTED TO THE ARCHITECT PRIOR TO FINAL INSPECTION.
- K. PROVIDE AT THE TIME OF FINAL INSPECTION THREE SETS OF MAINTENANCE AND OPERATING INSTRUCTION FOR: LIGHTING AND POWER PANEL BOARDS, FUSES, WIRING DEVICES
- L. ALL ELECTRICAL WORK SHALL MEET OR EXCEED THE LATEST REQUIREMENTS OF THE FOLLOWING CODES AND/OR OTHER AUTHORITIES EXERCISING JURISDICTION OVER THE ELECTRICAL CONSTRUCTION WORK AND THE PROJECT.
- THE NATIONAL ELECTRICAL CODE (NFPA 70) 2014 EDITION
- THE NATIONAL ELECTRICAL SAFETY CODE (ANSI C-2) THE LIFE SAFETY CODE (NFPA 101) - 2012 EDITION
- THE INTERNATIONAL BUILDING CODE 2015 EDITION REGULATIONS OF THE LOCAL UTILITY COMPANY WITH RESPECT TO METERING AND SERVICE ENTRANCE. MUNICIPAL AND STATE ORDINANCES GOVERNING ELECTRICAL WORK
- M. ALL REQUIRED PERMITS AND INSPECTION CERTIFICATES SHALL BE OBTAINED, AND MADE AVAILABLE AT THE OMPLETION OF THE WORK, PERMITS, INSPECTIONS, AND CERTIFICATION FEES SHALL BE PAID FOR AS A PART OF THE ELECTRICAL WORK.
- N. THIS CONTRACTOR SHALL SCHEDULE HIS WORK AND IN EVERY WAY POSSIBLE COOPERATE WITH ALL OTHER CONTRACTORS ON THE JOB TO AVOID DELAYS, INTERFERENCES, AND UNNECESSARY WORK. HE SHALL NOTIFY
- THEM OF ALL OPENINGS, HANGERS, EXCAVATIONS, ETC., SO THAT PROPER PROVISIONS SHALL BE MADE FOR HIS O. THIS CONTRACTOR SHALL DO ALL CUTTING AND EXCAVATING NECESSARY FOR THE COMPLETE INSTALLATION OF HIS WORK, BUT HE SHALL NOT CUT THE WORK OF ANY OTHER CONTRACTOR WITHOUT FIRST CONSULTING THE

ARCHITECT. HE SHALL REPAIR ANY WORK DAMAGED BY HIM OR HIS WORKMEN, EMPLOYING THE SERVICES OF THE

CONTRACTOR WHOSE WORK IS DAMAGED. SAW CUT EXISTING SLAB AS REQUIRED FOR ROUTING CONDUITS AND

- FLOOR BOXES NOTED TO BE INSTALLED IN EXISTING FLOORS. RESTORE TO ORIGINAL FINISH. P. RACEWAYS, FIXTURES, DEVICES, AND OTHER ELECTRICAL EQUIPMENT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER AND IN ACCORDANCE WITH RECOGNIZED GOOD PRACTICE FOR A FIRST CLASS
- Q. THE ARCHITECT OR HIS REPRESENTATIVE SHALL HAVE THE AUTHORITY TO REJECT ANY WORKMANSHIP NOT
- R. THE ELECTRICAL CONTRACTOR SHALL PERSONALLY OR THROUGH AN AUTHORIZED LICENSED AND COMPETENT ELECTRICIAN, CONSTANTLY SUPERVISE THE WORK FROM BEGINNING TO COMPLETE AND FINAL INSPECTION.
- S. CONSULT OWNER AND UTILITY COMPANIES FOR UNDERGROUND LINES BEFORE ANY UNDERGROUND WORK IS STARTED. CONTRACTORS SHALL BE RESPONSIBLE FOR ANY DAMAGE
- T. ALL EMPTY CONDUITS SHALL HAVE A PULL STRING INSTALLED. ALL FLUSH RECESSED BOXES SHALL HAVE BLANK
- U. THE CONTRACTOR SHALL PERFORM ALL EXCAVATION TO INSTALL CONDUIT STRUCTURES AND EQUIPMENT SPECIFIED IN THIS DIVISION OF THE SPECIFICATIONS.
- V. ALL EQUIPMENT REQUIRING ELECTRICAL POWER CONNECTIONS SHALL BE CONNECTED UNDER THIS DIVISION OF
- THESE SPECIFICATIONS. W. ELECTRICAL CIRCUITS TO EQUIPMENT FURNISHED UNDER OTHER SECTIONS OF THESE SPECIFICATIONS ARE BASED ON DESIGN LOADS. IF ACTUAL EQUIPMENT FURNISHED HAS LOADS OTHER THAN DESIGN LOADS ELECTRICAL

CIRCUITS AND PROTECTIVE DEVICES SHALL BE REVISED TO BE COMPATIBLE WITH EQUIPMENT FURNISHED AT NO

- ADDITIONAL COST TO THE OWNER. ANY REVISIONS MUST HAVE PRIOR APPROVAL BY THE ARCHITECT X. REMOVE OIL, DIRT, GREASE AND FOREIGN MATERIALS FROM ALL RACEWAYS, FITTINGS, BOXES, PANELBOARD TRIMS AND CABINETS TO PROVIDE A CLEAN SURFACE FOR PAINTING. TOUCH-UP SCRATCHED OR MARRED SURFACES OF
- LIGHTING FIXTURES, PANELBOARD AND CABINET TRIMS, MOTOR CONTROL CENTER, SWITCHBOARD OR EQUIPMENT OSTIBES WITH PAINT EURNISHED BY THE EQUIPMENT MANUEACTURERS SPECIFICALLY FOR THAT PURPOSE Y. DEFECTIVE LAMPS SHALL BE REPLACED UP-TO-DATE OF ACCEPTANCE AND SHALL BE GUARANTEED FOR ONE YEAR.
- 7 ALL SYSTEMS AND COMPONENT PARTS SHALL BE GLIARANTEED FOR ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE OF THE COMPLETE PROJECT. DEFECTS FOUND DURING THIS GUARANTEED PERIOD SHALL BE
- PROMPTLY CORRECTED AT NO ADDITIONAL COST TO THE OWNER.

#### SECTION 16010 - LIGHTING AND POWER PANELBOARDS

PLATES INSTALLED.

- A. COMPLETE PANELBOARD SHOP DRAWINGS SHALL BE SUBMITTED, LISTING AS A MINIMUM THE FOLLOWING ITEMS: VOLTAGE RATING. BUS ASSEMBLY RATING. MAIN BREAKER RATING BY CAPACITY, NUMBER OF POLES AND INTERRUPTING RATING IN RMS SYMMETRICAL AMPERES. SURFACE OR FLUSH MOUNTING. LISTING OF BRANCH BREAKERS BY CAPACITY NUMBER OF POLES AND INTERRUPTING RATING IN RMS SYMMETRICAL AMPERES, SCHEDULE SIMILAR TO THAT SHOWN ON THE DRAWINGS, DEPICTING BRANCH BREAKER ARRANGEMENT AND BREAKER SIZES AND GIVING FULL EXPLANATION FOR ANY DIFFERENCE BETWEEN THE TWO., LUG SIZES AS REQUIRED FOR FEEDERS SHOWN ON DRAWINGS.
- B. FOR THE PURPOSE OF SELECTING QUALITY AND TYPES OF PANELS, EQUIPMENT AS MANUFACTURED BY SQUARE "D" COMPANY HAS BEEN SPECIFIED. FOLLOWING MANUFACTURERS MEETING THESE SPECIFICATIONS ARE ACCEPTABLE: G. E., SIEMENS, CUTLER HAMMER
- C. FURNISH AND INSTALL CIRCUIT BREAKER LIGHTING AND POWER PANELBOARDS AS INDICATED IN THE PANELBOARD SCHEDULE AND WHERE SHOWN ON THE PLANS. PANELBOARDS SHALL BE OF THE DEAD-FRONT SAFETY TYPE. EQUIPPED WITH THERMAL MAGNETIC MOLDED CASE CIRCUIT BREAKERS WITH FRAME AND TRIP RATING AS SHOWN
- D. CIRCUIT BREAKERS SHALL BE HACR RATED, QUICK-MAKE, QUICK-BREAK, THERMAL-MAGNETIC, TRIP-INDICATING. AND HAVE COMMON TRIP ON ALL MULTI-POLE BREAKERS. TRIP INDICATION SHALL BE CLEARLY SHOWN BY THE BREAKER HANDLE TAKING POSITION BETWEEN ON AND OFF, WHEN THE BREAKER IS TRIPPED. BRANCH CIRCUIT BREAKERS FEEDING CONVENIENCE OUTLETS SHALL HAVE SENSITIVE INSTANTANEOUS TRIP SETTING OF NOT MORE THAN 10 TIMES THE TRIP RATING OF THE BREAKERS. CONNECTION TO BUS IN ALL PANELS SHALL BE BOLTED. ALL 3REAKERS SHALL BE 20 AMPERE TRIP, UNLESS OTHERWISE SHOWN. ALL BREAKERS SHALL BE MINIMUM FOR 120/208 VOLTS 10,000 A.I.C. SYM. AND FOR 277/480 VOLTS 14,000 A.I.C. UNLESS OTHERWISE NOTED.
- E. PANEL FRONT SHALL BE PROVIDED WITH A CONTINUOUS PIANO HINGE ON ONE SIDE. CUTLER HAMMER "EZ-TRIM" IS NOT ACCEPTABLE.
- F. A STEEL CIRCUIT DIRECTORY FRAME PERMANENTLY ATTACHED (SPOT WELDED) AT FACTORY (NOT GLUED), AND CARD WITH A CLEAR PLASTIC COVERING SHALL BE PROVIDED ON THE INSIDE OF THE DOOR. THE DIRECTORY CARD SHALL PROVIDE A SPACE AT LEAST 1/4" HIGH X 3" LONG FOR EACH CIRCUIT
- G. ALL PANELS SHALL BE EQUIPPED WITH A COPPER EQUIPMENT GROUNDING BAR. THE BAR SHALL HAVE LUGS OF SUFFICIENT SIZE TO HANDLE ALL GROUNDING CONDUCTORS.
- H. WIRING IN PANELBOARDS SHALL BE NEATLY GROUPED AND SECURED WITH TY-WRAPS.
- I. ELECTRICAL PANELS SHALL NOT BE USED AS WIREWAYS OR JUNCTION BOXES FOR CONTROL CONDUCTORS.

#### SECTION 16020 - RACEWAYS

- A. ACCEPTABLE MANUFACTURERS OF RIGID STEEL AND ELECTRICAL METALLIC TUBING CONDUIT ARE: ALLIED TUBE AND CONDUIT CO., WHEATLAND TUBE CO., REPUBLIC CONDUIT
- B. ACCEPTABLE MANUFACTURER'S OF POLYVINYL CHLORIDE (PVC) CONDUIT ARE: CERTAINTEED, GEORGIA PIPE, CARLON, CAN-TEX C. ALL METALLIC CONDUIT AND ELECTRIC METALLIC TUBING SHALL BE STEEL, OF STANDARD PIPE DIMENSIONS,
- SMOOTH INSIDE AND OUT, AND SHALL BE GALVANIZED. WHERE THE WORD "CONDUIT" IS USED HEREINAFTER IT SHALL MEAN EITHER RIGID STEEL CONDUIT, ELECTRIC METALLIC TUBING, FLEXIBLE STEEL CONDUIT, LIQUID TIGHT FLEXIBLE STEEL CONDUIT OR SCHEDULE 40 PLASTIC CONDUIT. INTERMEDIATE GRADE CONDUIT IS NOT
- DAMAGE. SCHEDULE 40 PLASTIC CONDUIT SHALL BE USED UNDERGROUND AND IN SLAB-ON-GRADE. IN NO CASE SHALL PLASTIC CONDUIT BE EXPOSED; SWITCH TO RIGID STEEL CONDUIT WHEN TURNING UP EXPOSED. ALL OTHER CONDUIT, UNLESS OTHERWISE SPECIFIED OR CALLED FOR ON THE PLANS, MAY BE GALVANIZED ELECTRIC METALLIC TUBING. ANY EXPOSED CONDUIT ON EXTERIOR OF THE BUILDING SHALL BE GALVANIZED RIGID STEEL ONLY. E. ALL CONDUIT SHALL BE CONCEALED IN BUILDING CONSTRUCTION EXCEPT AS NOTED OR SHOWN OTHERWISE. IN

D. GALVANIZED RIGID STEEL CONDUIT SHALL BE USED IN ALL AREAS WHERE IT WILL BE EXPOSED TO PHYSICAL

- AREAS WITH NO FINISHED CEILING AND WHERE CONDUIT IS RUN EXPOSED ALL RUNS DOWN TO SWITCHES, RECEPTACLES, ETC. SHALL WHEN POSSIBLE BE CONCEALED IN WALL. IT IS THE INTENT OF THESE SPECIFICATIONS THAT ALL CONDUIT WILL BE CONCEALED WHENEVER POSSIBLE. WHERE OUTLETS ARE REQUIRED TO BE INSTALLED ON EXISTING WALLS IN A FINISHED SPACE, RACEWAY AND OUTLET BOX SHALL BE WIREMOLD SURFACE METAL
- F. EMT FITTINGS SHALL BE COMPRESSION AND MADE OF STEEL FOR SIZES TWO INCHES OR SMALLER, STEEL SET SCREW TYPE FITTINGS MAY BE USED ON SIZES 2 1/2" OR LARGER. CONNECTORS AND COUPLINGS SHALL BE RAIN TIGHT AND SHALL HAVE A NYLON INSULATED THROAT. ALL FITTINGS SHALL BE "UL" APPROVED. EMT CONDUIT (IN SIZES 2 1/2" THROUGH 4") PROVIDED WITH INTEGRAL STEEL COMPRESSION OR SET SCREW COUPLING ON ONE (1) END OF THE CONDUIT IS ACCEPTABLE. DIE CAST, AND INDENTER TYPE FITTINGS ARE NOT ACCEPTABLE. FITTINGS FOR FLEXIBLE STEEL CONDUITS AND LIQUID TIGHT FLEXIBLE CONDUIT SHALL BE STEEL AND HAVE NYLON INSULATED
- G. CONDUIT AND EMT SYSTEMS INDICATED ON THE DRAWINGS FOR COMMUNICATION AND SIGNALING SYSTEMS ARE FOR TYPICAL SYSTEMS. INSTALL CONDUIT AND EMT SYSTEMS FOR THE SYSTEM BEING INSTALLED.

#### H. GALVANIZED RIGID STEEL CONDUIT COUPLINGS AND CONNECTIONS:

- a. INSTALL STANDARD, CONDUIT-THREADED FITTINGS. b. FOR CONNECTION TO SHEET METAL BOXES, CABINETS AND OTHER SHEET METAL ENCLOSURES, INSTALL LOCKNUTS ON THE INSIDE AND OUTSIDE OF THE ENCLOSURE FOR EACH CONNECTION. SEE SECTION 16110 OF
- I. INSTALLATION OF PLASTIC CONDUIT:
- a. SHALL BE A MINIMUM OF 2'-0" BELOW FINISHED GRADE WHEN NOT COVERED BY CONCRETE. b. SHALL HAVE PROPERLY SIZED BOND WIRE INSTALLED WITH ALL CIRCUITS.
- BENDS AND TURNS SHALL BE KEPT TO A BARE MINIMUM. d. ALL CONDUIT AND FITTINGS SHALL BE SOLVENT WELDED e. PLASTIC CONDUIT MAYBE TURNED UP CONCEALED IN MASONRY AND GYPSUM BOARD WALLS. PVC CONDUIT

SHALL BE ALLOWED TO BE ROUTED CONCEALED IN WALLS TO A MAXIMUM HEIGHT OF 48" A.F.F.

f. DO NOT INSTALL CONDUIT IN SLAB. ALL CONDUIT SHALL BE INSTALLED A MINIMUM OF 6" BELOW SLAB. CONDUITS SHALL NOT BE BUNCHED TOGETHER. MAINTAIN 1" CLEARANCE BETWEEN CONDUITS. g. ALL 90° ELBOWS USED FOR FEEDER CONDUITS ROUTED TO SERVICE TRANSFORMERS, MAIN SWITCHGEAR AND PANELBOARDS SHALL BE GALVANIZED RIGID STEEL. 90° PVC ELBOWS FOR FEEDER CONDUITS SHALL <u>NOT</u> BE

#### PERMITTED. J. INSULATED BUSHINGS:

- a. INSTALL NYLON INSULATED BUSHINGS ON THE END OF ALL RIGID CONDUIT
- b. THE INSULATING MATERIAL SHALL BE DESIGNED FOR RUGGED, LONG SERVICE c. BUSHINGS WHICH CONSIST OF ONLY INSULATING MATERIAL WILL NOT BE ACCEPTED I. FITTINGS WHICH INCORPORATE INSULATED BUSHINGS WILL BE CONSIDERED FOR APPROVAL IN LIEU OF FITTINGS
- WITH SEPARATE BUSHINGS. K. ALL COUPLINGS AND CONNECTIONS IN LOCATION WHERE WATER OR OTHER LIQUID OR VAPOR MIGHT CONTACT THE
- CONDUIT AND EMT SHALL ALSO BE WATERTIGHT L. CLOSE EMPTY CONDUIT AND EMT AS COMPLETE RUNS BEFORE PULLING IN THE CABLES AND WIRES.
- M INSTALL EXPOSED CONDUIT AND EMT PARALLEL TO OR AT RIGHT ANGLES WITH THE LINES OF THE BUILDING. LOCATE THEM SO THEY WILL NOT OBSTRUCT HEADROOM OR WALKWAYS OR CAUSE TRIPPING
- N. INSTALL CONDUIT OR EMT CLAMPS:
- a. AT INTERVALS AS REQUIRED BY THE NEC. b. ABOVE SUSPENDED CEILINGS, METAL SUPPORTS MAY BE INSTALLED AS PERMITTED BY THE NEC, EXCEPT THAT CONDUIT CANNOT BE SUPPORTED OR SECURED TO THE T-BAR GRID OR FROM THE WIRE SUPPORTING THE T-BAR
- c. TRAPEZE, SPLIT RING, BAND OR CLEVIS HANGER MAY BE INSTALLED AS PERMITTED BY THE NEC. TRAPEZE HANGERS SHALL BE STRUCTURAL METAL CHANNELS, ANGLE IRONS OR PREFORMED METAL CHANNEL SHAPES WITH THE CONDUIT AND EMT RUNS HELD ON SPECIFIC CENTER BY U BOLTS, CLIPS OR CLAMPS. DO NOT SUPPORT CONDUIT FROM CEILING SUSPENSION WIRE OR FROM OTHER CONDUIT d. CHAIN, WIRE OR PERFORATED STRAP SUPPORTS WILL NOT BE ACCEPTABLE. NOR ARE THEY ACCEPTABLE AS A
- MEANS OF SECURING THE CONDUIT O TFI FPHONE CONDUITS: WHERE TELEPHONE CONDUIT RUNS ARE LONGER THAN 100'-0" OR HAVE MORE THAN TWO 900
- BENDS (OR EQUIVALENT) OR HAVE A REVERSE BEND, PULL BOXES SHALL BE PROVIDED P. DO NOT INSTALL CONDUIT IN CAVITY BETWEEN CONCRETE BLOCK AND BRICK. CONDUIT SHALL NOT BE STUBBED UP

#### INTO THIS CAVITY OR ROUTED HORIZONTALLY IN CAVITY. SECTION 16030 - CONDUCTORS

- A. ACCEPTABLE MANUFACTURERS ARE: GENERAL, SOUTHWIRE, ESSEX OR APPROVED EQUAL
- B. ALL WIRING SHALL BE MANUFACTURED IN THE UNITED STATES.
- a. SHALL BE NOT LESS THAN INDICATED ON THE DRAWINGS AND NOT LESS THAN REQUIRED BY THE NEC.
- b. MINIMUM SIZE SHALL BE NO. 12 AWG COPPER PROVIDED THE MAXIMUM VOLTAGE DROPS IN THE CONTROL CIRCUITS WILL NOT ADVERSELY AFFECT THE OPERATION OF THE CONTROLS c. CONDUCTOR SIZES INDICATED ON THE DRAWINGS ARE FOR COPPER CONDUCTORS
- D. CONDUCTORS AND GROUND WIRES:
- ). SIZE NO. 8 AWG AND LARGER SHALL BE STRANDED. c. SIZE NO. 10 AWG AND SMALLER SHALL BE SOLID.
- E. CONDUCTOR INSULATION: CONDUCTOR INSULATION SHALL BE THE NEC TYPE THHN.
- F. WIRE SHALL BE FACTORY COLOR CODED IN SIZE NO. 6 AND SMALLER, COLOR SHALL BE BY INTEGRAL PIGMENTATION WITH A SEPARATE COLOR FOR EACH PHASE, NEUTRAL AND GROUNDING CONDUCTOR. COLOR CODE PER PHASE SHALL BE CONTINUOUS THROUGHOUT THE PROJECT.
- G. ALL WIRING SHALL BE IN CONDUIT UNLESS SPECIFICALLY NOTED OTHERWISE
- H. OUTER JACKETS SHALL BE COLOR CODED AS FOLLOWS:
- 1. THREE PHASE OR SINGLE PHASE CIRCUITS, 120/208 VOLTS:
- b PHASE B RED
- c. PHASE C BLUE d. NEUTRAL - WHITE
- e. INSULATED GROUND WIRE GREEN 2. THREE PHASE OR SINGLE PHASE CIRCUITS, 480/277 VOLTS:
- a PHASE A BROWN.
- b. PHASE B ORANGE. c. PHASE C - YELLOW.
- I. DEDICATED NEUTRALS SHALL BE PROVIDED FOR ALL MULTI-WIRE BRANCH CIRCUITS AND OUTER JACKET SHALL BE PROVIDED WITH APPROPRIATE COLORED TRACER.
- a. 120/208V: WHITE WITH RED TRACER, WHITE WITH BLUE TRACER, WHITE WITH BLACK TRACER. b. 277/480V: GRAY WITH BROWN TRACER, GRAY WITH ORANGE TRACER, GRAY WITH YELLOW TRACER.
- I. ONLY FOR LARGE POWER CABLES AND WIRES WHICH DO NOT HAVE COLOR CODED JACKETS: NO. 6 AND LARGER
- K. INSTALL BANDS OF ADHESIVE NON-FADING COLORED TAPE OR SLIP-ON BANDS OF COLORED PLASTIC TUBING OVER THE CABLES AND WIRES AT THEIR ORIGINATING AND TERMINATIONS POINTS AND AT ALL OUTLETS OF JUNCTION BOXES.

#### SECTION 16040 - OUTLETS

A. BOXES SHALL BE GALVANIZED PRESSED SHEET STEEL FOR ALL CONCEALED WORK.

L. COLOR SHALL BE PERMANENT AND SHALL WITHSTAND CLEANINGS.

- B. WHERE CONDUIT RUNS ARE EXPOSED. OUTLET SHALL BE OF THE CAST METAL TYPE.
- C. FOR CONCEALED WORK EACH BOX SHALL BE PROVIDED WITH A SQUARE CORNERED PLASTER RING.
- D. FACH SURFACE LIGHTING FIXTURE, RECEPTACLE AND SWITCH SHALL BE PROVIDED WITH FLUSH MOUNTED OUTLET BOX. ALL OUTLETS INSTALLED IN PANELS AND OTHER ARCHITECTURAL FEATURES SHALL BE CENTERED. THE LOCATION OF ANY OUTLET MAY BE MOVED AS MUCH AS 10'-0" BY THE ARCHITECT BEFORE THE OUTLET IS PLACED WITHOUT INCURRING ANY EXTRA COST. ALL DIMENSIONS REFER TO THE FINISHED FLOOR LINE. OUTLET BOXES SHALL BE PRESSED SHEET STEEL AND SHALL BE GALVANIZED FOR ALL CONCEALED WORK. WHERE CONDUIT RUNS ARE EXPOSED OUTLETS SHALL BE OF THE CAST METAL TYPE. E. BOXES SHALL BE FOR THE SERVICE AND THE TYPE OF OUTLET AND SHALL NOT BE LESS THAN 4" SQUARE AND 1-1/2"

DEEP EXCEPT WHERE OTHERWISE SPECIFIED. BOXES INSTALLED IN WALLS SHALL BE PROVIDED WITH A SQUARE

STRUCTURAL MEMBER OF THE BUILDING EITHER DIRECTLY OR BY USING A SUBSTANTIAL AND APPROVED METAL

SUPPORT. CONDUIT IS NOT AN APPROVED MEANS OF SUPPORT. BOXES INSTALLED IN WALL SHALL BE SUPPORTED EITHER DIRECTLY TO A STUD OR BETWEEN STUDS UTILIZING AN APPROVED BAR HANGER. IN NO CASE SHALL SWITCH BOX SUPPORT AND CLIPS USED FOR MOUNTING BOXES IN OLD WORK BE USED UNLESS SPECIFICALLY CALLED FOR. TOP OF OUTLET BOX SHALL BE LEVEL. D. ALL CEILING OR WALL RECESSED OUTLET BOXES OR THEIR ASSOCIATED PLASTER RINGS SHALL BE FLUSH WITH THE FINISHED SURFACE. USING COVERPLATE TO SECURE WIRING DEVICES OR SHIMMING THE DEVICE IS NOT. ACCEPTABLE.

CORNERED 1-1/2" <u>PLASTER RING INSTALLED FLUSH WITH SURFACE OF WALL.</u> COORDINATE DEPTH OF PLASTER RING REQUIRED FOR PARTICULAR WALL CONSTRUCTION. EACH OUTLET BOX ABOVE CEILING SHALL BE SUPPORTED FROM A

- CONTRACTOR SHALL EXERCISE DUE CARE WHEN CUTTING OPENING IN WALLS OR CEILINGS FOR OUTLET BOXES SO THAT OPENING SIZE WILL PERMIT THE PROPER INSTALLATION OF BOXES AND DEVICES. FIXTURE STUDS IN CEILINGS AND BRACKET OUTLETS SHALL BE BOLTED WITH STOVE BOLTS OR SHALL BE LOCKING TYPE OF STUD MOUNTING.
- E. REMOVE ONLY KNOCKOUTS AS REQUIRED AND PLUG UNUSED OPENINGS. USE THREADED PLUGS FOR CAST METAL BOXES AND SNAP-IN METAL COVERS FOR SHEET METAL BOXES.
- F. "THERE SHALL BE NO OUTLETS INSTALLED BACK TO BACK. A MINIMUM OF 4" SHALL SEPARATE EACH OUTLET."
- G. WHERE THE VOLUME ALLOWED PER CONDUCTOR EXCEEDS THAT ALLOWED IN TABLE 370-6(B) OF THE NEC FOR THE MINIMUM SIZE OUTLET SPECIFIED, A LARGER SIZE OUTLET BOX SHALL BE USED AND SHALL BE SIZED IN ACCORDANCE
- WITH THE TABLE NOTED ABOVE.
- H. OUTLET BOXES SHALL BE CLEAN AND FREE FROM DUST, PAINT, DIRT, PLASTER READY MIX JOINT COMPOUND AND /OR I. ALL JUNCTION BOX COVER PLATES SHALL BE LABELED IDENTIFYING THE SYSTEM IT CONTAINS. THE LABEL SHALL BE
- NEATLY HAND WRITTEN WITH A WIDE TIP PERMANENT NON-REMOVABLE MARKER AND BE EASILY IDENTIFIED. JUNCTION BOXES CONTAINING HIGH VOLTAGE WIRING SHALL INCLUDE PANEL AND CIRCUIT DESIGNATION (EX. HA - 1.3.5 OR LA -2,4,6). JUNCTION BOXES UTILIZED FOR LOW VOLTAGE SYSTEM SHALL BE LABELED IN ACCORDANCE WITH THE SYSTEM
- SECTION 16035 METAL CLAD CABLE (TYPE MC) AND FITTINGS
- A. ACCEPTABLE MANUFACTURERS ARE: SOUTHWIRE, AFC, NEXANS ENERGY B. ALL WIRING SHALL BE MANUFACTURED IN THE UNITED STATES.
- C. PROVIDE HEALTHCARE GRADE METAL-CLAD CABLE THAT COMPLIES WITH UL STANDARD 1569, NATIONAL ELECTRIC CODE AND THIS SPECIFICATION.
- D. METAL-CLAD CABLE SHALL CONSIST OF THHN INSULATED SOLID COPPER CIRCUIT CONDUCTORS, AN INSULATED SOLID COPPER EQUIPMENT GROUNDING CONDUCTOR, A MYLAR WRAPPING AROUND THE CONDUCTOR BUNDLE, AND A CLOSE FITTING ALUMINUM OR GALVANIZED STEEL OUTER SHEATH. THE EQUIPMENT GROUND WIRE SHALL BE OF THE SAME NSTRUCTION AND BE THE SAME SIZE AS THE CURRENT CARRYING CONDUCTORS, BARE ALUMINUM GROUNDING COUNDUTOR ARE NOT ACCEPTABLE. THE INSULATION COLOR SHALL BE GREEN.
- E. PROVIDE MINIMUM 12 AWG CONDUCTORS IN TYPE MC CABLES. F. PROVIDE MC CABLES WITH THE SAME CONDUCTOR COLOR CODING AS SPECIFIED IN SPECIFICATION SECTION 16030 -
- G. CONNECTORS SHALL BE STEEL SET SCREW TYPE WITH INSULATED THROAT AND LOCKNUT FOR NON-JACKETED METAL CLAD CABLE. COMPRESSION GLAND TYPE CONNECTORS SHALL BE USED FOR JACKETED METAL CLAD CABLE.

- H. METAL CLAD CABLE SHALL BE UTILIZED FOR 15 AND 20 AMPERE BRANCH CIRCUIT WIRING BEYOND THE FIRST DUTLET OR JUNCTION BOX. CONDUIT SHALL BE UTILIZED FOR THE HOMERUN FROM THE FIRST OUTLET OR JUNCTION BOX TO THE BRANCH CIRCUIT PANELBOARD.
- I. METAL CLAD CABLE SHALL BE UTILIZED IN INTERIOR, DRY LOCATIONS WHERE THEY WILL BE CONCEALED ABOVE CEILINGS, IN DRY-WALL PARTITIONS, IN EQUIPMENT ENCLOSURES, OR BELOW RAISED FLOORS.
- J. METAL CLAD CABLES SHALL BE SECURELY FASTENED IN PLACE AT INTERVALS OF NOT MORE THAN SIX FEET. WITH SUITABLE CLAMPS OR FASTENERS OF APPROVED TYPE, AND ALL VERTICAL CONDUITS SHALL BE PROPERLY
- K. METAL CLAD CABLE SHALL BE SUPPORTED IMMEDIATELY ON EACH SIDE OF A BEND AND NOT MORE THAT ONE (1) FOOT FROM AN ENCLOSURE WHERE A RUN OF METAL CLAD CABLE ENDS. BENDS SHALL BE MADE SO THAT THE CABLE WILL NOT BE DAMAGED.

#### SECTION 16050 - WIRING DEVICES AND DEVICE PLATE

c. FOUR WAY: HBL 1224.

GROUNDED U SLOT. GF 5262

- A FOR THE PURPOSE OF SELECTING QUALITY AND TYPE OF DEVICE FOUIPMENT MANUFACTURED BY HUBBELL HAS BEEN SPECIFIED. THE FOLLOWING MANUFACTURERS MEETING THIS SPECIFICATION ARE ACCEPTABLE: PASS AND
- B. SWITCHES: ALL WALL SWITCHES SHALL BE RATED 20 AMPERE, 120/277 VOLTS, HAVE SELF GROUNDING PROVISIONS, SIDE WIRING ONLY AND SHALL BE OF THE SILENT TYPE. COLOR SHALL BE GRAY a. SINGLE POLE: HBL 1221. b. THREE WAY: HBL 1223
- C. RECEPTACLE: ALL RECEPTACLES SHALL BE OF THE GROUNDING TYPE, OF THE CONFIGURATION SHOWN ON THE DRAWINGS AND SHALL BE FLUSH WALL MOUNTING TYPE. COLOR SHALL BE GRAY. a. STANDARD DUPLEX RECEPTACLE: 20 AMPERE, 125 VOLT, NEMA TYPE 5-20 R, 2 POLE, 3 WIRE, STRAIGHT BLADE, U-GROUNDING SLOT, HOSPITAL GRADE, HBL 5362. b. GROUND FAULT INTERRUPTER RECEPTACLE: 20 AMPERE, 125 VOLTS, NEMA TYPE 5-20R, 2-POLE, 3-WIRE WITH
- D. DEVICE PLATES: PLATES SHALL BE FURNISHED FOR ALL DEVICES AND OUTLETS INDICATED ON THE DRAWINGS (TELEPHONE, COMPUTER, TV, ETC.). ALL PLATES ON MASONRY WALLS SHALL BE OVERSIZED JUMBO TYPE.
- E. FLUSH MOUNTED PLATES: BEVELED TYPE WITH SMOOTH ROLLED OUTER EDGE, STAINLESS STEEL TYPE 302 WITH
- F. SURFACE BOX PLATES, BEVELED, GALVANIZED STEEL, PRESSURE FORMED FOR SMOOTH EDGE TO FIT BOX.
- G SWITCHES: a. SWITCHES SHALL BE CONNECTED TO THE LIVE SIDE OF THE CIRCUIT AND SHALL CONTROL ONLY THE OUTLETS b. CONDUCTORS SHALL BE LOOPED AROUND THE TERMINAL SCREW.

c. WHERE MORE THAN ONE SWITCH IS INDICATED IN THE SAME LOCATION SWITCHES SHALL BE GANG MOUNTED

UNDER A COMMON PLATE. d. CENTER LINE OF SWITCHES IN GENERAL, SHALL BE SET 3'-6" ABOVE THE FLOOR (OFF POSITION DOWN) AND SHALL CLEAR THE DOOR TRIM OR CORNER BY 4" OR CENTER THE SPACE OCCUPIED. e. ARCHITECTURAL PLANS SHALL BE CONSULTED BEFORE PLACING SWITCHES SO THEY WILL IN EVERY CASE BE LOCATED ON THE STRIKE SIDE OF THE DOOR AND CLEAR DOOR, CHAIR, WINDOW, AND BASEBOARD MOLDINGS. f SWITCHES SHALL BE SCREWED TIGHT TO THE BOXES AND SHALL NOT DEPEND ON THE COVER PLATE TO PULL

#### H. RECEPTACLES:

- a. CONDUCTORS SHALL BE LOOPED AROUND THE TERMINAL SCREWS, "DO NOT BACK WIRE DEVICES." b. RECEPTACLES SHALL BE GROUNDED BY THE GREEN WIRE BOND AND SHALL BE PIGTAILED AS SHOWN ON THE
- c. RECEPTACLES SHALL BE SCREWED TIGHT TO THE PLASTER RING OR OUTLET BOX AND SHALL NOT DEPEND ON THE DEVICE PLATE TO PULL THEM TIGHT.
- d. CENTER LINE OF GENERAL USE RECEPTACLES SHALL BE IN GENERAL, SET 18" ABOVE THE FLOOR WITH RECEPTACLE MOUNTED IN THE VERTICAL POSITION AND WITH GROUNDING POLE AT THE BOTTOM. e. COORDINATE RECEPTACLE HEIGHT WITH ARCHITECTURAL DRAWINGS AND LOCATE SO THAT BOTTOM OF RECEPTACLE PLATE SHALL BE 1" ABOVE COUNTER OR BACK SPLASH AND CLEAR ALL MOLDINGS.

f. CENTER LINE OF RECEPTACLES LOCATED ADJACENT TO LAVATORIES IN TOILETS SHALL BE SET 3'-6" ABOVE

- g. RECEPTACLES SERVING WATER COOLERS SHALL BE LOCATED WITHIN COOLER HOUSING OR AS CLOSE TO BOTTOM OF HOUSING AS POSSIBLE. CORD SERVING UNIT SHALL BE AS SHORT AS POSSIBLE. IN NO CASE SHALL CORD OR RECEPTACLE BE SEEN FROM NORMAL VIEWING ANGLE. h. ALL RECEPTACLES INSTALLED IN BATHROOMS OR TOILETS OR WITHIN 6 FEET OF LAVATORIES OR SINKS, OR ANY RECEPTACLE LOCATED ON BUILDING EXTERIOR SHALL BE GROUND FAULT CIRCUIT INTERRUPTER TYPE.
- a. PLATES SHALL BE LEVEL AND ALL EDGES SHALL BE IN FULL CONTACT WITH WALL b. PLATES SHALL BE FURNISHED FOR ALL DEVICES AND OTHER OUTLETS INDICATED ON THE DRAWINGS.

i. ALL RECEPTACLES INSTALLED IN KITCHENS OR OUTDOORS SHALL BE GFCI TYPE.

#### SURFACE MOUNTED OUTLETS. d. PLATES SHALL NOT BE USED TO KEEP DEVICES SECURE. e. PLATES SHALL BE CLEAN AND FREE FROM DUST, PLASTER OR PAINT AND SPOTS.

f. PLATE SHALL COVER OPENINGS AROUND OUTLETS.

OF SMALLER RATINGS ARE NOT ACCEPTABLE

SECTION 16060 - LIGHTING FIXTURES AND LAMPS A. LIGHTING FIXTURES SHALL BE SELECTED FROM THOSE FIXTURES INCLUDED IN THE FIXTURE SCHEDULE AS NOTED

c. INSTALL PLATES ON OUTLET BOXES AND JUNCTION BOXES IN UNFINISHED AREAS ABOVE CEILINGS AND ON

- ON THE DRAWINGS OR IN THE SPECIFICATIONS. B. FIXTURES SHALL BE SELECTED FROM THE FIXTURE SCHEDULE NOT ONLY BY CATALOG NUMBER BUT WITH CONSIDERATION TO MOUNTING, NUMBER AND TYPES OF LAMPS, AND REFERENCE NOTES AS CONTAINED IN THE FIXTURE SCHEDULE AND AS NOTED ON THE DRAWINGS AND IN THE SPECIFICATIONS. MANUFACTURERS NOT LISTED
- ON FIXTURE SCHEDULE OR ADDED BY ADDENDUM WILL NOT BE ACCEPTED.
- FOLLOWS: a. FIXTURE FLUSH MOUNTED IN EXPOSED TEE, SUSPENDED ACOUSTICAL TILE CEILINGS SHALL BE OF THE LAY-IN TYPE AND SHALL BE SUPPORTED AT DIAGONAL CORNERS OF THE FIXTURE. UTILIZING TWO (2) #14 GAUGE STEEL WIRES ATTACHED TO THE BAR JOIST OR OVERHEAD STRUCTURE. FLEXIBLE CONDUIT AND WIRING FROM OUTLET BOX TO FIXTURE SHALL BE MINIMUM 3/8"C., AND MINIMUM #14 THHN CONDUCTORS. FACTORY SUPPLIED WHIPS

b. SURFACE MOUNTED FIXTURES SHALL BE SUPPORTED BY LIGHT WEIGHT CHANNEL TO TWO MEMBERS OF THE

- CEILING SUSPENSION SYSTEM. TWO SUPPORT CHANNELS ARE REQUIRED. SURFACE MOUNTED FIXTURES MOUNTED ON SHEET ROCK OR PLASTER CEILINGS OR LOW DENSITY ACOUSTICAL TILE CEILINGS SHALL BE MOUNTED PER MANUFACTURER'S RECOMMENDATION. c. EXIT LIGHTS SHALL BE MOUNTED DIRECTLY TO THE OUTLET BOX AND IN CASE OF CEILING MOUNTED UNITS THE OUTLET BOX SHALL BE FLUSH WITH THE CEILING AND SHALL BE SUPPORTED BY A 1-1/2" CHANNEL SPANNING BETWEEN MAIN STRUCTURAL MEMBERS OF THE SUSPENSION SYSTEM. SECURE CHANNEL WITH METAL
- F. LIGHTING FIXTURES SHALL BE LOCATED AS SHOWN ON THE LIGHTING PLAN. IF FOR ANY REASON THIS IS
- MPOSSIBLE OR IMPRACTICAL, THE ARCHITECT SHALL BE NOTIFIED IMMEDIATELY FOR A DECISION AS TO THE BEST DIRECTION FOR THE SHIFT. G. UPON COMPLETION OF INSTALLATION, LIGHTING FIXTURES AND EQUIPMENT SHALL BE IN FIRST CLASS OPERATING ORDER, IN PERFECT CONDITION AS TO FINISH, FREE FROM DEFECTS. AT FINAL INSPECTION, FIXTURES SHALL BE COMPLETELY LAMPED. BE COMPLETE WITH REQUIRED DIFFUSERS. REFLECTORS. SIDE PANELS. LOUVERS OR THE OTHER COMPONENTS NECESSARY TO COMPLETE FIXTURES. ALL FIXTURES AND EQUIPMENT SHALL BE CLEAN AND

#### FREE FROM DUST, INSECTS, PLASTER OR PAINT SPOTS. ANY REFLECTORS, DIFFUSERS, SIDE PANELS OR OTHER PARTS BROKEN PRIOR TO FINAL INSPECTION SHALL BE REPLACED BY CONTRACTOR.

APPROVED METAL ROD OR BRACE.

- SECTION 16070 DISCONNECT SWITCHES
- F. ACCEPTABLE MANUFACTURERS ARE: SQUARE "D" COMPANY, G. E., SIEMENS, CUTLER HAMMER G. DISCONNECT SWITCHES SHALL BE PROVIDED FOR ALL MOTORS AND STRIP HEATERS LOCATED OUT OF SIGHT OF MOTOR CONTROLLER, AND WHERE SPECIFICALLY INDICATED ON THE DRAWINGS. DISCONNECT SWITCHES SHALL DISCONNECT ALL UNGROUNDED CONDUCTORS. WHEN EXPOSED TO WEATHER, ENCLOSURE SHALL BE NEMA - 3R. SWITCHES SHALL BE INSTALLED TO BE FULLY ACCESSIBLE IN ACCORDANCE WITH ARTICLE 110-26 OF THE NATIONAL
- H. ALL DISCONNECTS SHALL BE HEAVY DUTY TYPE AND SHALL BE EQUIPPED WITH FACTORY INSTALLED EQUIPMENT
- GROUND KIT BONDED TO THE CAN FOR GROUNDING PURPOSES I. ALL DISCONNECTS SHALL BE FUSIBLE TYPE, FUSED IN ACCORDANCE WITH THE NAME PLATE DATA ON THE UNIT. DISCONNECTS SERVING WATER HEATERS OR RESISTANCE HEAT STRIPS SHALL BE FUSED AT 125% OF THE FULL LOAD AMPS OF THE UNIT
- J. INSTALL FUSES SO THAT AMPERE RATING CAN BE READ WITHOUT HAVING TO REMOVE FUSES.
- K. ALL FUSES SHALL BE AS NOTED IN SECTION 16015.
- L. DISCONNECTS SHALL BE IDENTIFIED AS REQUIRED UNDER SECTION 16120. SECTION 16100 - PULL BOXES AND JUNCTION BOXES AND FITTINGS
- A. BOXES SHALL BE PROVIDED IN THE RACEWAY SYSTEMS WHEREVER REQUIRED FOR THE PULLING OF WIRES AND THE MAKING OF CONNECTIONS. B. PULL BOXES OF NOT LESS THAN THE MINIMUM SIZE REQUIRED BY THE NATIONAL ELECTRICAL CODE ARTICLE 370 SHALL BE CONSTRUCTED OF CODE-GAUGE GALVANIZED SHEET STEEL. BOXES SHALL BE FURNISHED WITH SCREW-FASTENED COVERS. COVERS ON FLUSH WALL MOUNTED BOXES IN WELL APPOINTED AREAS (OFFICES RECEPTION, CLASSROOMS, MEDIA CENTER, ETC) SHALL BE MINIMUM 1/16 302 STAINLESS STEEL. BOXES LOCATED
- C. BOXES SHALL BE SECURELY AND RIGIDLY FASTENED TO THE SURFACE OF WHICH THEY ARE MOUNTED OR SHALL BE SUPPORTED FROM STRUCTURAL MEMBER OF THE BUILDING EITHER DIRECTLY OR BY USING A SUBSTANTIAL AND

ON THE EXTERIOR OF THE BUILDING SHALL BE WATERTIGHT. COVERS SHALL BE SECURED WITH TAMPER PROOF

D. ALL BOXES SHALL BE SO INSTALLED THAT THE WIRING CONTAINED IN THEM CAN BE RENDERED ACCESSIBLE WITHOUT REMOVING PART OF THE BUILDING.

E. WHERE SEVERAL CIRCUITS PASS THROUGH A COMMON PULL BOX, THE CIRCUITS SHALL BE TAGGED TO INDICATE

- CLEARLY THEIR ELECTRICAL CHARACTERISTICS, CIRCUIT NUMBER AND DESIGNATION. F. ALL JUNCTION BOXES LARGER THAN 4" X 4" FLUSH MOUNTED IN WALL SHALL HAVE OVERLAPPING COVER PLATE TO COVER ROUGH-IN OPENINGS.
- SECTION 16110 GROUNDING A THE WORK REQUIRED UNDER THIS SECTION OF THE SPECIFICATIONS CONSISTS OF FURNISHING INSTALLATION AND CONNECTIONS OF THE BUILDING SECONDARY GROUNDING SYSTEMS. EXTERIOR BRANCH CIRCUIT WIRING AND FEEDER CONDUCTORS EXTENDED BEYOND THE BUILDING ARE INCLUDED. THE BUILDING ELECTRICAL SYSTEM SHALL BE A 3 PHASE, 4 WIRE GROUNDED WYE DELTA SYSTEM SUPPLEMENTED WITH EQUIPMENT GROUNDING SYSTEM FOUIPMENT GROUNDING SYSTEM SHALL BE ESTABLISHED WITH FOUIPMENT GROUNDING CONDUCTORS
- B. ALL MATERIALS SHALL BE UL LISTED AND BEAR A UL LABEL.

THE USE OF METALLIC RACEWAYS FOR EQUIPMENT GROUNDING IS NOT ACCEPTABLE

C. GROUNDING ELECTRODE CONDUCTOR SHALL BE BARE OR GREEN INSULATED COPPER CONDUCTOR SIZED AS

- D. EQUIPMENT GROUNDING CONDUCTORS SHALL BE GREEN INSULATED TYPE THHN CONDUCTORS SIZED AS INDICATED ON THE DRAWINGS. WHERE SIZE IS NOT INDICATED ON THE DRAWINGS, CONDUCTOR SIZE SHALL BE DETERMINED
- E. EACH RECEPTACLE AND SWITCH DEVICE SHALL BE FURNISHED WITH A GROUNDING SCREW CONNECTED TO THE METALLIC DEVICE FRAME. BOND EQUIPMENT GROUNDING CONDUCTOR TO EACH OUTLET BOX. FOR ISOLATED GROUND RECEPTACLES. BOND EQUIPMENT GROUNDING CONDUCTOR TO BOX. AND ISOLATED GROUND CONDUCTOR

FROM THE NATIONAL ELECTRICAL CODE TABLE OF SIZES OF EQUIPMENT GROUNDING CONDUCTORS.

- TO DEVICE GROUNDING SCREW. F. GROUND ALL NON-CURRENT CARRYING PARTS OF THE FLECTRICAL SYSTEM LE. WIREWAYS EQUIPMENT ENCLOSURES AND FRAMES, JUNCTION AND OUTLET BOXES, MACHINE FRAMES AND OTHER CONDUCTIVE ITEMS IN
- CLOSE PROXIMITY WITH ELECTRICAL CIRCUITS, TO PROVIDE A LOW IMPEDANCE PATH FOR POTENTIAL GROUNDED G. GROUNDING ELECTRODE CONNECTIONS TO STRUCTURAL STEEL, REINFORCING BARS, GROUND RODS, OR WHERE NDICATED ON THE DRAWINGS SHALL BE WITH CHEMICAL EXOTHERMIC WELD CONNECTION DEVICES RECOMMENDED

FOR THE PARTICULAR CONNECTION TYPE. CONNECTIONS TO PIPING SHALL BE WITH UL LISTED MECHANICAL GROUND

- H. BONDING SHALL BE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE.
- INSTALL GROUND RODS WHERE INDICATED ON THE DRAWINGS WITH THE TOP OF THE GROUND RODS 12" BELOW
- J. GROUNDING CONDUCTORS SHALL BE PROVIDED IN ALL BRANCH CIRCUIT RACEWAYS AND CABLES. GROUNDING CONDUCTORS SHALL BE THE SAME AWG SIZE AS BRANCH CIRCUIT CONDUCTORS.
- K. A GROUNDING CONDUCTOR SHALL BE INSTALLED IN ALL FLEXIBLE CONDUIT INSTALLATIONS. FOR BRANCH CIRCUITS, GROUNDING CONDUCTOR SHALL BE SIZED TO MATCH BRANCH CIRCUIT CONDUCTORS.
- L. A FEEDER SERVING SEVERAL PANELBOARDS SHALL HAVE A CONTINUOUS GROUNDING CONDUCTOR WHICH SHALL BE CONNECTED TO EACH RELATED CABINET GROUNDING BAR.

#### SECTION 16120 - EQUIPMENT IDENTIFICATION A. LAMINATED PLASTIC PLATES WITH 3/16" HIGH WHITE LETTER ETCHED ON BLACK BACKGROUND.

- B. PLATES SHALL BE PERMANENTLY MOUNTED UTILIZING POP RIVETS OR A PERMANENT MASTIC/EPOXY
- PAINTED. STENCILED OR INDENTED TAPE IDENTIFICATION IS NOT ACCEPTABLE D. ALL ELECTRICAL APPARATUS SUCH AS WIRING TROUGHS, PANELBOARDS, INDIVIDUAL CIRCUIT BREAKERS
- IDENTIFICATION SHALL MATCH LABELING SHOWN ON PLANS. A "<u>STEEL</u>" CIRCUIT DIRECTORY FRAME PERMANENTLY ATTACHED AT FACTORY (NOT GLUED), AND A DIRECTORY CARD WITH A PLASTIC COVERING SHALL BE PROVIDED ON THE INSIDE OF EACH PANEL DOOR. THE DIRECTORY SHALL BE TYPED TO IDENTIFY THE LOAD FED BY EACH CIRCUIT AND THE AREAS SERVED. SPACES OR ROOM NUMBERS SHOWN ON THE DRAWINGS ARE NOT NECESSARILY THE FINAL NUMBERS TO BE ASSIGNED TO THESE AREAS. THE

TRANSFORMERS AND DISCONNECT SWITCHES SHALL HAVE LAMINATED PLASTIC IDENTIFICATION PLATES.

- CONTRACTORS SHALL BEFORE COMPLETION OF THE PROJECT OBTAIN FROM THE ARCHITECT FINAL SPACE OR ROOM NUMBERS SO THAT IT CAN BE TYPED ONTO DIRECTORY. F. CIRCUIT BREAKERS AND DISCONNECTS SHALL IDENTIFY DESIGNATION OF THE EQUIPMENT SERVED, CIRCUIT AND
- PANEL FROM WHICH IT IS SERVED AS WELL AS VOLTAGE/PHASE OF CIRCUIT G. ON ALL PANELBOARDS THE EXTERIOR IDENTIFICATION PLATE SHALL MATCH THAT ON THE DRAWINGS AND THE PANEL

#### AND CIRCUIT NUMBER SERVING THE PANEL SHALL BE DESIGNATED WITHIN THE PANEL SECTION 16130 - DATA OR VOICE CONDUIT AND OUTLET SYSTEM

- A. PROVIDE A COMPLETE SYSTEM OF CONDUITS AND OUTLET BOXES FOR DATA AND VOICE WIRING. EACH DATA OR VOICE OUTLET SHALL HAVE A CONDUIT ROUTED FROM THE FLUSHED RECESSED OUTLET BOX UP TO THE ACCESSIBLE CEILING SPACE ABOVE OR TO CRAWL SPACE BELOW. TURN CONDUIT OUT ABOVE CEILING WITH A 90° HORIZONTAL ELBOW AND TERMINATE WITH AN INSULATED BUSHING. WHERE CEILING FINISH IS EXPOSED STRUCTURE (I.E. NO ACOUSTICAL TILE CEILING), EXTEND CONDUIT TO AN AREA WITH AN ACCESSIBLE GYPBOARD/ACOUSTICAL CEILING
- PROVIDE NYLON PULL STRING IN CONDUIT. B. ALL CONDUIT AND OUTLET BOXES SHALL BE FOR DATA AND VOICE CABLE ONLY. JOINT USE WITH SOUND SYSTEMS,
- FIRE, TELEPHONE, ETC. IT IS NOT ACCEPTABLE. C. LOCATION OF OUTLETS SHALL BE AS SHOWN ON THE DRAWINGS.
- D. HEIGHT OF WALL OUTLETS SHALL BE AS NOTED ON THE DRAWINGS. ALL WALL OUTLET BOXES IN NEW CONSTRUCTION SHALL BE TWO GANG TYPE, 4" X 4" X 2 1/8" DEEP, WITH SINGLE GANG PLASTER RINGS, PLASTER RINGS SHALL BE FLUSH WITH FINISH OF WALL. COORDINATE DEPTH OF PLASTER RING REQUIRED WITH TYPE OF WALL CONSTRUCTION.
  - E. ALL CONDUIT SHALL BE CONCEALED UNLESS OTHERWISE NOTED.

#### F. PROVIDE 302 JUMBO STAINLESS STEEL BLANK WALL PLATES FOR ALL OUTLETS NOT CABLED.

SECTION 16140 - FIRE ALARM SYSTEM THIS SPECIFICATION COVERS THE INSTALLATION OF A COMPLETE ELECTRONICALLY OPERATED FIRE ALARM SYSTEM THE SYSTEM WITHIN THE BUILDING SHALL BE ELECTRICALLY SUPERVISED AND SHALL INCLUDE, BUT NOT BE LIMITED

TO, THE FOLLOWING COMPONENTS: COMBINATION VIBRATING HORNS AND FLASHING LIGHT, CONTROL EQUIPMENT,

- CONDUIT, AND WIRING. B. THE ALARM EQUIPMENT AND ALL WIRING SHALL BE INSTALLED AND INTERCONNECTED BY A FACTORY CERTIFIED INSTALLER AND PLACED IN WORKING ORDER. THE NAME OF THE MANUFACTURER AND SERIAL OR IDENTIFICATION NUMBERS SHALL APPEAR ON ALL MAJOR COMPONENTS. ELECTRICAL SUPERVISION OF THE SYSTEM SHALL CONFORM TO PROVISIONS OF ARTICLE 240. NFPA STANDARD 72. CORRESPONDING PARTS OF ALL SIMILAR TYPE EQUIPMENT UNITS SHALL BE INTERCHANGEABLE, AND LOCKS FOR ALL CABINETS SHALL BE KEYED ALIKE. ALL DEVICES. EQUIPMENT AND COMBINATION THEREOF SHALL BE OF THE MANUFACTURER'S CURRENT PRODUCTION. ALL DMPONENT PARTS OF THE SYSTEM AND THE CONTROL UNIT SHALL BE APPROVED FOR THE PURPOSE INTENDED
- THE STAMP, LABEL, SEAL OR CERTIFICATE OF THE UNDERWRITER'S LABORATORIES OR THE FACTORY MUTUAL LABORATORIES SHALL BE CONSIDERED AS ACCEPTABLE EVIDENCE OF SUCH APPROVAL. C. FIRE ALARM SUBCONTRACTOR SHALL SUBMIT A CERTIFICATION STATING THAT HE IS AN AUTHORIZED

MAINTAINS A FULLY EQUIPPED AND STOCKED SERVICE SHOP AND SHALL RESPOND TO SERVICE WITHIN 12 NORMAL

THREE COPIES OF COMPLETE INSTRUCTIONS FOR THE OPERATION. INSPECTION, TESTING AND MAINTENANCE OF THE SYSTEM INCLUDING WIRING DIAGRAMS AND REPLACEMENT PARTS LIST SHALL BE FURNISHED UPON FINAL ACCEPTANCE OF THE SYSTEM. ALSO PROVIDE ALL SPECIAL TOOLS THAT ARE NECESSARY FOR THE MAINTENANCE OF THE EQUIPMENT AND INCLUDE ONE SET OF FUSES FOR EACH TYPE AND SIZE.

E. A QUALIFIED FIRE ALARM TECHNICIAN SHALL INSTALL, ADJUST AND TEST THE EQUIPMENT. THE TECHNICIAN SHALL BE

- QUALIFIED BY TRAINING AND EXPERIENCE IN THE INSTALLATION AND OPERATION OF THE FIRE ALARM SYSTEM SPECIFIED. THE TECHNICIAN SHALL INSTRUCT OPERATING PERSONNEL IN THE OPERATION, ADJUSTMENT AND MAINTENANCE OF THE SYSTEM. A STATEMENT SIGNED BY THE PERSON OR PERSONS INSTRUCTED SHALL BE
- F. PROVIDE A WRITTEN CERTIFICATION THAT THE SYSTEM IS IN COMPLETE AND PROPER WORKING ORDER AND IN COMPLIANCE WITH ALL CODES.

G. OPERATION OF ANY MANUAL OR AUTOMATIC INITIATING DEVICE SHALL CAUSE A GENERAL ALARM TO SOUND.

H. ALSO CIRCUITS AND AUDIBLE SOUNDING DEVICES SHALL BE ELECTRICALLY SUPERVISED. IN THE EVENT OF AN OPEN

PROVIDE ADDITIONAL POWER SUPPLY MODULES AS REQUIRED. PROVIDE 120 VOLT CIRCUIT FOR POWER SUPPLY AND

SUPPLIED TO THE ARCHITECT PRIOR TO FINAL OPERATION.

CIRCUIT OR GROUND IN THE SYSTEM, LOSS OF OPERATION OF SUPERVISORY POWER, OR OTHER SUPERVISEI COMPONENT FAILURE, A TROUBLE SIGNAL SHALL BE ACTUATED UNTIL THE SYSTEM IS RESTORED TO NORMAL. A SILENCING SWITCH SHALL BE PROVIDED FOR SILENCING THE TROUBLE ALARM. THE SYSTEM SHALL OPERATE FROM ONE 120 VOLT CIRCUIT.

SERVE FROM NEAREST 120/208 VOLT PANEL. LABEL PANELBOARD SCHEDULES ACCORDINGLY.

J. FIRE ALARM SUBCONTRACTOR SHALL DETERMINE THE LOAD BASED ON THE FIRE ALARM DEVICE LAYOUT AND

LIGHT FOR BOTH AUDIBLE AND VISUAL SIGNALING OR STROBE LIGHT FOR VISUAL SIGNALING ONLY. WHERE SHOWN ON DRAWINGS PROVIDE COMBINATION SPEAKER/STROBE FOR VOICE EVACUATION OPERATION. MINIMUM SOUND LEVEL INDOORS AT 10 FEET SHALL BE 90 DB. MAXIMUM CURRENT DRAW FOR HORN AND STROBE LIGHT OF 0.063 AMPS, NOMINAL VOLTAGE OF 24 D.C. UNITS SHALL BE FLUSH WALL MOUNTED 6'-8" ABOVE THE FINISHED FLOOR A POINTS NOTED ON THE DRAWINGS. MINIMUM CANDELA LEVEL SHALL BE 75 CANDELA. CANDELA LEVEL FOR AREAS

K. SIGNAL DEVICE: PROVIDE COMBINATION LOW POWER D.C. STROBE/HORN WITH HIGH INTENSITY FLASHING STROBE

- UNDER 300 SQUARE FEET MAY BE 15. ALL STROBES IN A COMMON AREA SHALL BE SYNCHRONIZED. WHERE SIGNALING DEVICES ARE LOCATED IN A GYMNASIUM OR AREA SUSCEPTIBLE TO DAMAGE. CONTRACTOR SHALL PROVIDE A WIREGUARD. .. EACH FIRE ALARM CIRCUIT SHALL BE PROTECTED FROM LIGHTNING BY INSTALLING SURGE PROTECTION DEVICES
- ADDITION TO PROTECTION AT CONTROL PANEL. M. ALL CONDUCTORS SHALL BE INSTALLED IN CONDUIT. CONDUIT INSTALLATION SHALL BE AS COVERED UNDER SECTION

EITHER INTERNALLY OR EXTERNALLY, CIRCUITS RUN BETWEEN BUILDINGS SHALL BE INDIVIDUALLY PROTECTED IN

- NUMBER AND SIZE OF CONDUCTORS SHALL BE AS REQUIRED BY MANUFACTURER OF SYSTEM BEING INSTALLED. ANY CABLE RUN IN CONDUIT BELOW GRADE SHALL BE MOISTURE PROOF, CABLE SHALL BE EQUAL TO WEST PENN AQUA
- LOCATION, DEVICE ADDRESS, AND DEVICE DESCRIPTOR. PANEL SHALL BE FULLY PROGRAMMED TO DENOTE LOCATION OF ADDRESSABLE DEVICE. PROVIDE A WRITTEN REPORT DENOTING THAT ALL FIRE ALARM DEVICES HAVE BEEN TESTED AND ARE OPERABLE.

16020 OF THESE SPECIFICATIONS.

SECTION 16220 - CONSTRUCTION REVIEWS INSPECTION AND TESTING A. THE ARCHITECT OR HIS REPRESENTATIVE SHALL OBSERVE AND REVIEW THE INSTALLATION OF ALL ELECTRICAL

INSTALLATION AND OPERATION BY THE CONTRACTOR IN THE PRESENCE OF THE ARCHITECT OR HIS

E. FOLLOWING IS A LIST OF ITEMS THAT THE CONTRACTOR MUST DEMONSTRATE TO THE ARCHITECT OR HIS

O. AT TIME OF FINAL INSPECTION, CONTRACTOR SHALL TURN OVER A RED-LINED SET OF PLANS SHOWING DEVICE

SYSTEMS SHOWN ON THE DRAWINGS AND AS SPECIFIED HEREIN. B. BEFORE COVERING OR CONCEALING ANY CONDUIT BELOW GRADE OR SLAB. IN WALL OR ABOVE CEILING, THE CONTRACTOR SHALL NOTIFY THE ARCHITECT SO THAT HE CAN REVIEW THE INSTALLATION

C. AT THE TIME OF THE CONTRACTOR'S FINAL INSPECTION, ALL SYSTEMS SHALL BE CHECKED AND TESTED FOR PROPER

D. THE CONTRACTOR SHALL FURNISH THE PERSONNEL, TOOLS AND EQUIPMENT REQUIRED TO INSPECT AND TEST ALL

REPRESENTATIVE AS COMPLYING WITH THE PLANS AND SPECIFICATIONS. PLEASE NOTE THAT THIS LIST DOES NOT

- NECESSARILY REPRESENT ALL ITEMS TO BE COVERED IN THE FINAL INSPECTION, BUT SHOULD GIVE THE CONTRACTOR AN IDEA OF WHAT IS TO BE REVIEWED. a. DEMONSTRATE THAT MAIN SERVICE EQUIPMENT IS PROPERLY BONDED
- DIRECTORY FOR CIRCUIT IDENTIFICATION AND THAT THEY ARE FREE OF TRASH c. DEMONSTRATE THAT ALL CONDUITS ARE SUPPORTED AS REQUIRED BY THE NATIONAL ELECTRICAL CODE. d. DEMONSTRATE THAT ALL OUTLET BOXES ABOVE OR ON THE CEILING ARE SUPPORTED AS REQUIRED BY THE NATIONAL ELECTRICAL CODE. e. DEMONSTRATE THAT OUTLET BOXES IN WALL OR CEILINGS OF COMBUSTIBLE MATERIALS ARE FLUSH WITH

b. DEMONSTRATE THAT ALL PANELS HAVE BREAKERS AS SPECIFIED, GROUND BAR, COPPER BUS, TYPED

f. DEMONSTRATE THAT ALL DEVICES ARE PROPERLY SECURED TO BOXES, THAT DEVICE PLATES ARE PROPERLY ALIGNED AND ARE NOT BEING USED TO SECURE DEVICE.

SURFACE OF WALL OR CEILING, AND THAT OUTLET BOXES IN WALLS OR CEILINGS OF NON-COMBUSTIBLE

MATERIALS ARE SO INSTALLED THAT THE FRONT EDGE OF THE BOX OR PLASTER RING IS NOT SET BACK MORE

 DEMONSTRATE THAT ALL 125 VOLT RECEPTACLES ARE PROPERLY CONNECTED. n. DEMONSTRATE THAT ALL FIXTURES HAVE SPECIFIED LAMPS, BALLAST AND LENS, AND THAT THEY ARE SUPPORTED AS REQUIRED BY THE NATIONAL ELECTRICAL CODE OR AS CALLED FOR ON THE DRAWINGS OR IN THE SPECIFICATIONS. DEMONSTRATE THAT ALL DISCONNECTS REQUIRING FUSES ARE FUSED WITH THE PROPER SIZE AND TYPE, AND THAT ALL DISCONNECTS ARE PROPERLY IDENTIFIED.

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**KEY PLAN:** 

REVISIONS: Description

**PROJECT 50003278 USC-AIKEN RUTH PATRICK CLASSROOM** 

**RENOVATIONS** 

**USC AIKEN** 

471 UNIVERSITY PKWY, AIKEN, SC 29801

**SPECIFICATIONS** 

**ELECTRICAL** 

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DRAWING NO